NOTE TO READER

This document was published in December 1998. Between then and January 2003, several changes in ODP policy and procedure have occurred. For example, safety guidelines have been significantly updated by ODP/TAMU, and a new ODP Sample, Data and Publications policy has been implemented. As such, please use this document with this in mind. For most current practices, see the ODP Policy Manual and the appendices therein, which contain the new safety and sampling/data/publication policy.

A drawing of the new top lab space and facilities therein is included in the tour of the JOIDES Resolution on the ODP/TAMU web page (www-odp.tamu.edu/public/level7). There is also a floor plan of this space in the ODP/TAMU Shipboard Laboratory Safety and Hazard Communication Compliance Policy (p.68, Appendix O – ODP Policy Manual).

Additionally, page numbers listed in the Table of Contents and throughout this document are not accurate. They make reference to the format used in the 1998 document.

For further information, contact ODP representatives in JOIDES, JOI, TAMU, or LDEO.

JOIDES Journal

Joint Oceanographic Institutions for Deep Earth Sampling

University of California, San Diego,
Scripps Institution of Oceanography

People's Republic of China

Columbia University,
Lamont-Doherty Earth Observatory

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

France: Centre National de la Recherche Scientifique

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 Science

Pacific Rim Consortium: Australia, Canada, Korea,
Chinese Taipei

University of Rhode Island,
Graduate School of Oceanography

Rutgers, The State University of New Jersey
Institute of Marine and Coastal Sciences

Texas A&M University,
College of Geosciences

University of Texas,
Institute for Geophysics

United Kingdom: Natural Environment Research Council

University of Washington,
College of Ocean and Fishery Sciences

Table of Contents

Preface

Evolution of scientific ocean drilling and the Ocean Drilling Program has resulted in many changes in the organization and facilities.

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.

JOIDES Resolution		
Year and Place of Construction	1978	Halifax, Nova Scotia, Canada
Laboratories and other scientific equipment installed	1984	Pascagoula, Mississippi
Gross Tonnage		7539
Net Tonnage		3839
Engines/Generators		Seven 16 cyl. diesel 5 @ 2100 kw (3000 hp) 2 @ 1500 kw (2200 hp)
Length		143 m
Beam		21 m
Derrick		62 m
Speed		11 knots
Cruising Range		120 days
Scientific and Technical Party		50
Ship's Crew		65
Laboratory Space		1,115 sq. m
Drill String		9,100 m

ORGANIZATION AND STRUCTURE:
Ocean Drilling Program

The Ocean Drilling Program (ODP) is an international partnership of scientists and research institutions organized to explore Earth's history and structure as recorded in the ocean basin through a program of seafloor drilling and coring, and downhole measurements and experimentation. ODP provides sediments and rock samples ("cores"); shipboard and shore-based facilities for the study of these samples; downhole geophysical and geochemical measurements ("wireline logging"); and opportunities for special experiments to determine in situ conditions beneath the seafloor. ODP studies lead to a better understanding of the structure and composition of the Earth's crust, the processes of plate tectonics, the environmental conditions in ancient oceans, and climatic changes through time.

ODP is funded by the United States National Science Foundation (NSF) and by international partners, which currently include: Pacific Rim Consortium (representing Australia, Canada Chinese Taipei and Korea), European Science Foundation (representing twelve countries), Germany, France, Japan, United Kingdom, and China. A prerequisite for participation in ODP is a Memorandum of Understanding (MOU) between NSF and the responsible funding agency of a partner nation. The MOU (see Appendix I) outlines the relationship between NSF and the partner agency, and defines membership level. Membership levels within ODP consist of Full Membership and three levels of Associate Membership (see Appendix II).

The ODP office at NSF (which falls under the Oceanographic Centers and Facilities Section of the Ocean Sciences Division of the Directorate for Geosciences) is responsible for overseeing the Program and administering commingled funds from the international partners. The ODP Council, representing all of the partners, provides a forum for exchange of views among member nations, and reviews financial, managerial and other matters regarding the overall support of ODP. The Director of the Oceanographic Centers and Facilities Section of NSF acts as standing chairperson of the Council.

Overall scientific planning for ODP is provided by the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), an international organization of advisory committees and panels. A report from the Conference on Scientific Ocean Drilling (COSOD), held in November 1981, is the scientific basis and justification for ODP. The first COSOD report identified twelve major scientific themes for which JOIDES continues to develop specific drilling plans. The report of the second COSOD meeting (COSOD-II), held in July 1987, provides the framework for scientific ocean drilling through the 1990s. The ODP Long Range Plan (published in 1990) distilled the COSOD themes, JOIDES panel white papers, and other scientific and technical advice into a scientific and engineering strategy through the year 2002. The new ODP Long Range Plan, published in 1996, updates and extends the 1990 Long Range Plan.

Overall program management is provided by Joint Oceanographic Institutions, Inc. (JOI) as the prime contractor to NSF. The management structure for the Ocean Drilling Program is shown in Figure 1. JOI, a consortium of United States (US) oceanographic institutions, was established to focus its collective capabilities on large oceanographic research projects. In 1998, the JOI Board of Governors elected to open up

the consortium to new members, so it is likely that there will be additions to the membership. The current 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 Science
- University of Rhode Island, Graduate School of Oceanography
- Rutgers, The State University of New Jersey, Institute of Marine and Coastal Studies
- Texas A&M University, College of Geosciences
- University of Texas, Institute for Geophysics
- University of Washington, College of Ocean and Fishery Sciences, Woods Hole Oceanographic Institution

JOI operates under the direction of a Board of Governors consisting of one representative from each US member institution, and is responsible for managing the scientific planning and operations for ODP, ensuring that the scientific advice provided by JOIDES is implemented in a cost-effective manner by program subcontractors. JOI is also responsible for supporting the US science community's participation in ODP through a separate NSF program called the US Science Support Program (USSSP).

JOI contracts with Texas A&M Research Foundation to serve as Science Operator and with Lamont-Doherty Earth Observatory (LDEO) to provide logging and other wireline services, as well as Data Bank Services. The Science Operator is responsible for operation of the drillship, JOIDES Resolution, and associated activities of cruise staffing, logistics, engineering development and operations, shipboard laboratories, curation and distribution of core samples and data; publication of scientific results; and assisting with ODP public relations. The Wireline Services Operator is responsible for the acquisition, processing, and presentation of a full suite of geophysical and geochemical logging measurements. Basic logging services are provided by Schlumberger under contract to ODP-LDEO. The ODP Site Survey Data Bank (SSDB) houses regional geophysical and site survey data submitted in support of proposed drilling programs. The SSDB assists in the planning and development of ODP programs by (1) compiling packages of available data for each ODP program for review by various JOIDES advisory panels; and (2) supplying each shipboard party with the geophysical data necessary for proper conduct of scheduled drilling cruises.

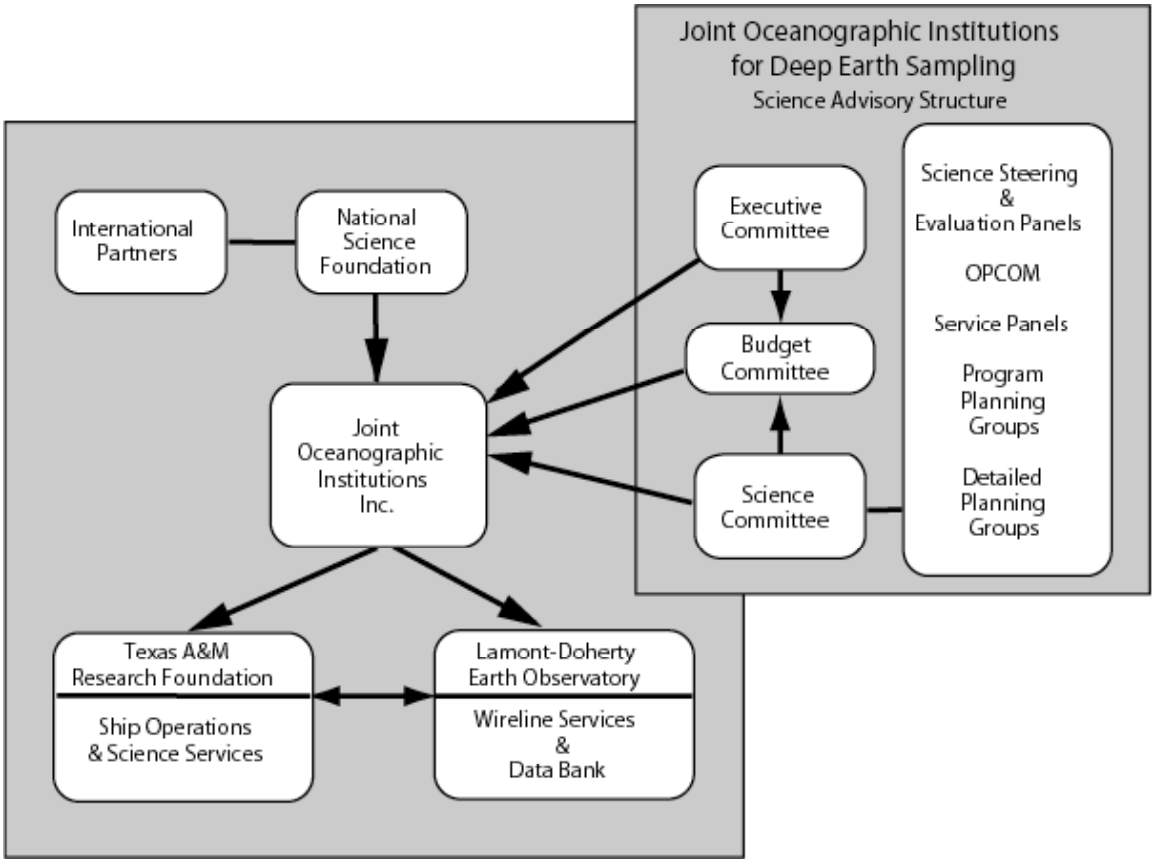

Figure 1. Management Structure of the Ocean Drilling Program

SCIENCE PLANNING:
JOIDES Science Advisory Structure

In 1964, four institutions (Scripps Institution of Oceanography -University of California, Lamont-Doherty Earth Observatory - Columbia University, Rosenstiel School of Marine and Atmospheric Science - University of Miami, 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 sea floor through a systematic program of ocean drilling, known as the Deep Sea Drilling Project (DSDP). In 1968, the University of Washington joined the four original institutions, and in 1975, the University of Hawaii, University of Rhode Island, Oregon State University, and Texas A&M University became members. The University of Texas joined the consortium in 1982 and Rutgers became a member in 1998.

International participation in the deep sea drilling effort has become 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.

Currently, four of these nations are members of JOIDES and active in the Ocean Drilling Program (ODP) which succeeded DSDP in 1983. Canada and the European Science Foundation (then represented by 12 European countries) became members in 1983. In 1988, Australia became a participant through the establishment of the Canada-Australia Consortium; Korea and Chinese Taipei joined the consortium in 1996. China joined ODP in March 1998 as an Associate Member.

International member institutions of JOIDES are:

- Pacific Rim Consortium: Natural Sciences and Engineering Research Council, Department of Natural Resources and Department of Fisheries and Oceans, Canada; Australian Geological Survey Organization (AGSO), Australia; National Taiwan University, Chinese Taipei; Korean Institute of Geology, Mining and Materials (KIGAM), Korea
- Bundesanstalt für Geowissenschaffen und Rohstoffe (BGR), Germany
- People's Republic of China
- Centre National de la Recherche Scientifique (CNRS), 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, Iceland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and Turkey. JOIDES is responsible for establishing the scientific objectives of ODP through an Advisory Structure of panels and committees. In addition to the US institutions and the international partners, scientists and engineers from many universities, government and private research laboratories, and private industries also participate in the JOIDES Advisory Structure and the Ocean Drilling Program.

The JOIDES Science Advisory Structure

Providing scientific and technological advice to a program as complex as the Ocean Drilling Program while satisfying the diverse scientific communities and the funding agencies of the ODP partners is a challenging task. The ODP Mid-Term Review Committee in late 1995 recognized that the JOIDES Science Advisory Structure had been "outstandingly successful" in maintaining a proposal-driven program while delivering high-quality science. However, with the development of the ODP Long Range Plan and its emphasis on new directions for ocean drilling, reorganization of the Advisory Structure in alignment with the themes and scientific objectives of the ODP Long Range Plan was required. In 1996, ODP took the bold step of revising the JOIDES Science Advisory Structure in order to better tackle the initiatives and objectives contained in the 1996 ODP Long Range Plan.

The JOIDES Advisory Structure is shown in Figure 2, and involves over 100 scientists and engineers on standing committees and panels, and almost 100 in the shorter-lived planning groups. The primary governing body of the JOIDES organization is the Executive Committee (EXCOM), which consists of representatives of organizations that are partners in the Ocean Drilling Program. EXCOM presides over JOIDES and advises JOI on policy issues.

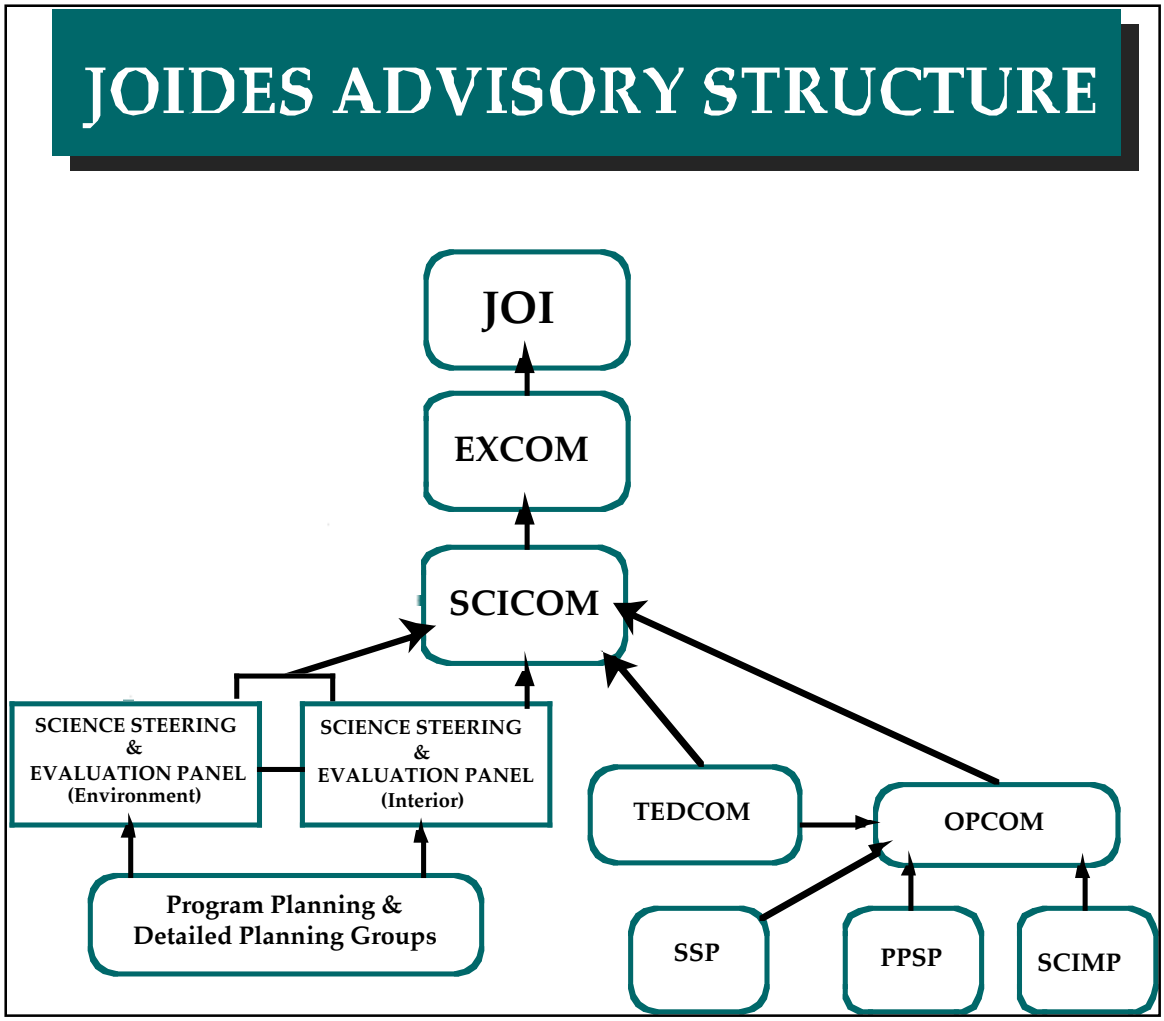

Figure 2. JOIDES Advisory Structure

The new JOIDES Science Advisory Structure is headed by a Science Committee (SCICOM), the mandate of which focuses on the long-term science planning activities necessary to meet, and go beyond, the goals of the ODP Long Range Plan. In this capacity, SCICOM prioritizes scientific and technological objectives based on input and advice from the Advisory Structure panels in order to optimize the scientific returns from drilling. An Operations Committee (OPCOM), created as a sub-committee of SCICOM, deals with operational issues, such as ship scheduling, technological development, and scientific measurements. OPCOM's responsibilities include providing SCICOM with drilling schedules based on SCICOM's proposal rankings, advising SCICOM on short-term logistical and technological implementations of highly ranked scientific programs, as well as longer term technological requirements for implementing the ODP Long Range Plan.

SCICOM receives scientific advice on drilling proposals from two Science Steering and Evaluation Panels (SSEPs) — the Dynamics of Earth's Environment SSEP and the Dynamics of Earth's Interior SSEP. They provide SCICOM with evaluations of high priority drilling proposals, as well as advice on longer-term thematic development.

Program Planning Groups (PPGs) and Detailed Planning Groups (DPGs) are small focused groups that are created as necessary by SCICOM. PPGs are formed when there is a need to develop drilling programs or technological strategies to achieve the goals of the ODP Long Range Plan. DPGs are short-lived groups that may meet only once or twice for more intensive study of certain aspects of planning. For example, a DPG may be asked to create a viable drilling plan from a series of drilling proposals for a specific scientific objective.

Technical and operational advice is provided by the JOIDES Service Panels which include the Site Survey Panel (SSP), the Pollution Prevention and Safety Panel (PPSP), and the new Scientific Measurements Panel (SCIMP). The latter provides information and advice on the handling of ODP data, samples and information, methods and techniques of all ODP measurements including shipboard and downhole measurements, and experiments. The Service Panels are not directly involved with selection of drilling targets or definition of cruise objectives. The Technology and Engineering Development Committee (TEDCOM) is charged with recommending the proper drilling tools and techniques to meet the objectives of the ODP Long Range Plan and monitoring the progress of their development. Each Committee, Panel, Program Planning Group, and Detailed Planning Group, operates under a mandate, along with guidelines as to membership and frequency of meetings. The Mandates and Terms of Reference for the JOIDES Advisory Structure are presented in Appendix III. The JOIDES panel meeting schedule guideline is shown in Figure 3.

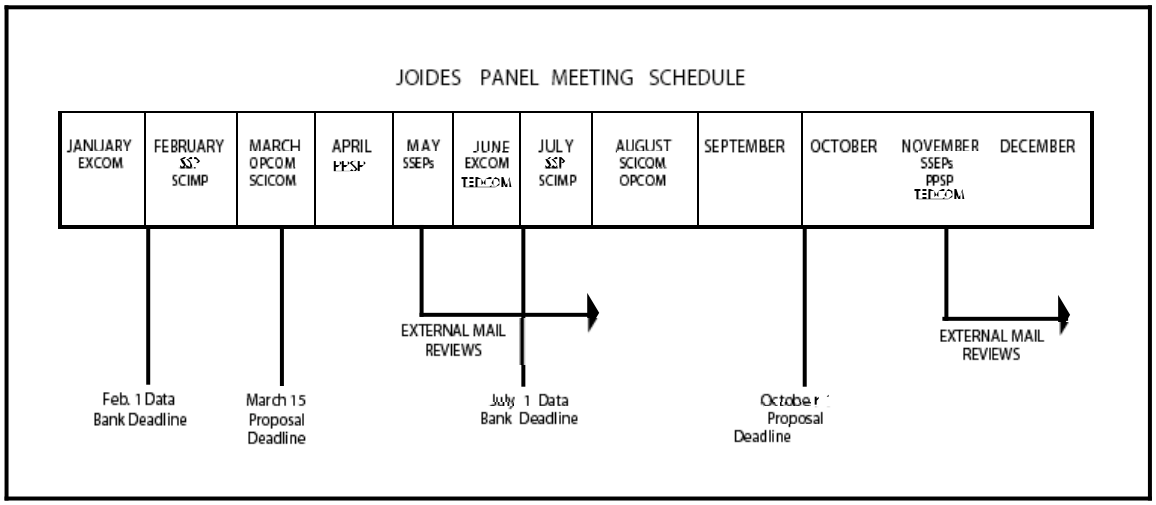

Figure 3. JOIDES Panel Meeting Schedule

Travel costs associated with Panel/Committee meetings are covered in the following ways:

- Travel by US panel members is paid for by the JOI/United States Science Support Program (JOI/USSSP);
- Travel by non-US JOIDES panel members and guests is paid for by their country;
- Travel by the EXCOM and SCICOM Chair is paid out of ODP commingled funds;
- Travel by non-member country panel members comes from ODP commingled funds;
- Travel by scientists employed by either JOI, the Science Operator, or by the Wireline Services Operator is included in that organization's ODP budget.

The JOIDES Office

The JOIDES Office is responsible for coordination of all activities of the JOIDES Science Advisory Structure, and for integrating advice from the panel structure to enable EXCOM to make policy decisions. The Chair of SCICOM manages the JOIDES Office, which rotates approximately every two years between US and non-US institutions (excluding the Science Operator and Wireline Logging Service Operator 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 to JOIDES members, JOI, NSF, and, when appropriate, to the scientific/technical community; providing administrative services to the JOIDES Advisory Structure; and producing the JOIDES Journal.

SCIENCE PLANNING:
The Science Planning Process

The science planning process for ODP has five major components in a nested strategy that initially provides broad directions followed by a focusing into very specific scientific goals and objectives. The five components are:

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 COSOD goals;
3. Distillation of those objectives into Long Range Plans for ODP (the latest being published in 1996) with consideration for overlapping interests with other international geosciences initiatives;
4. Submission of drilling proposals to ODP from the scientific community-at-large; and
5. Evaluation and prioritization 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 an important role. The scientific community-at-large not only defines the broad directions of ODP through participation in the COSOD conferences, but also generates the proposals. This maintains the proposal-driven nature of the Program, and also ensures responsiveness of the Program to the development and advancement of scientific ideas. The JOIDES Science Advisory Structure translates the broad goals of COSOD into specific long-range scientific objectives for ODP articulated to the scientific community in the form of an ODP Long Range Plan and other planning documents. The JOIDES Science Advisory Structure develops plans for drilling and logging programs, as well as plans for any necessary technical developments, based on evaluation of drilling proposals within the framework of the ODP Scientific objectives.

Conferences on Scientific Ocean Drilling (COSOD)

Conferences on Scientific Ocean Drilling are initiated by the JOIDES Executive Committee, and provide an opportunity for the international geosciences community to meet and discuss major scientific problems that should be addressed by ocean drilling. Two COSODs have been held to date—the first in 1981, and the second in 1987— and it is likely that another will be required in order to define the scientific objectives for a new drilling program post-2003.

Reports from these conferences provide an important source of scientific input and define the long-term directions of ocean drilling. COSOD-I outlined crustal, tectonic,

paleoceanographic, and sedimentological drilling goals designed to guide ten years of science planning, and appropriate engineering and technological developments. Based on the progress made, these goals were updated during COSOD-II. In addition, the active participation of communities studying global change and interested in long-term monitoring and experimentation 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 COSOD-II reports are available from JOI (see last page for contact information).

JOIDES Planning Process

The JOIDES Science Advisory Structure takes the broad scientific goals formulated by the COSOD conferences, and distills the scientific issues to be addressed by ODP into a Long Range Plan. It then acts as the custodian of that Plan and, based on advice from the Science Steering and Evaluation Panels (SSEPs), selects proposals to be incorporated into a drilling schedule to accomplish the long-term goals of the Program. These are then incorporated into both annual and four-year ODP Program Plans that are reviewed by NSF and other funding agencies, and approved by the JOIDES EXCOM.

Longer-range planning has become increasingly important for ODP. It is required for renewal of the Memorandum 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 science plans developed by the JOIDES Science Advisory Structure. In concert with science planning, the Advisory Structure also plans for technological advancement and innovations that are required to meet the long-term scientific objectives of the Program. This planning activity must be conducted well in advance due to its impact on the ODP budget and the lead time necessary for engineering and logging developments.

The Role of Proposals in Long-Range Planning

The proposal process gives tremendous opportunity for individuals and groups to promote their ideas through ocean drilling, and the success of the program rests with the quality of the science proposed by the community-at-large. Through proposals, individual scientists or groups have the opportunity to respond to ODP's scientific priorities and recommend the most appropriate targets for drilling. Scheduling a drilling cruise is a major investment of time and funds, and hence proposals need to be well developed before they are considered ready to be recommended to SCICOM for consideration for drilling. The nurturing and evaluation of proposals is the prime responsibility of the SSEPs, and full development of a proposal can take a few years.

The other important aspect of developing a drilling proposal is the collection of the requisite site survey data. The completion of such surveys, and the submission of the supporting data to the Program, is the responsibility of the proponents, and hence this also requires long-term planning.

The 1996 ODP Long Range Plan

A new long-range planning document, "Understanding our Dynamic Earth Through Ocean Drilling", was published in 1996. The LRP specifically identifies two overall themes for scientific ocean drilling beyond the year 1997. The first of these themes is "Dynamics of Earth's Environment" and it encompasses a range of scientific problems related to understanding how our planet's environment - in particular, the atmosphere, hydrosphere and biosphere – changes in response to natural and anthropogenic perturbations The second theme is "Dynamics of Earth's Interior" which seeks to examine the properties and processes within the lithosphere in order to advance our understanding of the structure of the Earth's outer layers, global mass and energy fluxes, mantle dynamics, and deformation processes.

Within these broad themes, "core" themes are identified for which ocean drilling is either the best, or only, way to solve problems of a fundamental scientific nature. In addition, the Plan emphasizes three initiatives and one pilot project which capitalize on new drilling technologies and scientific approaches, frontiers, and collaborations to which scientific ocean drilling can make a unique contribution.

Dynamics of Earth's Environment

- Understanding Earth's Changing Climate Initiative I: Understanding Natural Climate Variability and the Causes of Rapid Climate Change
- Causes and Effects of Sea Level Change
- Sediments, Fluids and Bacteria as Agents of Change
- Pilot Project: Earth's Deep Biosphere

Dynamics of Earth's Interior

- Exploring the Transfer of Heat and Material To and From the Earth's Interior Initiative II: In Situ Monitoring of Geologic Processes Initiative III: Exploring the Deep Structure of Continental Margins and Oceanic Crust
- Investigating Deformation of the Lithosphere and Earthquake process

The LRP adopts a continuing and phased implementation strategy to achieve its scientific objectives. Phase II ended in 1998; Phase III begins in 1999 and continues until the end of the current ODP (in 2003). Post-2003, a multi-platform program is envisaged, with two major vessels: one with mud circulation and blowout prevention capabilities, and a second with capabilities comparable with those of the JOIDES Resolution. A vessel with mud circulation capabilities is essential in order to address scientific questions that require deeper penetration or drilling in difficult environments.

Planning efforts beyond 2003 are already underway with the jointly sponsored Japanese/JOIDES CONCORD (Conference on Cooperative Ocean Riser Drilling) held in Japan in July, 1997. The purpose of the Conference was to formulate new scientific objectives that require riser drilling, and to define the strategies and technology needed to achieve these goals.

In November, 1998, representatives from industry were invited to a Technical and Operations Workshop to assist ODP in (1) identifying technical and infrastructure issues

associated with operating a multi–platform program; and (2) suggesting effective mechanisms to address the issues. In May, 1999, a second scientific meeting will be held in Vancouver, B.C., to define the scientific objectives of the new drilling program, with particular emphasis on the non-riser vessel, thereby complementing the results of CONCORD. This meeting is called COMPLEX (Conference on Multi Platform Exploration).

Copies of the ODP Long Range Plan, the CONCORD Workshop Report, and the COMPLEX Workshop Report are available from JOI (see last page for contact information).

SCIENCE PLANNING:
Proposal Submission and Evaluation

ODP has recently implemented new Proposal Submission and Evaluation Guidelines which are aimed at providing proponents with early feedback from the SSEPs as to whether their project is likely to be considered of high priority to the Program. Figures 4 and 5 schematically illustrates how a proposal moves through the JOIDES planning process to reach the stage of actual scheduling. A new procedure of external comment of fully-developed proposals has been added to the evaluation process in order to solicit comments from the community-at-large on the fundamental importance of the proposed work.

There are two deadlines each year for the submission of ODP proposals: 15 March and 1 October. The proposal process consists of two steps:

1. submission of a **"Preliminary Proposal"** that will be evaluated and nurtured (if appropriate) through Panels within the JOIDES Advisory Structure; and
2. subsequent submission of a **"Full Proposal"** that is developed taking into account the advice from the appropriate Panels.

Guidelines for each of these, and their evaluation paths, are described below. Proposals already within the system are not required to go through the "Preliminary Proposal" stage, but any revisions are expected to meet the guidelines for "Full Proposals, and will be processed as described below.

Preliminary Proposals

New ideas for scientific ocean drilling are first submitted as Preliminary Proposals to the JOIDES Office by the 15 March or 1 October deadline. In exceptional cases (such as a narrow window of opportunity to test an exciting, fundamental scientific idea), a new idea can bypass the Preliminary Proposal stage, and be submitted immediately as a Full Proposal. However, it must meet all Full Proposal formatting requirements and meet the criteria necessary to be selected for external evaluation.

Sources of "Preliminary Proposals" may be:

I. individual scientists or groups of scientists:
II. national/international scientific groups (independent of ODP);
III. JOIDES Program Planning Groups (PPGs).

In each case, the individuals who are submitting the Preliminary Proposal must be named, and a contact proponent must be clearly identified.

Preliminary Proposals must be no more than 10 pages long and must adhere to the content and format requirements listed on Page 22. Individuals considering submitting a Preliminary Proposal should check the JOIDES Office web site for any revisions to the guidelines.

Preliminary Proposals are reviewed by the appropriate SSEP(s) with respect to the fundamental scientific advances that the proposed drilling might make; its relevance to the Long Range Plan; and the appropriateness of the geographic location and proposed drilled sections to addressing the scientific objectives of the proposal.

Written reviews from the SSEP(s) will be returned to the contact proponents with one of the following recommendations:

1. The proposal does not address high-priority goals of the LRP, or is of low scientific interest. The Panel(s) rejects the proposal and recommends that a Full Proposal should not be developed.
2. Some specific additional information is needed to evaluate the proposal adequately (e.g. insufficient data to evaluate whether drilling addresses the stated objectives). The Panel(s) requests these data from the contact proponent for their next meeting(s). If the data are unavailable and critical, the Panel(s) will recommend that a revised Preliminary Proposal be submitted once the data are available. Figure 4. Pathway of a Preliminary Proposal (see text for details)
3. The proposal addresses objectives for which other proposals exist. The Panel refers the proposal to a Program Planning Group (PPG), or recommends that the Proponents collaborate.
4. The proposal is of high priority, but could be improved or made more relevant. In this case, the appropriate SSEP may nurture a proposal (possibly through a watchdog system) and request a revised Preliminary Proposal.
5. The proposal is of high interest and well justified. The panel(s) recommends the development of a Full Proposal.

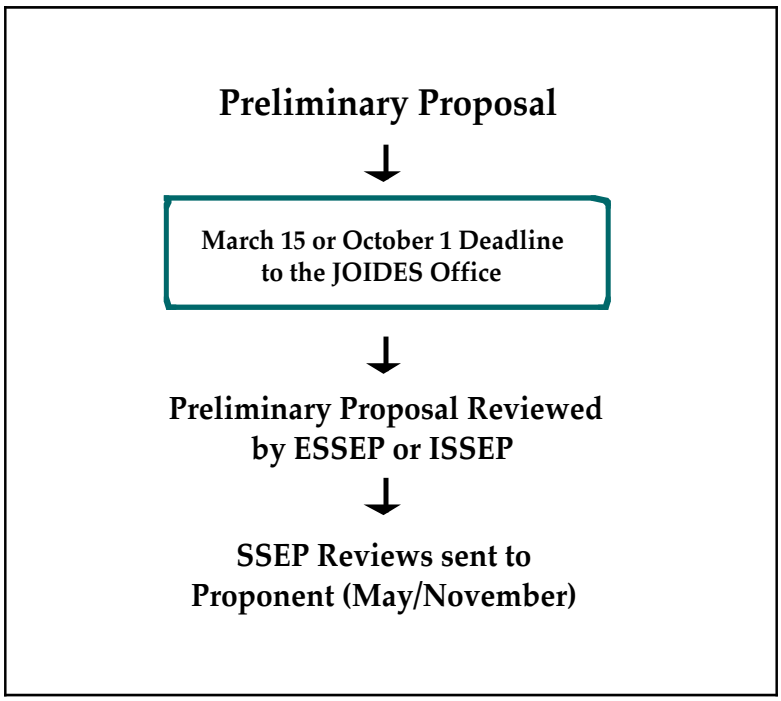

Figure 4. Pathway of a Preliminary Proposal (see text for details)

Content Guidelines for Preliminary Proposals

Preliminary Proposals may be no more than 10 pages (including Abstract, Figures, and References, but not including Site Summary Sheets) and should contain the following:

1. Clearly-stated scientific goals, and how they relate to high priority scientific objectives within the Long Range Plan (or represent a new area of inquiry that can be addressed by ocean drilling). A description of relationships to other international geoscience programs (if any) should be included.
2. Justification of the need for drilling to accomplish the objectives.
3. A brief description of proposed sites, penetration depths, expected lithologies, etc.
4. A brief description of available site survey data.
5. A well-defined drilling and logging/downhole measurements strategy and explanation as to how it addresses the scientific goals of the project.
5. For each proposed drill site, a Site Summary Form with Only Page One completed (see page 28). Site location names must conform to the ODP drilling site designation policy (see Page 27).

Full Proposals

The submission of a Full Proposal will be recommended by the SSEP(s) on the basis of the Preliminary Proposals. Full Proposals must be submitted to the JOIDES Office by the 15 March or 1 October deadline. Sources for these proposals will be mainly the proponent(s) of the Preliminary Proposal(s), but may include members of a PPG or DPG (for those proposals referred to such Groups), or others that are added to address issues raised by the panels.

Full proposals must be no more than 25 pages long and must adhere to the content and format requirements listed at the end of this Section. Individuals submitting Full Proposals should check the JOIDES Office web site for any revisions to the guidelines.

Full proposals will be reviewed by the appropriate SSEP(s) to determine whether they meet the criteria necessary to be sent out for external comment. These criteria are:

- The proposal addresses a scientific problem that is identified as a high priority in the ODP Long Range Plan (or moves the Program beyond the LRP);
- There is clear justification that drilling is the best way to achieve the scientific objectives being addressed;
- There is a well-defined drilling strategy, the success of which can be assessed on the basis of the geophysical/geological data as presented in the proposal.

If these criteria are met, the Panel(s) will recommend to the JOIDES Office that external comments be acquired, and will provide a list of qualified evaluators for each recommended proposal. The list of potential evaluators will include individuals who are active within the international drilling community, as well as others from outside that community who can comment on the science with a broader perspective of its contribution to the appropriate field.

If it is determined that the criteria are not met, the Panel will advise the proponents (through the JOIDES Office) as to which criteria are not met, and recommend the revisions necessary for further consideration.

Format Guidelines for Preliminary and Full Proposals

Both Preliminary and Full Proposals must adhere to the following formatting requirements. Failure to do so (or exceeding the page limits) will result in the proposals being returned to the proponents:

- Abstract - 400 words
- Font size - 12 point, 1 1/2 spacing
- Margins - one inch all around
- Binding- none; proposals must be stapled.
- Figures - black and white. Color figures are discouraged. If color figures are essential, please contact the JOIDES Office for advice. Figures should be page-sized. Do not include large foldouts.
- An electronic version is required on a disk formatted for Macintosh (WORD or WORD PERFECT).

The JOIDES Office requires ten (10) hard copies of both Preliminary and Full Proposals

Content Guidelines for Full Proposals

Full Proposals may be no more than 25 pages (including Abstract, Figures, and References, but not including Site Summary Sheets) and should contain the following:

1. Clearly-stated scientific goals, and how they relate to high priority scientific objectives within the Long Range Plan (or represents a new area of inquiry that can be addressed by ocean drilling). A description of relationships to other international geoscience programs (if any) should also be included.
2. Justification of the need for drilling to accomplish the objectives.
3. Detailed drilling and logging/downhole measurement strategies and how these relate to the scientific objectives of the project.
4. Detailed estimates of drilling and logging times.
5. A description of available site survey data and a discussion of the relation of drilling targets to pertinent site-survey data; a description of site survey information that is still required and the plans for its acquisition.
6. A description of logistical requirements including plans to deal with any anticipated logistical problems (e.g. the use of an alternative platform, ice, etc.).
6. Complete Site Summary Forms for each proposed drill site. Site location names must conform to the ODP drilling site designation policy (see page 27).
7. Discussion of the expected scientific outcome, of drilling and what studies will remain to be done at completion.
8. Information on the scientific background and relevant publications of proponents. This information may be in the form of: 1) a two page

curriculum vitae and relevant publication for one or more (not to exceed 4) proponents; or 2) a combined summary (not to exceed two pages) of the background of the individuals and/or groups submitting the proposal.

9. A list of at least five (5) individuals qualified to provide comment on the scientific aspects of the proposed drilling program.

The External Comment Process

JOI Inc. is responsible for managing the acquisition of external comments. The JOIDES Office provides JOI with the list of proposals selected by the SSEPs, together with the recommendations of potential evaluators from both the Panels and the proponents. JOI selects and contacts individuals to provide external comments, receives those comments (3-4 per proposal), and removes any identification from the comments before passing them back to the JOIDES Office. The anonymous external comments are then sent to proponents to allow them an opportunity to respond in a short (maximum of 5 pages) letter.

Given that this is a very different process from a normal proposal review, specific guidelines on issues to be addressed in the external comment process are provided. Individuals are given the following instructions and questions:

- Review critically the importance of the scientific problem addressed in the proposal and its likely impact on understanding Earth's history and/or Earth's processes;
- Identify and evaluate the scientific objectives and/or testable hypotheses that will be addressed by the proposed drilling; Figure 5. Pathway of a Full Proposal (see text for details)
- Is the general location selected appropriate to address the scientific problem and hypotheses posed;
- What is the likelihood that the sections drilled will contribute significantly to the solution of the stated scientific problem;
- The Ocean Drilling Program proposals differ in many ways from other science proposals. In particular, because a team of scientists is involved in planning and executing a drilling leg, scientists other than those listed as proponents will be involved in the project. With this in mind, please comment on the competence (e.g., research capability and research record) of the proponents if you feel that it is particularly relevant to the evaluation of the science contained in the proposal. Please explain why you feel that it is relevant.

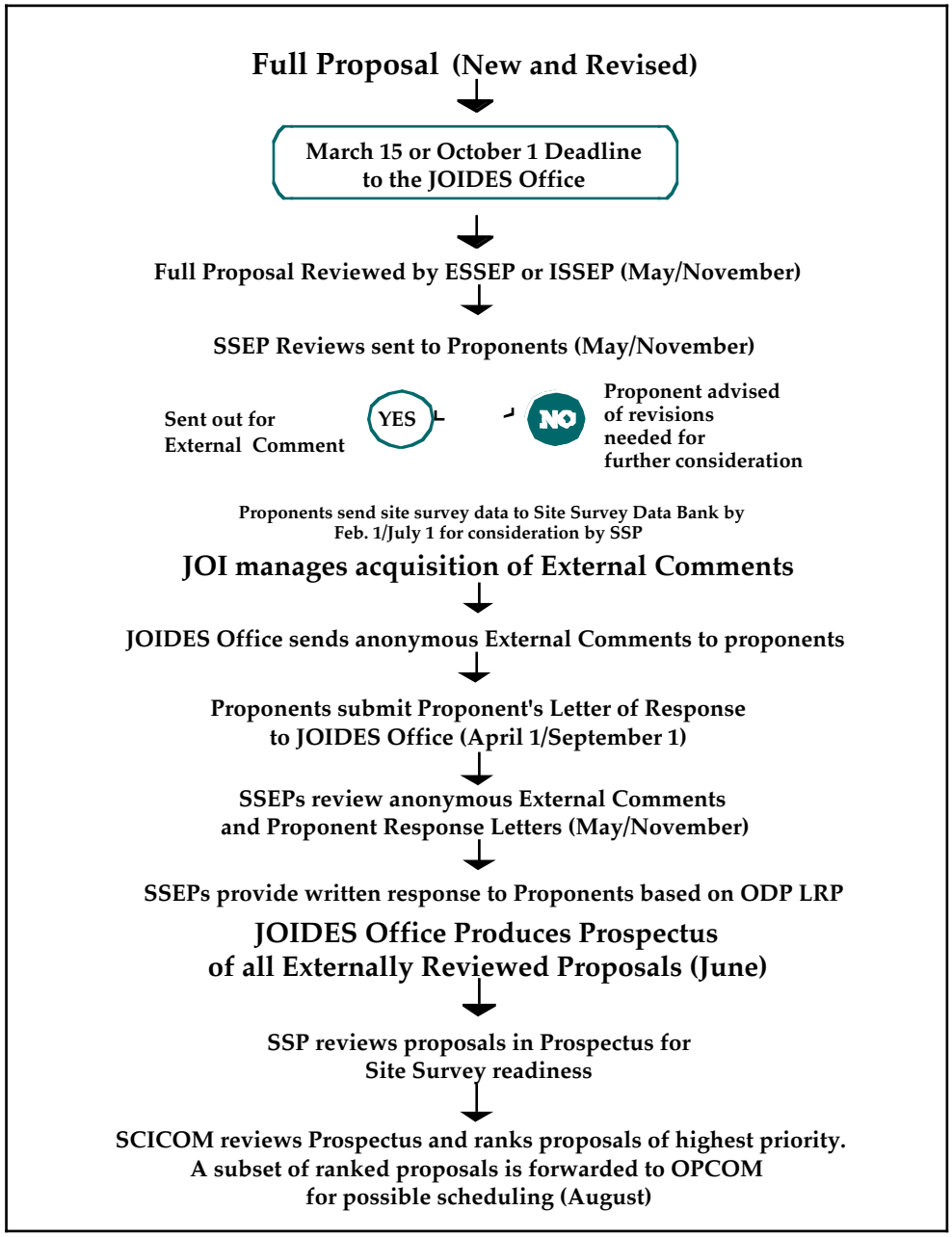

Figure 5. Pathway of a Full Proposal (see text for details)

Evaluation by the SSEPs and Recommendations to SCICOM

The anonymous external comments, together with the proponents' response, are reviewed by the SSEP(s) at their next meeting. Information on site survey readiness is also provided by the Site Survey Panel liaison(s) to the SSEP(s). For each reviewed proposal, a package is assembled for SCICOM that contains:

- the SSEP(s) review(s) of the proposal;
- the external comments received from anonymous evaluators;
- the proponents' response to the external comments;

- an assessment by the SSEP(s) as to the priority of the drilling program in the context of the overall achievement of the ODP Long Range Plan (or how the proposal addresses an exceptional scientific opportunity).

At its August meeting, SCICOM takes all this information into consideration and conducts a global ranking of the proposals in terms of their scientific priority for ODP's Long Range Plan. SCICOM acts under strict conflict-of-interest guidelines, and the ranking procedure is also clearly enunciated (both are included in Appendix IV). A subset of ranked proposals is then selected and forwarded to OPCOM for possible scheduling as drilling legs. Those that do not get selected are advised as to whether (i) SCICOM wishes to keep the proposal active for consideration at a later time (e.g. perhaps when more data are available, pending results from an already scheduled leg or scheduled site survey cruise), (ii) SCICOM wishes to see a revision, in which case the proposal is reconsidered by the SSEPs and sent out again for external comment, or (iii) will not consider it further.

The OPCOM meets directly following SCICOM, with the main goal being to devise a schedule that extends the drilling plans by approximately one year. Issues that are considered include SCICOM ranking, site survey readiness, potential safety and pollution considerations, technological Considerations (core recovery, enhancements to the standard set of logging tools, use of re-entry cones, and casing), operational considerations (weather -typhoons, ice cover, currents, and transit times between potential drilling sites), research clearance issues, heave restrictions in shallow water, and budgetary considerations. OPCOM then forwards its proposed schedule to SCICOM for final approval.

Proponents of proposals scheduled by OPCOM as drilling legs are notified in writing. Proponents of proposals sent forward by SCICOM to OPCOM, but not scheduled as drilling legs, receive an explanation of the decision and recommendations for future action. Such proposals are not revised and are not sent out for a second external evaluation. The SSEPs and SSP continue to track these proposals in the JOIDES system until the following year when they are reconsidered.

The scheduling of a proposal is not the end of the planning process! Within a few months of the schedule being finalized, the proposal will be reviewed by the Pollution Prevention and Safety Panel (PPSP). This requires the compilation of a data package to be submitted to PPSP for a safety review (see page 34).

DRILLING SITE DESIGNATIONS

ODP uses a uniform system of designating proposed sites, in which each point on the seafloor that has ever been considered for drilling is known by one and only one name, and that name is never used for any other point on the seafloor. Proponents must use the format (shown below) in naming proposed drill sites. Drill Site: AAAAnnX.

AAAA is up to 4 alphanumeric characters indicating the geographic area of the proposed drill site; nn is two numerals indicating the number of the site within that area; X is one letter indicating variants (alternates or revisions) of that site. The first time a site is proposed, X=A. If alternative sites are proposed in close geographic proximity and sharing scientific objectives, they must have X=B, X=C, X=D, etc. Every time a site is moved, a new value of X must be used to identify the relocated site. The site designator should not attempt to encode information about the priority of the site (i.e. no "alt." designators). Because site priorities often change as the proposal passes through the advisory system, a site name that encodes priority may became obsolete or misleading by the time the site is drilled.

Example: PIG-3B is Pigafetta Basin Site 3B, indicating that the proposed location has been changed once.

Ancillary Program Letters

On occasion, individuals or groups of investigators have projects with scientific objectives that do not address key scientific goals of proposed drilling legs, but that require collection of shipboard data and measurements from drill holes or cores. Examples include specific measurements of physical properties not routinely collected on a cruise, or the collection of an additional downhole measurement during logging unrelated to cruise objectives. Because such projects can require an investment of time (either drilling, logging or technician time), and/or the dedication of a shipboard bunk, it is critical that such projects are integrated with the appropriate drilling projects as early as possible in the proposal submission and evaluation process.

Requests for accommodation of ancillary programs in the Ocean Drilling Program are submitted to the JOIDES Office in the form of an Ancillary Program Letter. This should include:

- a description of the project and its overall scientific goals;
- the types of shipboard measurements/data collection necessary;
- the geographic areas of interest;
- the necessary time commitment, both in terms of shiptime and shipboard personnel.

Ancillary Program Letters are forwarded to the SSEPs who review them and suggest any appropriate collaborations. The JOIDES Office is responsible for initiating contact between proponents of appropriate drilling proposals (preferably at the Preliminary Proposal stage), and investigators with ancillary programs.

Site Summary Forms

Site Summary Forms (see Appendix V) should be filled out for each proposed drill site, and as much detail should be included as possible. The Site Summary Forms are frequently updated, and the most recent version is available at the Site Survey Data Bank web site (http:// www.ldeo.columbia.edu/databank.) **Please note that not every page of the Site Summary Forms is required in the early stages of the proposal process.** The table in the Appendix describes the purpose of each page, what information is needed, and when each page should be submitted.

SCIENCE PLANNING:
Data Submission Guidelines

Once a proposal is selected by the SSEPs to be sent out for external comment, the JOIDES Office notifies the proponents of the need to submit site survey data in support of the proposed drilling to the Site Survey Data Bank at Lamont-Doherty Earth Observatory. Submitted data are archived by the Data Bank for use by JOIDES panels and by individuals involved in scientific ocean drilling.

The Data Bank also acts as the operational arm of both the Site Survey Panel (SSP) and the Pollution Prevention and Safety Panel (PPSP).

The Data Bank deals with many active proposals at any given time, and hence it is vital that the Data Bank staff are able to identify which proposal each piece of data supports, which sites the data cover, 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 requirements are intended to assist proponents in the preparation of site survey data packages, and help avoid some of the pitfalls that have been encountered in the past. Any questions regarding these requirements, 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., the National Geophysical Data Center). Data are made available to Panels and individuals on a need-to-know basis only.

Members of SSP and PPSP 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 are honored; all data requests not considered essential to ODP operations are denied.

After the drilling leg, these restrictions remain in effect unless explicit permission is given by the proponents 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” geophysical data held at the Site Survey Data Bank, and all JOIDES scientists seeking data for ODP purposes are encouraged to continue requesting data from the Data Bank in support of their drilling or site survey proposals.

Cover Letter and Inventory

Each package of data sent to the Data Bank must contain a cover letter outlining for which proposal the data are being submitted and which sites the data support, and providing general information regarding the collection and processing of the items in the package.

Each package must also contain an inventory of its contents with specific information regarding each item in the package. This is used by the Data Bank staff to ascertain whether anything is missing from the package, in which case the data depositor

is contacted immediately. Key information includes the type of data, level of processing, cruise name and line number.

Data Tags

Usually profiler data is displayed with a processing box at one end of the line. This provides the Data Bank with useful information that can be entered into the data tracking system and that helps the Site Survey Panel judge the quality of the data and processing. However, this information is often missing from old lines, monitor records, and from sections of records cut from the middle of long profiles. For records such as these, it is important that a data label be filled out and attached to the records being submitted. A blank label can be found on Page 32.

Maps and Charts

Ideally, the scale and projection for all submitted maps (e.g., navigation, gravity, magnetics, bathymetry, etc.) will be the same, allowing the plots to be overlain for comparison. It is vital that each map have at least two annotations each of latitude and longitude, and that the projection of the map is noted.

For along-track data, it is important that the units on the navigation map be the same as the horizontal annotations on the profiles themselves. MCS data should use either date/time or shotpoint annotation. CDP units are discouraged due to their frequent changes during processing. However, CDP will be accepted if it is the only navigation available. Maps and charts can be up to 36 inches wide and should be on a translucent material, such as vellum or mylar, if possible. Data may be rolled, but should not be folded. Creases due to folding may be reproduced as lines on any copies made, obscuring information.

If possible, digital data files should be included with the hard copy. MGD77 is the preferred format, but tab-delimited ASCII files with clearly labeled columns are also accepted. Obtaining this data digitally allows the Data Bank to produce compilation maps at various scales, as needed. If maps are sent as image files, postscript format must be used.

Profiler Data

It is vital that all profiler data (3.5 kHz, Single and Multi-channel seismic, etc.) submitted to the Data Bank are accompanied by a navigation map with the same horizontal units (date/time or shotpoints). Vertical and horizontal scales must be noted, as well as an indication of the direction that the profile runs. There must be at least two horizontal and two vertical annotations on the copy of the submitted profile. A horizontal scale in kilometers must also be annotated on the profile.

Unmarked copies of seismic lines are needed by the Data Bank as colored annotations will obscure data on any copies made. If it is necessary to include an interpretation of a seismic line to emphasize a specific feature, an addition, unmarked copy of the line must also be submitted.

Seismic data that have been digitally collected should be processed to a reasonable level of quality; the more processing the better. Profiles at each step of the

processing must be part of the data package, and a description of the processing must appear either on the profile or be included in the cover letter of the data package. If reprocessed lines are submitted later, please indicate which old version has been superseded.

Reports and Reprints

Cruise Reports, reprints and other text copy must include a complete publication reference. If the reprint is being submitted in fulfillment of an SSP data requirement, please note this in the data package inventory or the cover letter.

When possible, reports reprints, figures and graphs should be on 8.5 x 11 inch papers (US Letter). If A4 paper is used, it is best to leave a wide bottom margin so that photocopies can be made to US Letter paper without reduction.

Photos and Video

When submitting seafloor imagery, the geographic coordinates of the photo or a trackline map for video surveys must be provided. Photos must be on glossy paper or as a negative. Video should be in US VHS format if possible. Digital photos may also be submitted.

Data Submission Label

Please attach one of these labels to each profile submitted to the Data Bank in support of your drilling program. If multiple lines from the same cruise are submitted, fill out first label completely and on subsequent profiles fill in only the line name.

Proposal Number:		Proposal Name:		
Full Line Name:		Site Name:		
Ship Name:		Cruise Name:		
Data Type:		Level of Processing:		
Institution collecting data:				
Date collected:				
Institution processing data:				
Horizontal units on profile:	*circle*	Date/Time	Shotpoints	Other:
Sending navigation for line:	*circle*	Yes	No	
Form of navigation:	*circle*	Map	Digital File	Other:
Units of navigation:	*circle*	Date/Time	Shotpoints	Other:

Figure 6. Data Submission Label

SCIENCE PLANNING:
Safety Guidelines

All drilling operations involve some risk of accident or pollution, and hence ODP must continually strive to achieve its scientific 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. This has been recognized throughout the history of the Deep Sea Drilling Project (DSDP) and Ocean Drilling Program (ODP), and policies originally developed during DSDP to minimize drilling hazards have been continually updated and implemented by ODP.

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 and in shallower water on continental margin sites. Moreover, the JOIDES Resolution continues to operate in a riserless mode, and hence ODP continues to face drilling hazards inherent in operating without a drilling riser to the surface, with a lack of return circulation, and without a standard blowout preventer. Although improved seismic surveys, an expanded borehole logging program, and advanced hydrocarbon monitoring capabilities 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 developed by the JOIDES Pollution Prevention and Safety Panel (PPSP). This Panel 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 into the final decision as to whether a specific site will be drilled. Every proposal that is scheduled as a drilling leg is subjected to a safety review by these two Panels. During this review, Co-Chief Scientists document safety conditions extant at proposed sites, the Safety Panels examine the data, and potential problems are discussed. Failure by Co-Chief Scientists to meet their responsibility of providing adequate data for review results in rejection of a drill site by the Safety Panels.

Much of the data needed for safety reviews is also required to assess the readiness of a proposal for drilling in terms of the available site survey data. All required documentation and data should be submitted to the ODP Site Survey Data Bank in the appropriate formats as described in the previous section.

Safety Panel Review Procedures

The 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. If proponents of a drilling leg anticipate early in their planning that there may 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. Such a preview is conducted at a scheduled Safety Review Meeting, and the matter should be discussed with the PPSP Chair in order to make necessary arrangements.

Safety Panel reviews vary from leg to leg, depending on the 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 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, which is collated and distributed by the Site Survey Data Bank and includes a Safety Review Check Sheet for each site (included in the required Site Summary Forms), acquaints Panel Members with the location, structure, stratigraphy and potential safety problems at drill sites, and allows time for them to search their own files for information on potential hydrocarbon and other hazards at proposed sites.

The second stage is a formal presentation by one of the Co-Chief Scientists of all pertinent data at the Safety Review Meeting. It is critical that any data that may indicate drilling hazards is openly discussed so that its merits can be judged in light of the overall safety aspects of a site. Avoiding reference to such data can be a significant deterrent to Panel approval. 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.

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:
    • Site number, location and penetration depth;
    • Traverse direction;
    • Horizontal scale in kilometers;
    • Vertical scale in seconds or meters;
    • Course changes;
    • Identification of important reflections;
    • Cross-line intersection point.
(4) Sketch of major structural elements, sediment thicks and thins, and areas of distinctive reflection character.
(5) Safety Review Check Sheets for each site (included in the Site Summary Forms). Material submitted should be Indexed and annotated to enable ready identification of Structural features, line locations, line directions, wells, Grabs samples, cores, etc.

Documentation Required for the Formal Safety Review

At the Safety Review Meeting, Co-Chief Scientists present scientific objectives of the leg using regional maps, sections, and published material as appropriate. This presentation should provide a comprehensive regional picture within which scientific objectives and safety hazards at each site can be evaluated. Co-Chief Scientists then 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. 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 Drilling: Hazard Surveys and Depth Limitation

In the past, concern regarding potential for gas blowouts in shallow water settings caused the JOIDES and ODP-TAMU Safety Panels to disapprove some proposed drill sites. 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.

JOIDES convened a Shallow Water Drilling Working Group (SWDWG) which met in February 1993 to determine the specifications of shallow water hazard surveys necessary to minimize the potential for gas blowouts in sedimented shelf drilling. Attendees included representatives of the former JOIDES Planning Committee (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 which is available upon request from the Site Survey Data Bank. 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 ranging between 75 and 200 m.
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.

A Shallow Water Gas Hazards Survey (SWGHS) is required for drilling in water depths from 75-200 m. The objective of a Shallow Water Gas Hazards Survey is to identify occurrences of gas, from the seafloor 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), 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 will be involved with the proponents in the planning of Shallow Water Gas Hazards Surveys and is responsible (both technically and fiscally) for quality control during data acquisition, processing, and interpretation of Shallow Water Gas Hazards Surveys. Funds to conduct these surveys (including ship time, data acquisition, and data processing) are the responsibility of the proponent(s).

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 be 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. ODP-TAMU and Overseas Drilling Limited (ODL) have developed guidelines (see Figure 7) for shallow water operations for the JOIDES Resolution:

0-75 m water depth:

• Operations will not be conducted.

76 to 300 m water depth:

1. Operations will be terminated if a water flow of excessive gas is detected.
2. ODL and ODP supervisors will be advised if overpull or torque increases.
3. Supervisors will be notified in the event of hole problems, and mud sweeps will be circulated in an attempt to clean the hole. A wiper trip will be made if required, and coring may be terminated to avoid stuck pipe.
4. A wiper trip should be made every 1-2 days to eliminate

tight hole sections.

5. The compensator will be left partially open while working stuck pipe.
6. Logs should not be attempted unless hole conditions are good. The CSES (side entry sub) should not be used.
7. ODL approval is required if the distance to shallow water is less than one nm. A primary and backup beacon will be used in confined locations.
8. Coring operations will be terminated if:
    - Heave compenator exceeds 1.0 m;
    - Wind exceeds 35 kts or roll exceeds 3 degrees;
    - Weather/sea state is rapidly deteriorating;
    - Floating ice enters the safety zone; and
    - Loss of positioning is anticipated.
9. Preparations will be made to sever the drill pipe if stuck pipe cannot be pulled free with up to 200K lb overpull.
10. The compensator will be locked and the 500 ton elevators will be landed on the rotary in the event of an emergency "drive-off" situation if time permits.
11. The overpull limitation and maximum allowable stress on the drill string will be calculated daily and posted.

301 to 650 m of water depth:

Same limitations as 76 to 300 m water depth, except:

- Coring operations will be terminated if heave compensator stroke exceeds 2.0 m;
- Wind exceeds 50 kts or roll exceeds 5°;
- Weather/sea state is rapidly deteriorating;
- Floating ice enters the safety zone.

Requirements for Shallow Water Hazards

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. Proponents should consult the details of this report prior to planning any shallow water drilling.

OCEAN DRILLING PROGRAM

GUIDELINES FOR SHALLOW WATER OPERATIONS

Water Depth	Well Bore Conditions	Environmental Factors	Equipment Limitations
0-75 m	Operations will not be conducted		
76-300 m	1-6	7, 8	9-11
301-650 m	1-6	7, 12	9-11
651+m	1-3	7	10, 11

Numbers refer to limitations enumerated in text.

Figure 7. Guidelines for Shallow Water Operations

PROGRAM FACILITIES:
ODP Science Operator

Texas A&M University in College Station (ODP-TAMU) serves as Science Operator for the Ocean Drilling Program. The Science Operator is responsible for collecting cores from the world's oceans, and for ensuring that adequate facilities are maintained for the analysis and preservation of these samples. In order to discharge this responsibility, ODP-TAMU (under guidance from the JOIDES community) is responsible for the lease-procurement and conversion of the drillship Sedco/BP 471, a dynamically-positioned drillship. Now officially named the JOIDES Resolution, the ship was outfitted with scientific and drilling equipment, and special onboard laboratories (see page 48 for more detailed descriptions of shipboard facilities). ODP-TAMU subcontracts for operation of the drillship with Overseas Drilling Limited, which is owned by Det Søndenfjelds-Norske Dampskibsselskab and Sedco-Forex, a subsidiary of Schlumberger.

On board the ship, ODP-TAMU maintains the laboratories and provides technical and logistical support for shipboard scientific teams. On shore, ODP-TAMU manages scientific and drilling activities before and after each cruise, curates the cores, distributes samples, edits and publishes scientific results, and provides administrative and logistical support for all these activities. The Science Operator's management structure is shown in Figure 8. More information on the Science Operator is available on the World Wide Web at http://www.oceandrilling.org/

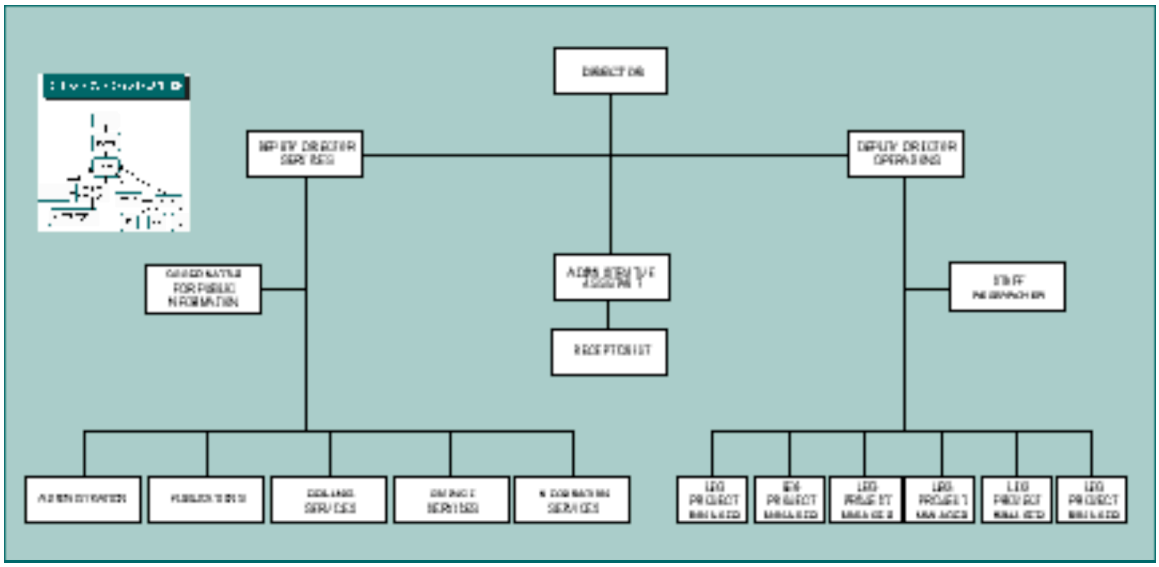

Figure 8. Management Structure of the Science Operator

Science Services

The ship's staffing of scientific and technical support personnel is handled by the Science Services Department of the Science Operator. Based on recommendations made by SCICOM, two Co-Chief Scientists are selected for each cruise. Approximately half of the scientists selected as Co-Chief Scientists are representatives of the United States, and the other half provides representation from other ODP partners. For each cruise, typically

lasting about two months, an ODP-TAMU Staff Scientist is responsible for ensuring the successful implementation and completion of the cruise-based science plan as defined by the JOIDES panels. The Staff Scientist interacts with the Co-Chiefs, coordinates the shipboard scientific party before and during the cruise, and coordinates operational and curatorial planning.

The shipboard scientific staff, usually totaling up to 25 in number, represents a team of specialists in the various fields of Earth science (petrology, sedimentology, geophysics, microbiology, etc.). The shipboard science party is drawn from universities, government, and industry from ODP member countries and consortia. Opportunities for undergraduates to sail on a cruise are available through ODP's Undergraduate Student Trainee Program (see Appendix VI).

The shipboard scientific staff are assisted by a technical support crew, also up to 25 in number. These highly-trained ODP-TAMU employees — electronic and marine technicians, curatorial representatives, computer experts — maintain and support the shipboard laboratories, which are designed to meet the needs of the shipboard scientific staff. An experienced Drilling Superintendent oversees drilling operations and acts as liaison between drilling and scientific activities.

The Science Services Department is also responsible for sample and data archiving and dissemination; this 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.

ODP-TAMU is curator for the Micropaleontological Reference Centers. Located at sites around the world, MRCs provide scientists with an opportunity to examine microfossils of various geologic ages and provenance (see section on "Sample Distribution and Acquisition Policy," on page 66, for more details).

Drilling Services

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, lab equipment, etc.), assessing safety and operational procedures prior to drilling, and ensuring the organized transportation of necessary supplies between cruises.

The Drilling Services department consists of three team-oriented project groups, which also work to improve the existing drilling and downhole techniques and to develop new ones required to meet scientific objectives established by the JOIDES community.

Scientific drilling and core recovery are handled by the Drilling Operations team. A member of this team sails with each cruise to provide expertise for the shipboard scientific party and to make sure scientific objectives are met within safe parameters.

The Development Engineering team evaluates, modifies, develops and designs coring, drilling, and re-entry equipment, handling tools and downhole systems. The team maintains a current knowledge of, and recommends improvements to, the capabilities of all ship systems (hull, machinery and electrical) and drilling systems. The team also

possesses an engineering knowledge of electrical and electronic systems to ensure the stability of all upgrades and additions to the ship, drilling system and lab stack.

The ship is supplied with all materials needed to accomplish drilling and scientific objectives by the Material Services team, which provides inventory control, warehousing, procurement, quality control, and shipping/receiving, both on shore and on board the ship.

Information Services

The Information Services department (IS) offers technical support for all developmental phases of computer usage on the ship, and at the Science Operator's headquarters in College Station, the repositories at Scripps Institution of Oceanography of University of California San Diego, Bremen University in Germany, and Lamont-Doherty Earth Observatory of Columbia University. Based upon input from, and the needs of, scientists and technicians, Information Services specifies, acquires, and installs computer-related equipment and software at all ship and shore facilities. The program's data collection is archived, processed and edited by IS's Database group, which then distributes the information to the scientific community. The archived data from the Deep Sea Drilling Project and the computerized geological data collected on JOIDES Resolution make up the ODP computerized database. ODP has recently completed a major upgrade of the data management system that allows all interested users to conduct their own searches and extract data over the Internet.

The flow of information to the scientific community is maintained by the Operations/ Network group who provide a major link between shipboard and shorebased computing on a daily basis. This group also plans for the future technology needs of the ODP.

The Application Development group designs, develops and maintains custom application programs to be used on ship and shore, when suitable commercial software is unavailable.

Publication Services

The Science Operator is responsible for the production of an authoritative series of publications that summarize the scientific and/or technical accomplishments of each cruise. These publications are the Proceedings of the Ocean Drilling Program and two volumes are issued for each cruise. The Initial Reports details the operations and shipboard results and is published one year after the cruise; the Scientific Results describes the results of shore-based studies and is published four years after a cruise. 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.

In 1995, the Publication Services Department initiated the production of electronic volumes on CD-ROM as a means to increase readership and Program visibility, as well as to improve the accessibility of data. Continual involvement in research and development of electronic publishing technologies has enabled the department to provide more sophisticated and useful products for the scientific community. ODP is now moving towards production of both volumes in electronic form.

About two to three months prior to a cruise, ODP-TAMU issues a pre-cruise Scientific Prospectus, based on JOIDES panel recommendations on site priorities. A Preliminary Report is issued summarizing the shipboard scientific results and technical operations.

Details of ODP's Publications Policy, and the responsibilities of participants regarding publication of scientific data, are presented in the Sample Distribution and Acquisition Policy on page 66.

Public Information

The ODP-TAMU Public Information Office provides relevant information to the news media, television/movie producers, scientific community, industry and educators regarding ODP science and engineering innovations. Presentation material is available such as videos, 35mm color slide sets, black and white photos, written background material, and more for anyone working on projects related to scientific ocean drilling.

Administration Services

The Administration Services department oversees the business and administrative activities such as contracts, financial services, and general administrative services.

The Contracts Division assures compliance with all contracts entered into on behalf of the Ocean Drilling Program (ODP). This includes the Prime Subcontract between the Joint Oceanographic Institutions Inc. (JOI) and the Texas A&M Research Foundation (TAMRF), the drillship subcontractor, and all other lower-tier subcontracts.

The procurement of goods and services, and accounting for all current property/equipment through a computerized capital inventory system, is handled by the Purchasing/Property branches.

The Fiscal Affairs branch manages fiscal activities of the program through Accounts Payable/ Accounts Receivable, Budget Planning/Analysis, and Payroll. Activities include reviewing and processing invoices for payment, projecting and revising detailed budgets, and maintaining payroll and leave records.

The Personnel/Insurance branch handles staffing needs in accordance with State and Federal guidelines, administers employee benefits, conducts orientation and training, and maintains program insurance policies, including the marine liability package. This branch also handles facilities management and security.

The Travel/Conferences branch coordinates and arranges all Program travel requirements (except for JOIDES Advisory Structure meetings which are handled by the JOIDES Office and JOI) and maintains conference arrangements for meetings held in the U.S. and foreign cities.

PROGRAM FACILITIES:
Ship Facilities

Scientific Features and Operational Capabilities

In March 1984, the drillship Sedco/BP 471 was contracted by the international ODP's Science Operator from a Sedco subsidiary, Underseas Drilling Incorporated (now Overseas Drilling Limited). The drillship underwent major modification to convert her to the scientific research vessel, which is now called the JOIDES Resolution.

JOIDES Resolution is a dynamically-positioned drilling ship with a length of 143 m, beam of 21 m, draft of 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 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 helipad are located aft. Drilling equipment, machinery, tools, and supplies are located amidships.

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 Positioning 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. Her computer-controlled dynamic positioning 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 7 m diameter well, the "moonpool", is located on the centerline amidships under the derrick and provides an area for running drilling equipment to the seabed. On

site, JOIDES Resolution can deploy as much as 9150 m of drill string and maintain her position in up to 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 rough-neck", 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 a hole several times.

To date, operations have been carried out in water depths ranging from 38 m to 5980 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 shore, 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 on the 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 houses the ship's library and hospital.

Research Facilities

The JOIDES Resolution 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, routine analytical studies are conducted on a continuing basis, as well as detailed programs by individual scientists.

The Poop Deck (Aft)

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 (under-way) 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)

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 (both wireline and LWD) are provided by the Borehole Research Group at Lamont-Doherty Earth Observatory through a subcontract to Schlumberger. Geophysical logs are recorded using Level 7probes 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, two standard tool combinations are in operation. Specialty logging tools are run separately from the standard strings. Logging-While-Drilling (LWD) operations may be conducted in holes where conditions prohibit the traditional wireline logging (e.g., accretionary prisms). In LWD, the logging tools are mounted in the rotating bottom-hole assembly in order to obtain open-hole logging. At present, three standard tool combinations are in operation; the seismic stratigraphic, the lithoporosity, and the geochemical combinations (for more information on logging see page 55).

Deck 6 (Bridge)

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 paleontological 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)

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 "real time" hydrocarbon monitoring, using two of the three Hewlett Packard gas chromatographs, and the Rock Eval unit when required. One gas chomatograph is set up for the rapid analysis of methane/ethane ratios, while the second is configured as a natural gas analyzer and is equipped with three chromatographic columns that allow hydrocarbon separations as well as stationary gas separations. The third Hewlett Packard gas chromatograph 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 including 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 varispeed 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 equipment to determine the mineralogy and geochemistry of sediment and hard rocks. The instruments were chosen for their 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)

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 compatible, Apple Macintosh, and Sun) located conveniently throughout the ship. Shipboard computers are linked via ethernet to maximize data transfer.

Deck 3 (Upper 'Tween)

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.

PROGRAM FACILITIES:
ODP Logging Services

As contractor for ODP logging, the Bore hole Research Group (BRG) at Lamont-Doherty Earth Observatory is charged to provide state-of-the-art "oil industry" logging capabilities and specialty logs customized to the needs of JOIDES scientists. This involves the acquisition, processing, and presentation to JOIDES scientists of in situ logging measurements in usable scientific form. ODP-LDEO also provides data analysis and distribution services in order to help JOIDES scientists use these logs to solve particular scientific problems. More detailed, up-to-date information is available on the ODP Logging Services web page at http://www.ldeo.columbia.edu/BRG/ODP.

Structure of Logging Services

The Logging Services for ODP consist of three major components:

1. Standard Logging. Schlumberger, the industry leader, provides standard logging services on board the JOIDES Resolution on every ODP leg. See the section on "ODP Logging: Standard Tools," page 57.
2. Specialty Logging. Specialty logging tools are available from Schlumberger or third parties and are coordinated through LDEO-BRG. See section on "ODP Logging: Additional Tools," page 58.
3. Log Analysis Support Service and Database. Log analysis centers at LDEO in the United States, Leicester University in the UK, and Laboratoire de Mesures en Forage 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. LDEO-BRG 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: one ODP-LDEO logging scientist, one Schlumberger field engineer to operate their tools; and one logging scientist from the JOIDES scientific community. Together they assist the Co-Chief Scientists in the design and implementation of the logging program, and subsequent interpretation of the data on each leg.

On certain legs, an ODP-LDEO logging engineer is required to run specialty tools. In addition, a second ODP-LDEO logging scientist is often sailed when the logging operations require additional personnel or for training purposes.

ODP 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-LDEO Director, excluding exemption by SCICOM (via the ODP-LDEO Director), undue hazard to Operations drilling equipment as determined by the 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 may be logged through-pipe 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 drilling and logging objectives and Kinley tool procedures (if necessary) are properly followed during the cruise operations.
4. In general, the "standard" Schlumberger logging suite is required in every hole logged. SCICOM 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.

ODP 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.

As of April 1996, "standard" logging consists of two logging runs:

Run 1: Neutron-Density-Resistivity
- a. Natural Gamma Ray Spectrometry
- 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, Run 1 will be split into two separate runs.

The Neutron-Density-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. 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: Formation MicroScanner-Sonic
   a. Natural Gamma Ray Spectrometry
   b. General Purpose Inclinometer
   c. Formation MicroScanner
   b. Sonic Tool

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 from accelerometer 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 with 5 mm resolution, and interpretation of depositional environments. Sonic velocity data can be used with density measurements to calculate an impedance log and generate synthetic seismograms. These are used in turn to tie the seismic record to the log and core data.

The Schlumberger Multitask Acquisition & Imaging System (MAXIS) computers provide shipboard log data acquisition. MAXIS provides increased data acquisition rates, enhanced processing capabilities, and permits ODP to run the newest logging tools currently available. In late FY'99, this system will be upgraded to the new MCM generation of MAXIS systems.

ODP Logging: Additional Tools

In addition to the standard tools, other types of logging tools are run at selected sites. SCICOM 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:

- Vertical Seismic Profile (BGKT, WST)
- Array Seismic Imager (ASI)
- Borehole Televiewer (BHTV)
- Geologic High Resolution Magnetometer (GHMT)
- Azimuthal Resistivity Imager (ARI)
- Geochemical Logging Tool (GLT)
- Logging While Drilling (LWD)

Specialty/Third Party Tools

- Lamont TAP (Temperature, Acceleration, Pressure) Tool
- BGR High-Resolution/High-Temperature Magnetometer
- DMT Digital Borehole Televiewer (slimhole and high-Temperature tools)
- BRGM High Temperature/High Resolution Temperature Tools
- Becker/Morin Packer Flowmeter

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 bore-hole. 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. Figure 9. Schematic configurations of the Schlumberger tool strings operated in the Ocean Drilling Program

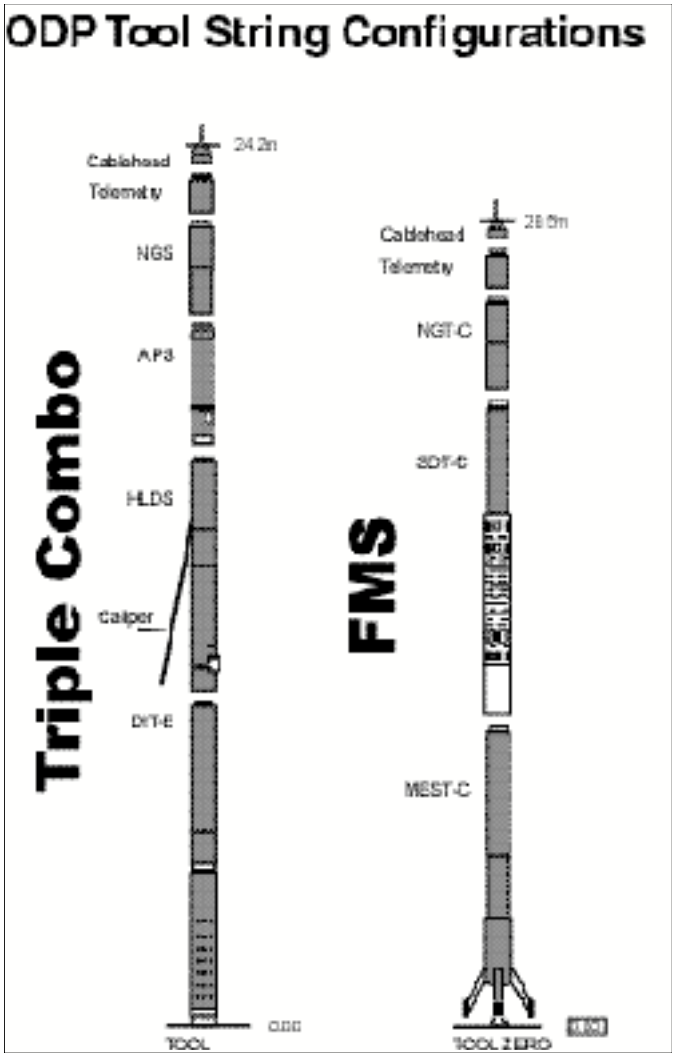

Figure 9. Schematic configurations of the Schlumberger tool strings operated in the Ocean Drilling Program

Shipboard Log Analysis

The Downhole Measurements Lab (DHML) computing facilities onboard the JOIDES Resolution currently consists of SUN, Macintosh, and PC (DAS) systems. Using these systems, the ODP-LDEO and JOIDES Logging Scientists can acquire specialty tool data and 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 specialty) of log analyses is performed for each cruise at log interpretation centers at ODP-LDEO and Laboratoire de Mesures en Forage (LMF). These include:

- Depth correlation and shifting of all conventional logs to sea floor
- Processing (where necessary) of acoustic data from transit times
- Depth shifting and additional processing (where necessary) of FMS data
- Processing of dipmeter data
- Processing of specialty data (e.g. GHMT)

In addition, expertise and facilities at Lamont, Leicester, and Aix-en-Provence are available for post-cruise log analysis by interested scientists.

ODP Log Data Distribution Policy

See section on "Sampling Distribution and Acquisition Policy " on page 66 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).

ODP Logging Web Page.

The web page contains detailed information on all logging operations, a Proponent's Helper, and Access to the ODP Log Database: http:// www.ldeo.columbia.edu/BRG/ODP

Training Sessions and Special Presentations.

Training sessions on log interpretation may be held at the Lamont, Marseille, or Leicester centers, or on the JOIDES Resolution. Logging research and results are presented at special sessions of major scientific meetings consisting of invited and contributed talks and posters.

PROGRAM FACILITIES:
Site Survey Data Bank

The JOIDES/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 DSDP and ODP drilling Legs. The Data Bank distributes site survey data to the various JOIDES panels, planning groups, and to individuals involved with scientific ocean drilling. Additional information can be obtained at the Data Bank web site http:// www.ldeo.columbia.edu/databank/. The Data Bank's tasks include:

Assisting the Site Survey Panel (SSP)

Assembles data submitted for each drilling proposal into packages that are evaluated by the Site Survey Panel. The Data Bank acts as the operational arm of this panel.

Assisting the Pollution Prevention and Safety Panel (PPSP)

Prepares 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

Provides the Co-Chief Scientists and the Science Operator with a package of site survey data relevant to cruise operations.

Preparing Data Packages for Panels and Working Groups

Assembles data packages for use by JOIDES Panels and planning groups to aid in the proper planning and evaluation of drilling operations.

Providing Data to Science Operator

Provides data to the Science Operator upon request to aid in the planning of future drilling legs.

Providing Data to Interested Investigators

Provides site survey data to investigators engaged in planning future drilling Legs or in post-mortem studies of completed Legs. Investigators are welcome to visit the Data Bank and utilize its resources in their studies. Appointments should be made well in advance by contacting the Data Bank Manager at LDEO.

Facilities

The Data Bank's computer hardware consists of a Sun Workstation for most data manipulation tasks, as well as networked Power Macintosh and Pentium computers for general use. Software for data management and display include GMT and ArcView, as well as the MB System software for display of digital swath bathymetry data. The Data Bank can output color hard copy up to 42 inches in width on a Color Versatec plotter and up to 36 inches wide using a Calcomp Inkjet plotter.

Databases

Being located at LDEO affords the Data Bank access to Lamont's cleaned MGG database. 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 geophysical data.

Also available are 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.

The Data Bank also manages a large archive of paper records which have been submitted since 1975 in support of DSDP and ODP drilling proposals. These data are inventoried and described in a database which can be queried by proposed site, geographic region, and by proposal. Reports can be produced for use by panels and drilling proponents.

Data Availability

Trackline geophysical data are stored digitally in NetCDF format, and are available in the form of magnetic tapes, paper plots, or electronically via Internet data transfers. There is no direct access to the LDEO databases from off campus, but the Data Bank can provide subsets of this information upon request.

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.

Proponents should be aware that they have the prime responsibility for obtaining and providing data in support of their drilling. The Data Bank is, however, frequently able to supplement the data available to proponents. Those seeking data in support of a

drilling proposal, or for post-cruise studies, are encouraged to request data from the Site Survey Data Bank.

Proprietary Data

Note: 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). See additional information on Page 29.

PROGRAM FACILITIES:
Sampling Distribution and Acquisition Policy

This policy will be periodically updated. The most current version will be made available through the World Wide Web (WWW) on the ODP website. The URL for this website is: http://www.oceandrilling.org/.

1. Introduction

The international Ocean Drilling Program (ODP) collects and analyzes marine cores of rocks and sediments from the global ocean recovered by the research vessel JOIDES Resolution. These cores, as well as those from the Deep Sea Drilling Project (DSDP), are stored in four repositories located in the United States and Germany. Ship-board samples and residues, thin sections, and smear slides also reside in these repositories. Core photographs, hand-written data sheets, and core analysis data are curated at the Texas A&M University location. Downhole logging data is managed by the Borehole Research Group at LDEO.

This document outlines the policy and the procedures for distributing ODP and DSDP samples and data to research scientists, curators, and educators. This document also defines the obligations that sample and data recipients incur, and the publications policy of the ODP.

Everyone who sails as an invited participant on an ODP cruise, and anyone who obtains samples after a cruise, incurs an obligation to the Ocean Drilling Program as defined in this policy. These obligations are fulfilled by conducting research and publishing the results, and by providing the ODP with associated data. If the procedures outlined in this policy are not met, recipients will be restricted from obtaining future samples and may not be allowed to participate on future drilling legs.

At the end of each drilling leg, the ODP publishes a set of two volumes known as the Proceedings of the Ocean Drilling Program, which consist of an Initial Reports (IR) volume and a Scientific Results (SR) volume. The Initial Reports (IR) volume is prepared by the shipboard scientific party and contains the scientific and engineering results from each ODP leg. The Scientific Results (SR) volume contains peer-reviewed papers prepared by individual scientists that present the results of their post-cruise scientific research from a drilling leg. In order to fulfill their obligation to the ODP, scientists are given the option of publishing their post-cruise results in either the Scientific Results volume, or in an appropriate peer-reviewed scientific journal or book that is published in English.

2. General Provisions

The specific objectives of ODP's sample and data distribution policy are to: (1) insure availability of samples to scientific party members so that they can fulfill the objectives of the drilling leg and their responsibilities to the ODP; (2) encourage scientific analyses over a wide range of research disciplines by providing samples to the scientific community; (3) to preserve core material as an archive for future description and observations, for non-destructive analyses, and for sampling; and (4) to disseminate scientific results from post-cruise research.

ODP and DSDP samples and data are generally distributed for research projects that can be completed within 2-3 years. ODP and DSDP samples are given or loaned to persons in the following four categories:

(1) scientists who participate on specific drilling legs as shipboard or shorebased members of a "scientific party" that has been formally approved by the ODP, and whose requests have been approved by the Sample Allocation Committee (see: 3a. Curatorial Responsibilities);
(2) scientists who wish to conduct research on ODP or DSDP materials, and publish the results, but who are not necessarily associated with a specific leg;
(3) curators of museums and collections; and
(4) educators.

Within the "moratorium" of each leg, which extends from the time the leg begins (i.e., the ship sails) to 12 months after it ends (i.e., the ship returns to port), only members of the scientific party (including approved shorebased researchers) are permitted to receive core samples and associated data (also see 5. Moratorium Sampling). Sample requests from scientists not formally associated with the scientific party will be considered after the moratorium has expired (also see 6. Post-Moratorium Sampling).

Data produced from samples taken for routine shipboard analyses are available to the entire shipboard party and to approved shorebased participants during the moratorium. After the moratorium expires, all cruise data are made available to everyone. Data from all DSDP and ODP cruises are available upon request from the ODP data librarian. Data from ODP Leg 171B and beyond are also available on the world wide web:(http://wwwodp.tamu.edu/database/). During the moratorium, the data from each leg is password protected and can only be accessed by members of the scientific party.

3. Program Responsibilities

3a. Curatorial Responsibilities:

The responsibility and authority for making decisions regarding the distribution of DSDP/ ODP samples, as per this policy, lies with the Sample Allocation Committee (SAC), the Curatorial Advisory Board (CAB), and the ODP Curator.

The ODP Curator maintains a record of all distributed samples, both on board ship and from the repositories. This record, which includes the recipients, the nature of the proposed research, and the status of the request, is available to investigators upon request.

For each drilling leg, a Sample Allocation Committee (SAC) is constituted, comprising the Co-Chief Scientists, the ODP Staff Scientist, and the ODP Curator or Curatorial Representative.

During the leg, the Curator's authority and responsibilities to the SAC may be ceded to the shipboard Curatorial Representative.

Because the Sample Allocation Committee (SAC) best understands the scientific needs of their leg, this group establishes leg-specific sampling policy and makes decisions on leg-specific sample requests received before the leg sails, during the leg, and

within the moratorium, but not after. Approval of such sample requests requires endorsement by a majority of the SAC. In the event of an evenly divided vote, a decision will be made by the ODP Curator. If so desired, the sample requester may choose to appeal the SAC's decision to the Curatorial Advisory Board (CAB).

The Curatorial Advisory Board (CAB) is a standing body that consists of the ODP Deputy Director of Services, the Manager of Science Services, and two members of the scientific community (selected by the JOIDES Scientific Measurements Panel) who will serve four-year terms that overlap by two years. Every effort will be made to insure that CAB membership represents as wide a variety of scientific disciplines as possible.

The Curatorial Advisory Board (CAB) acts as an "appeal board" vested with the authority to make final decisions regarding sample distribution if and when significant conflicts or differences of opinion arise among any combination of the ODP Curator, the sample requester, and the Sample Allocation Committee (SAC). In the case of an equally split vote among the four CAB members, a decision will be made by the JOI Office. The CAB is also responsible for reviewing and approving requests to sample the "permanent archive" (defined below), and requests for loans of core material for public display. To insure prompt decisions, CAB members will communicate via teleconferencing or e-mail. The current Curatorial Advisory Board members are:

Curatorial Advisory Board Members

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Manager of Science Services
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College Station, TX 77845 USA

3b. Publications Responsibilities

The Initial Reports (IR) volume is prepared by the shipboard scientific party during the leg. A representative group of 6 to 10 individuals meets 3 to 5 months postcruise to complete the final editing of the Initial Reports volume. Following the final editing, the Initial Reports volume is published 1 year after the end of the cruise.

The Scientific Results (SR) volume is published 4 years after the end of the cruise. It contains peer-reviewed papers presenting the results of post-cruise research relating to each leg. Contributions to the SR volume are managed by an Editorial Review Board (ERB).

Authors who wish to submit manuscripts to the outside literature during the 12 month post-cruise moratorium must receive, in writing, prior approval from a majority of the scientific party. Authors must submit a copy of the manuscript to the ODP Staff Scientist at the same time that they initially submit the manuscript to an outside journal. The ODP Staff Scientist will circulate the manuscript among the scientific party and will notify the authors of the approval (or disapproval) of the scientific party. Any disputes arising from this process may be taken to the Curatorial Advisory Board (CAB; see 3a: Curatorial Responsibilities).

The responsibility and authority for making decisions regarding the publication of post-cruise research to fulfill the ODP obligation, lies with the Manager of Publication Services and the Editorial Review Board for each leg.

3c. Editorial Review Board (ERB)

An Editorial Review Board (ERB) is established for every leg. The Board is comprised of up to four persons: two Co-Chief Scientists for the leg, the ODP Staff Scientist, and an external scientist/ specialist. The external scientist/specialist is selected by the other members of the ERB. The need for external ERB members will be determined on a leg-by-leg basis, based on the leg workload and Co-Chief/Staff Scientist's expertise.

The primary purpose of the Editorial Review Board (ERB) is to maintain an independent and effective peer-review system for the publication of leg results. The ERB is responsible for:

(i) Ensuring that all manuscripts are of reviewable quality before they are sent out for review. Upon submission, the ODP Staff Scientist will check all manuscripts to ensure that they are complete and of reviewable quality. Manuscripts that do not meet ODP's standards will be returned to the author and will not go through the review process unless they are revised to meet ODP standards before the submission deadline.
(ii) Coordinating the peer-review process for each manuscript.
(iii) Reviewing each paper for proper citation of site summaries and site chapters and for proper use of data and conclusions from other members of the scientific party.
(iv) Collecting manuscript reviews and making the final decision on manuscript acceptance or rejection of articles submitted for the SR volume.

The ERB compiles and approves a final table of contents for the SR volume, which links ODP sample or data requests to specific manuscripts titles at the science (2nd) postcruise meeting.

The Editorial Review Board (ERB) will remain active for 42 months post-cruise. Effective with Leg 169, the handling of additional contributions to the SR volume after 42 months post-cruise will be coordinated by the Staff Scientist for the leg.

It is the responsibility of the Co-Chief Scientist(s) from each leg to write, or coordinate, a Leg Synthesis paper to be published in the Scientific Results (SR) volume.

The ODP Staff Scientist will document the submissions of manuscripts and post-cruise data by leg scientists to the ODP.

4. Terminology and Curatorial Requirements

In this section, ODP-related curatorial terms, concepts and requirements are defined and explained.

4.1 Unique and Non-unique Intervals

A cored interval is designated "unique" if it has been recovered only once at a drill site. The most common occurrence of a unique interval is one that results when only one hole is drilled at a site. If the cored interval is recovered from two or more holes, then the interval is considered "non unique."

A critical exception to this definition occurs when drilling into igneous basement rocks, metamorphic rocks, or ore deposits. Every hole drilled into these lithologies is considered unique because of their inherent lateral heterogeneity.

Lithostratigraphic analysis of advanced piston cores from multiple holes drilled at one site may reveal that short (generally less than two meter) sedimentary intervals are

commonly missing between successive cores from any one drill hole, even where nominal recovery approaches 100%. These missing intervals can be ignored when considering whether or not an interval is unique.

4.2 Archive and Working Halves

Cores are split into halves for shipboard analysis. The halves are referred to as "working half" and "archive half". The entire working half is available for sampling. The concept and definition of an archive half (see below) is aimed to enhance scientific flexibility and to enable greater access to coveted material. In certain circumstances, the archive half is available for sampling. Before 1997, the archive was preserved (unsampled) and conserved in the repository, available only for non-destructive examination and analysis. Since 1997, the entire core has been available for sampling. The procedure of splitting cores into working and archive halves will continue, for practical and database purposes, but the concept and definition of an archive half has now been expanded and modified.

4.3 Permanent Archive

A "minimum permanent archive" will be established for each ODP drill site. Archive core earmarked "permanent" is material that is initially preserved unsampled and is conserved in the core repositories for subsequent non-destructive examination and analysis. In "unique intervals," this minimum permanent archive will consist of at least one half of each core, excluding whole-round samples (e.g., for interstitial pore water analysis). If so desired, the Sample Allocation Committee (SAC) may choose to designate more, but not less than this amount as the permanent archive. In "non-unique intervals", the permanent archive will consist of at least one half of one set of cores that span the entire drilled sequence, again, excluding whole-rounds samples. The permanent archive is intended for science needs that may arise five years or more after drilling is completed.

In practice, if holes are cored continuously, the minimum permanent archive may consist of one half of each core taken from the deepest hole drilled at a site. As such, the archive halves of cores from additional holes drilled to equal or shallower depths, which contain replicate copies of stratigraphic intervals constituting the minimum permanent archive, need not be designated as permanent archive, but can be, if so desired by the SAC. If not deemed permanent archive, they are "temporary archive".

4.4 Temporary Archive

Cores taken from non-unique intervals that are not part of the "minimum permanent archive" will be considered "temporary archives", unless stipulated otherwise by the Sample Allocation Committee (SAC) in the Sample Strategy. These halves may be sampled and treated as working halves when either the working halves have been depleted by sampling, or when pristine, undisturbed material is needed for special sampling needs, such as U-channels or slab samples.

4.5 Critical Intervals

Critical intervals are defined as lithologic spans that are of such scientific interest that there is extremely high sampling demand for them. These intervals may vary from thin, discrete horizons to thick units, extending over an entire core or more. Examples include, but are not limited to: décollements, sediment-basement contacts, igneous contacts, impact/tektite horizons, gas hydrates, marker ash horizons, scaly fabric, magnetic reversals, and particular biostratigraphic levels. The Sample Allocation Committee (SAC) is responsible for anticipating the recovery of critical intervals and for developing a strategy for sampling and/or conserving them. For post-moratorium sampling, the ODP Curator will work with investigators to ensure that previously-defined critical intervals are sampled only when necessary.

4.6 Non-Destructive Analyses

Requests to perform non-destructive analyses on cores (e.g., descriptions, imaging, x-ray) should be submitted to the ODP Curator through the standard ODP Sample Request Form. Investigators who carry out non destructive analyses incur the same obligations as those who request samples (see Sections 5.4 and 6.2 of this policy).

5. Moratorium Sampling

5.1 Leg-Specific Sampling Strategy

Leg-specific sampling, both shipboard and shorebased, will follow a "Sampling Strategy" established by the Sample Allocation Committee (see Appendix A). The strategy will integrate and coordinate the programs for drilling, sampling, and downhole measurement in order to best meet scientific needs. By necessity, the strategy will evolve over the course of leg planning, the leg itself (e.g., depending on drilling results), and in the post-cruise moratorium. All sampling plans will be carefully considered in the strategy. Whenever possible, sampling should be deferred to a coordinated shorebased sampling effort (commonly referred to as a "sampling party") in order to sample more efficiently, and with the perspective gained from having completed the leg. This will insure the best possible use of the core and distribution of samples. Shorebased sampling will be particularly appropriate for legs where many samples will be needed, such as those focusing on paleoceanographic objectives. Travel funds have been specifically allocated for this purpose in some ODP member countries.

5.2 Requests from Scientific Party Members

Scientific party members are requested to submit sample requests to the ODP Curator (see address provided below) three months prior to the start of the leg. This will provide sufficient lead time for planning. Sample requests submitted at sea or during the moratorium will also be considered by the Sample Allocation Committee (SAC). The sample requests will be reviewed by the Sample Allocation Committee (SAC) and approval will be based on compatibility with the Sampling Strategy. In cases where a sample request is considered incompatible, the SAC may: (1) recommend modifications to the request, (2) modify the Sampling Strategy, or (3) reject the request if the other options are inappropriate.

Sample request approval requires endorsement by a majority of the SAC. In the event of an evenly divided vote, a decision will be made by the ODP Curator. If so desired, the sample requester may choose to appeal the SAC's decision to the CAB. If a conflict arises over the allocation of samples, shipboard scientific party members have priority over shorebased members.

Instructions for obtaining an ODP Sample Request Form are provided in Appendix B. Appendix C contains guidelines to assist the requester in estimating sample volumes.

5.3 Samples for Routine Shipboard Analyses

Data produced from samples taken for routine shipboard analyses (e.g., index properties, interstitial (pore) water whole rounds, thin sections, smear slides, x-ray diffraction and x-ray fluorescence samples, paleontology core-catcher samples) are available to the entire shipboard party and approved shorebased participants during the moratorium. Unless requested, these samples, and/or their residues, are shipped to the appropriate core repository at the end of the cruise. If scientific party members want these materials for post-cruise research, they are available through the normal sample request procedure. Shipboard thin sections and smear slides are also sent to the repository, post-cruise, where they are catalogued before being made available for short-term (less than one year) loan to scientific party members upon request.

Instructions for obtaining an ODP Sample Request Form are provided in Appendix B. Appendix C contains guidelines to assist the requester in estimating sample volumes.

5.4 Responsibilities

Scientists who receive samples or conduct non-destructive analyses within the 12-month moratorium must:

(1) Fulfill their publication obligation to the Ocean Drilling Program by either:

   (a) Publishing a paper in a peer-reviewed scientific journal or book that is published in English, or
   (b) Publishing a paper or a data report in the Scientific Results (SR) volume.

Authors must submit their initial manuscripts by the specialty paper submission deadline, which is 28 months post-cruise.

An author who submits a manuscript to an outside journal must simultaneously submit a copy of the manuscript to the ODP Staff Scientist, who is a member of the Editorial Review Board (ERB). If the ERB determines that there is improper usage of the data and conclusions of other members of the Scientific Party, or failure to properly cite the Initial Reports volume, the ERB will contact the author and the journal editor with a recommendation that the manuscript be withdrawn or suitably modified. Any disputes arising from this activity will be addressed by the Curatorial Advisory Board (CAB).

If a manuscript submitted to a peer-reviewed scientific journal is rejected by the journal, then the author must contribute a manuscript or a data report to the SR volume

no later than six months after receiving the rejection notice, in order to fulfill their publication obligation to the ODP.

Authors who choose to submit a paper to the SR volume will be required to meet the ODP submission deadlines. These deadlines are:

Initial submission, specialty papers:	28 months Postcruise
Revised submission, specialty papers:	34 months Postcruise
Initial submission, synthesis papers:	35 months Postcruise
Revised submission, synthesis papers:	40 months Postcruise

(2) Acknowledge the international Ocean Drilling Program (ODP) in all publications that result from the use of data collected from ODP samples.

(3) Submit one reprinted copy of all published works derived from ODP samples or data to:

ODP Curator
Ocean Drilling Program
1000 Discovery Drive
College Station, TX 77845-9547 U.S.A.

(4) Submit all final analytical and/or descriptive data obtained from the samples to the ODP Curator, as soon as the data have been published, or within five years after Receiving samples, whichever comes first. Data, preferably in electronic format, should be submitted to the ODP Curator.

Investigators should be aware that they may have other data obligations under the U.S. National Science Foundation's Ocean Science Data Policy or under relevant policies of other funding agencies that require submission of data to national data centers.

(5) Return all unused samples to the appropriate core repository no later than five years post-cruise. Residues from processed samples need not be returned.

(6) Comply with all written collaborative agreements identified in the leg sampling plan.

If a scientist is unable to fulfill their obligations to the Ocean Drilling Program (as described above), then a letter of explanation must be submitted to the ODP Curator (see address above). Failure to meet these responsibilities will result in the rejection of future sample requests and may influence participation on future legs.

6. Post-Moratorium Sampling

6.1 Introduction

Post-moratorium sampling is supervised by the ODP Curator and the Curatorial Advisory Board (CAB). Core material recovered during a leg is available to the broader science community for sampling beginning 12 months after a cruise has ended.

Samples will be provided to any scientist, curator, or educator who has the resources to complete a scientific investigation, or prepare materials for curatorial or educational purposes. The sample requester must independently secure funds for sample-related research activities. Requests for samples should be submitted to the ODP Curator. Approval of sample requests will be based on the availability of material and the length of time it will take the investigator to complete the proposed project. Typical studies will take two to three years, but a longer duration will be considered under certain circumstances. If a sample requester disagrees with the ODP Curator's decision, the requester can appeal to the Curatorial Advisory Board (CAB).

Instructions for obtaining an ODP Sample Request Form are provided in Appendix B. Appendix C contains guidelines to assist the requester in estimating sample volumes.

6.2 Responsibilities

Scientists who receive samples or conduct non-destructive analyses after the 12-month moratorium must:

(1) Fulfill their publication obligation to the Ocean Drilling Program by either:
   (a) Publishing a paper in a peer-reviewed scientific journal or book that is published in English, or
   (b) Submit a progress report to the ODP Curator outlining the status of the samples and/or the data no later than 36 months after receiving them.

(2) Acknowledge the ODP, DSDP and/or others as appropriate In all publications that use data collected from ODP or DSDP samples

(3) Submit one reprinted copy of all published works derived from ODP samples or data to:

ODP Curator
Ocean Drilling Program
1000 Discovery Drive
College Station, TX 77845-9547 U.S.A.

(4) Submit all final analytical and/or descriptive data obtained from the samples to the ODP Curator, as soon as the data have been published, or within five years after receiving samples, whichever comes first. Data, preferably in electronic format, should be submitted to the ODP Curator (curator@odpemail.tamu.edu).

Investigators should be aware that they may have other data obligations under the U.S. National Science Foundation's Ocean Science Data Policy or under relevant policies of other funding agencies that require submission of data to national data centers.

(5) Return all unused samples to the appropriate core repository no later than five years post cruise. Residues from processed samples need not be returned.

If the sample recipient is unable to produce research results because data could not be obtained during post-cruise analysis, a letter of explanation must be submitted to the ODP Curator. Failure to meet these responsibilities will result in the rejection of future sample requests and may influence participation on future legs.

6.3 Curatorial Duties

The ODP Curator will receive post-moratorium sample requests and will evaluate them for completeness and for adherence to the provisions in this policy. If questions arise, the ODP Curator will consult with the requester. If a sample requester disagrees with the ODP Curator's final decision on a sample request, and wishes to appeal the decision, the ODP Curator will forward the request to the Curatorial Advisory Board (CAB) for resolution.

When considering a sample request, the ODP Curator will ascertain whether the requested material is available in the working half or the temporary archive half of the core. If not available, the ODP Curator will consult with the requester to determine if the range of the sought interval(s) or the sample spacing within the interval(s) may be modified. If the request cannot be modified because of scientific requirements, a request to sample the permanent archive can be considered (see 6.4 Permanent Archive Sampling).

To assist the sample requester, the ODP Curator can provide relevant information on previous sample requests and resultant studies on the core interval in question. The ODP Curator can also provide advice and guidance to the requester when considering sample volumes and frequencies (see Appendix C).

6.4 Archive Sampling

Requests to sample the permanent archive should be sent to the ODP Curator, who will forward them to the Curatorial Advisory Board (CAB), after preliminary review. The CAB will evaluate the request based on its scientific merit and on the extent to which the working half is depleted. If necessary, the CAB may also consult with members of the original Sample Allocation Committee (SAC) who were responsible for establishing the permanent archive being considered for sampling. The Curatorial

Advisory Board (CAB) will strive to maintain a representative continuous section of core material for archival purposes whenever possible.

6.5 Educational Sampling

Cores can be viewed, described, and sampled for teaching and educational purposes. Core materials that are abundant in the collection, and thus not in demand for research purposes, are available to educators for sampling. Sample requests (made using the Sample Request Form, see: Appendix B) are approved by the ODP Curator if the request does not deplete the working and/or the temporary archive halves of the core. Educators who receive samples or conduct non-destructive analyses do not incur the same obligations as researchers to publish or provide data to ODP.

6.6 Requests for Public Display Material

Core material is available for public display, such as in museums or at professional scientific meetings. Requests to borrow cores may be submitted to the ODP Curator, and the requests should:

(1) include a description of the public display, including the location and purpose;
(2) indicate the duration of the display and how the curatorial state of the cores will be maintained; and
(3) identify the person(s) responsible for overseeing the cores.

All public displays of ODP/DSDP material will include a notice that properly credits the ODP and support by the National Science Foundation and its international partners.

Requests will be reviewed by the ODP Curator and possibly the Curatorial Advisory Board (CAB), and will be forwarded to Joint Oceanographic Institutions, Inc. (JOI) as appropriate. A loan agreement will be required for long-term loans (two weeks or more). The Curator will provide details about the loan agreement upon request.

Appendix A: Leg-Specific Sampling Strategy: Guidelines and Examples

Guidelines

Development of the leg-specific Sampling Strategy begins in the initial stages of leg planning, when ODP drilling proposals are written and submitted to JOIDES. At this stage, proponents will develop a draft Sampling Strategy that will fulfill the scientific objectives of the leg.

Once a proposal has been scheduled by JOIDES for drilling and Co-Chiefs have been selected, the Sample Allocation Committee (SAC) will write a formal, leg-specific Sampling Strategy for publication in the ODP Scientific Prospectus. The Prospectus will be reviewed by the ODP Director and the Deputy Director of Operations prior to publication. This gives them an opportunity to advise on sampling issues pertaining to the broader (non-leg-specific) community. The Sampling Strategy will meet the specific objectives of the leg. The Strategy will define the minimum permanent archive and any supplements to it that the SAC deems necessary. The Strategy will also become the basis of the shipboard and moratorium "sampling plan".

A successful Strategy will:

(1) define the amount of core material available to the scientific party for sampling by deciding if (and when) more than a minimum permanent archive is needed;
(2) anticipate and possibly define limits on the volume and frequency of shipboard sampling for routine analyses, pilot studies, and low-resolution studies;
(3) estimate the sampling volume and frequency that is needed to meet the objectives of the leg, as per scientific sub-discipline and request type;
(4) anticipate the recovery of critical intervals and develop a protocol for sampling and/or preserving them;
decide where and when sampling will occur. SACs are strongly encouraged to defer large-volume and high-frequency sampling to post cruise "sampling parties" at ODP core repositories;
(5) determine special sampling methods and needs (e.g., Pressure Core Sampler, microbiology, whole rounds); consider any special core storage or shipping needs (e.g., plastic wrap, freezing sections); and
(6) identify disciplines/personnel needed for shorebased sampling.

Needs

Detailed sampling will be necessary to achieve the scientific objectives. Large-volume samples may be required.

Sampling Timetable

High-resolution sampling of cores from a given site will proceed after a composite sampling splice has been constructed from cores from the two or more holes drilled at that site. The splice will be constructed and distributed to the scientific party after the site has been drilled, but in advance of post-cruise sampling, in order to facilitate planning and scientific collaboration. Requests to sample shipboard, for pilot studies or for projects requiring lower stratigraphic resolution, will be considered by the Sample Allocation Committee (SAC).

General Sampling Procedures

Investigators should try to avoid sampling the center of the working and the temporary halves of the core. Sample plugs (e.g., plastic vials of 5 and 10 cc) and paleomagnetic cubes should be taken as close to the edges of the core as possible. Samples may also be parceled out with the "scoop" tool, which inherently takes samples from the edges of the core. Large samples taken with the "cookie-cutter" tool, often for lamina-scale studies, will be shared equally among the interested scientific party members.

Critical Intervals

Marker beds of volcanic ash layers or major transitions from oxic to anoxic layers may be encountered. They will be considered "critical intervals," and as such will not be sampled onboard the ship. Requests to sample these intervals will be evaluated by the Sample Allocation Committee (SAC) and sampling will occur at the post-cruise "sampling party" at the repository.

Appendix B: ODP Sample Request Form

An electronic version of the ODP Sample Request Form is available on the WWW. (http://www-odp.tamu.edu/curation/
subsfrm.htm). Individuals who cannot easily access this form on the internet should contact the ODP Curator for a printed copy.

Appendix C - Typical Sample Volumes

The following volumes are guidelines, not limits.

Thin Section Billets 10cc, up to 50cc for large grained plutonic rocks
Alkenone (Uk37) 5cc
X-ray diffraction 5cc
X-ray fluorescence 20cc (sediments), 20-50cc (igneous/sulfides - varies depending on grainsize and homogeneity of rock)
Carbonate 2cc
Paleomag 7cc cubes, 12cc minicores
Moisture and Density 10-20cc
Grain Size 10-20cc depending upon coarseness
Planktonic Foraminifers 10cc

Benthic Foraminifers 10-20cc
Nannofossils 2cc
Diatoms 5-10cc
Radiolarians 10cc
Palynology 10-15cc
Organic Samples 20cc
Interstitial Porewaters 5 cm whole rounds, up to 10-20 cm, based on water content
Inorganic Geochemistry 10cc
Organic Geochemistry 10cc
Sedimentology 10-20cc
Slabs (for laminae studies) 25-50cc, depending on slab length
Slabs (large grained plutonic rocks) 50-100cc, often shared by scientists for multiple analyses
Stable isotopes (C, O) 10-20cc

Permanent Archive

The permanent archive will be the ODP-defined "minimum permanent archive."
Temporary Archive

Once the working halves of the cores have been depleted, the temporary archive will be accessible for sampling. When possible, one quarter of the core should be preserved by sampling off-center.

NATIONAL ODP STRUCTURE:
ODP Members

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 innovative experiments and technology related to drilling, NSF funds proposals in three categories:

1. Regional geological and geophysical studies well in advance of drilling. This category is for concentrated studies on high-priority areas which address thematic goals identified by the COSOD reports, as well as priorities identified by JOIDES Long Range Plan. In general, priority is 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: 15 February and 15 August.

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:

- Planning activities such as US workshops and participation on JOIDES panels and funding for the travel of US panel members to JOIDES panel meetings.
- Site development, including data syntheses and Site survey augmentation.
- Site survey 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, and support for drilling related science on ships of opportunity.
- Support for participation of US scientists in specific drilling legs and funding for salaries and travel of US shipboard scientific party members.

- Development of downhole instrumentation, which may include a wireline re-entry system, and vertical seismic profiling.
- Education and public information, including logging schools, graduate student fellowships, and storage and dissemination of ocean drilling data.

United Kingdom

The United Kingdom was one of the founder members of the International Phase of Ocean Drilling and has been a full member of the ODP since 1985. UK membership of ODP is funded and administered by the Natural Environment Research Council.

In preparation for Phase III, a new national UK ODP Committee is being established. Its role is: to advise NERC on ODP policy; to oversee national obligations as a JOIDES member; to maximize benefits of membership of the Program; to advise on links with other international activities; and to promote the profile of ODP within the UK. It will also advise NERC on proposed ocean drilling activities post-2003.

The UK ODP Committee also oversees the allocation of science funding to ODP-related projects and Fellowships and support for participation in ODP legs. Membership includes the UK EXCOM, SCICOM and SSEP representatives, other JOIDES Panel members as required, together with independent academic and industrial members.

The UK ODP Committee reports to NERC's Earth Science and Technology Board, which in turn has responsibility for developing the Earth science component of Council's strategy, advising Council on the health of the science within its remit, overseeing the portfolio of geoscience programmes (including ODP) supported by public funds, and representing the UK Earth Science community.

Proposals for funding from the science allocation are invited from the research community and subject to international peer review. The proposals come in response to open competition from universities, research institutes and other approved groups in science and technology spanning the geological, geophysical, geochemical, biological and multidisciplinary research communities.

Awards are made for research grants and for two-year ODP Fellowships, the latter being made to promising postgraduate candidates who have proposed a high quality, personal research topic of particular relevance to the Program. In addition, small awards are made for post-cruise science projects. An annual ODP Science Forum is also held at which the achievements of recent Legs are reported and details given of upcoming Legs. This Forum attracts a broad audience from the student, postgraduate, academic and industrial community with a special or general interest in ODP.

The UK's commitment to ODP is further sustained through its full participation in ODP Legs and its active membership of the JOIDES Panels and Committees. The UK member of SCICOM is the coordinator of UK shipboard participation, receiving applications from UK scientists and acting as the liaison with ODP-TAMU. Between 1994 and 1996, the UK was the first non-US country to host the JOIDES Office.

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 Bildung, Wissenschaft, Forschung und Technologie (BMBF), the Federal Ministry of Education, Science, 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 Committee.

DFG has established a priority program, 'Schwerpunktprogramm ODP/DSDP', providing grants totaling approximately DM 5 million 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 is 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, and the German JOIDES panel memberships are determined. 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.

Japan

Japan has been a full member of ODP since October 1985. The Monbusho (Ministry of Education, Science, Culture and Sports) 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, effective until 2003, will be signed in June 1998.

There are two national committees equivalent to EXCOM and SCICOM. ORI Director, Prof. K. Taira chairs the National Executive Committee which has 29 members from universities, research institutions, oil companies and Monbusho. The Committee normally meets twice a year to discuss budgetary issues and science plans. The National Science Planning Committee, chaired by Prof. A. Taira (ORI), meets at least twice a year to develop scientific plans, including long-range plans.

The members are current ODP Panel representatives, liaisons to InterRidge, ION, and OD21*, and other scientists who 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 the international scientific community to be available in the 21st Century.) Five special working groups serve to discuss the following detailed science plans:

1. Paleoenvironments
2. Seismogenic Zone Study
3. LIPs and Mantle Dynamics
4. Seismic Tomography
5. Downhole Measurements

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

2. Publish and distribute the ODP Newsletter and other information to about 700 addresses, and distribute ODP Proceeding.
3. Hold workshops and symposia to discuss recent scientific results from ODP cruises.
4. Ensure access to R/V Tansei Maru and R/V Hakuho Maru of ORI for ODP site surveys and coordinate drilling proposal submission.
5. Promote developments of new downhole instruments towards establishing ocean floor laboratories.

France

France has an administrative structure comprised of an Executive Committee which includes representatives of various French organizations and ministerial delegates and an ODP Scientific Committee that meets two to three times a year. Members of the latter are scientists from different institutions (University, CNRS, IFREMER, BRGM, IFP, ORSTOM, or oil industry), and are selected for their specific field of expertise as representatives on JOIDES Panels and Program Planning Groups.

The Institut des Sciences de l'Univers (INSU) of the Centre National de la Recherche Scientifique (CNRS) is the national research agency which represents France in the Ocean Drilling Program. The ODP budget at INSU-CNRS covers the ODP subscription, travel funds, and other support for the Program. Ship operations are managed by The Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), and cruises may be devoted to regional surveys useful for ODP. In addition, subject to proposal review, the IFREMER may allocate ship time for MCS surveys relevant to ODP site surveys. The French science support program is made up of special grants provided by the INSU-CNRS; proposals are examined by a grant selection

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 IFREMER, ORSTOM, IFP, and BRGM) to their scientists involved with ODP.

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, Iceland, Italy, The Netherlands, Norway, Portugal, 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 ECOD Management Committee (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 ECOD 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.

Pacific Rim Consortium

The Pacific Rim Consortium, consisting of organizations from Australia, Canada, Chinese Taipei and South Korea was established January 1997. Canada joined the ODP as a regular member in 1985. In 1988, Australia and Canada signed a Memorandum of Understanding whereby Australia shared one-third and Canada two-thirds of an ODP membership. Canada's participation decreased to one-third membership in 1994. The Republic of Korea joined the AusCan Consortium in 1996 as a one-twelfth member and Chinese Taipei joined the consortium in 1997 with a one-sixth membership. Canada presently holds the Pacific Rim Consortium Secretariat, and as such, acts as the liaison and coordinator between the governing bodies of each of the consortium partners and ODP and JOIDES. The Consortium office rotates between each member country every eighteen months.

In Australia, a National Science Committee (SciCom) is made up of scientists from all contributing institutions and geological disciplines, and oversees Australia's scientific involvement in the Program. The Committee's responsibilities include choosing shipboard participants, scientific and technical planning, and dissemination of

information to the respective scientific communities. An Australian ODP Council is chaired by a senior official of the Australian Geological Survey Organisation (AGSO), and includes additional representation from AGSO, ARC, and the Australian Vice-Chancellors Committee (AV-CC). The Council Chair (currently Dr. Neil Williams, Director, AGSO) is also Australia's representative on the International ODP Council.

Operation of the AusSciCom is administered by an Australian Secretariat which is responsible for ensuring proper communication with the science community and the management of meetings and workshops. The Australian Secretariat for the Ocean Drilling Program has been housed successively at universities in Hobart, Armidale and Townsville. On 1st April, 1998, the Secretariat rotated to the Department of Geology, University of Sydney, where it will operate under Director Dr. J. Keene for a period of three years.

CanadaODP aims to have a cost-effective organization with a broad representation of scientific and engineering talent. Funding for CanadaODP is provided by the Natural Sciences and Engineering Research Council (NSERC) and the Geological Survey of Canada (GSC). A CanadaODP Council provides overall direction for ODP activities in Canada and participates in the selection of shipboard nominees. The Council is comprised of Canadian representatives on JOIDES panels and PPGs, plus members from the funding agencies (NSERC, GSC) or their representatives, and a member from the Canadian Geoscience Council.

The Canadian Secretariat for the ODP, located in the Department of Geology at the University of Toronto as of February 1994, is responsible for the coordination, administration and day-to-day management of CanadaODP activities. The Secretariat is accountable to the Canadian ODP Council. The Secretariat publishes a quarterly newsletter and maintains a web site as a part of its mandate to increase awareness of the program within the scientific community. Dr. S. Scott is currently the Director of the Secretariat and Helen Lasthiotakis is the Associate Director. Following the successful application to NSERC in November 1996 for renewal of Canada's participation in ODP, Canada will continue in the program for the period 1999-2004.

The Chinese Taipei ODP Consortium, a National Society made up of geoscientists and administrators in Chinese Taipei was formed in 1996. The Society's responsibilities include scientific and technical planning, choosing shipboard participants, and dissemination of information to the respective scientific communities. Chinese-Taipei ODP Consortium consists of 10 institutions in Chinese Taipei, including National Taiwan University, National Sun Yat-Sen University, National Taiwan Ocean University, National Taiwan Normal University, National Cheng Kung University, National Central University, National Chung Cheng University, Academia Sinica, Central Geological Survey and Chinese Petroleum Corporation. Currently, this Consortium is located at the National Taiwan University, Taipei. Dr. Ju-Chin Chen is the chairman of the Consortium. Dr. Min-Pen Chen is the Director of Secretariat which is responsible for ensuring proper communication with the science community, and the management of meeting and workshops. This Consortium consists of four Panels: Sedimentology and Paleontology Panel; Petrology, Mineralogy and Geochemistry Panel; Geophysics and Plate Tectonics Panel; and Ocean History Panel. Drs. Min-Pen Chen, Sun-Ling Chung, Char-Shine Liu and Kuo-Yen Wei are the coordinators of each panel respectively.

In Chinese Taipei, funding for the Ocean Drilling Program is provided entirely by the National Science Council. The Chinese Taipei National Science Council agreed to support the Consortium from 1997-2002. Whether the support will be continued beyond 2002 will depend on an evaluation at the end of 2001.

The primary governing arm of the Korean ODP organization is the Korean ODP Council (KOC). The Korean ODP Scientific Committee (KOSC) and Korean ODP Secretariat (KOS) are under the KOC umbrella. The chairperson of KOC is the president of the Korea Institute of Geology, Mining and Materials (KIGAM) and members consist of representatives of research institutes, universities, other organizations or administrations related to the geoscience community, and prominent scholars in the field of Geosciences. KOC as the ultimate decision-making body for the Korean ODP and is responsible for the Korean ODP budget and the appointment of the KOSC chairperson and members. The role of KOSC is to recommend shipboard scientists, encourage broad Korean understanding of ODP, and to evaluate ODP-related research proposals. The main role of KOS is for support of KOC and KOSC, and administering the Korean ODP budget. Funding for the ODP in the Republic of Korea is provided entirely by the Ministry of Science and Technology (MOST) but the KOC is currently also looking for support from the Ministry of Education.

People's Republic of China

The People's Republic of China joined ODP as its first Associate Member in 1998 with the signing of a MOU between NSF and the Marine High Technology Bureau of the National Science and Technology Commission (now renamed the Ministry of Science and Technology) of the People's Republic of China. An Executive Committee, consisting of representatives from different governmental departments, and a Science Committee, consisting of scientists from different academic organizations and institutions, have been set up to coordinate ODP activities.

APPENDIX I

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 1996, JOIDES updated its Long Range Plan which identifies scientific priorities and calls for continued international cooperation in ocean drilling extending to the year 2002. JOIDES has endorsed use of the JOIDES Resolution as the primary facility for ODP coring and logging through 2002. Facilities, including any alternate or additional drilling platforms utilized through 2002 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. **Actual wording may differ slightly from that identified above due to individual member preference.

APPENDIX II

ODP Membership Policy

(Ratified by EXCOM: June 1998)

Although a policy of full and equal participation remains a goal of ODP, this document identifies degrees of participation in the JOIDES Advisory Structure at reduced member-ship levels. Membership levels will consist of Full Members and three levels of Associate Membership. Each level has defined degrees of participation in the JOIDES Advisory Structure. Countries and consortia at all levels have the right to observer status on all JOIDES panels and committees, and can participate in their discussions at the discretion of the Chair.

Only Full Members of ODP (whether individual countries or consortia) have voting rights in the policy- and scientific-decision making for ODP (i.e., on EXCOM and SCICOM). All other levels of membership do not include representation on EXCOM and SCICOM. For the purposes of defining the Associate Member levels, the standing Panels and Committees within the JOIDES Advisory Structure are divided into three groups:

Group I (Highest level of advice on ODP science and policy)
- EXCOM
- SCICOM

Group II (Scientific advice)
- ESSEP
- ISSEP

Group III (Technical and operational advice)
- SCIMP
- SSP
- TEDCOM
- PPSP

Privileges of Different Membership Levels

1. SHIPBOARD PARTICIPATION
   Shipboard participation will be directly proportional to the contribution.
2. PARTICIPATION IN THE JOIDES ADVISORY STRUCTURE

Membership Level	Contribution	Privileges
Associate 3	**2/3**	**One member on all Panels of Groups II & III;**
Associate 2	**1/2**	**One member on one Panel from Group II; One member on two Panels from Group III;**
Associate 1	**1/6**	**One member on one Panel from Group II; One member on one Panel from Group III**

APPENDIX III:
Mandates and Terms of Reference

JOIDES

Joint Oceanographic Institutions for Deep Earth Sampling
The Mandates and Terms of Reference for the new
JOIDES Science Advisory Structure

Prepared by the JOIDES Office
University of Wales, Cardiff, United Kingdom
September 12, 1996

Revised by the JOIDES Office
Woods Hole Oceanographic Institution, Woods Hole, MA January 9, 1997,
March 1, 1997 and March 20, 1997

Ratified by EXCOM: February 12, 1997

TERMS OF REFERENCE
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 sea floor and an adequate capability in terms of scientific human power and facilities to carry out such studies.
3. The membership of this committee is now composed 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) [Australia-Canada-Korea Consortium, European Science Foundation, France, Germany, Japan, and the United Kingdom] and one representative of each of ten 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.
6. 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.
7. 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 Science Committee and a Budget Committee shall be established.
8. The Committee, and all subcommittees thereto, shall keep written records of their proceedings.
9. 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.

The Chair of EXCOM rotates with the JOIDES Office among the JOIDES institutions, excluding the Science Operator and Wireline Logging Service Operator institutions. The term of office is usually two years.

JOIDES Budget Committee for the Ocean Drilling Program

1. **General Purpose**. The Budget Committee (BCOM) may be convened as required to provide JOIDES overview and review of the ODP Program Plan and budgets therein.

The ODP Program Plan is compiled by JOI, Inc., the ODP prime contractor. This includes the annual Science Plan which is developed by SCICOM and prepared by the JOIDES Office on the basis of the drilling schedule determined by OPCOM and approved by SCICOM. 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 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 continuing 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. If BCOM has met, it reports to EXCOM at its spring/summer 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.

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 SCICOM. This review is to be reported to EXCOM and SCICOM. 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 as required 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 consists of three EXCOM members and two SCICOM members, one of whom is the present SCICOM Chair. The second member is ideally the immediate past SCICOM Chair. A balance of three US and two non-US BCOM members is maintained. A quorum shall consist of two of the EXCOM members and one of the SCICOM members. BCOM members are appointed by EXCOM. EXCOM or SCICOM members representing JOIDES institutions with major ODP subcontracts will not be appointed.

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 Science Committee, an Operations Committee, a Technology and Engineering Development Committee, two Science Steering and Evaluation Panels and three Service Panels. Ad hoc Program Planning Groups and Detailed Planning Groups may be approved by the Science Committee as requested by the Science Steering and Evaluation Panels, the Scientific Measurements Panel, or by the Science Committee itself.

2. Committees, Panels, Program and Detailed Planning Groups

Each committee, panel, Program or Detailed Planning Group (PPG or DPG) 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 Science Committee for approval by the Executive Committee. Mandates, guidelines and duration of operation for the short-lived Program and Detailed Planning Groups will be specified by SCICOM as required.

3. Science Committee

3.1 General Purpose. The Science Committee (SCICOM) reports to the Executive Committee and provides advice to JOI, and through JOI, the Science Operator and Wireline Logging Services Operator on plans designed to optimize the scientific productivity and operational efficiency of the drilling program.

More specifically, the SCICOM is responsible for:

- custody of the ODP Long Range Plan;
- ranking of mature drilling proposals that address the scientific themes and initiatives in the ODP Long Range Plan;
- carrying out long-term science planning, over the 5-year period of ODP Phase III and beyond;
- fostering communications among and between the general community, the JOIDES science advisory panels, the Program Management and Operators.

3.2 Mandate. SCICOM is responsible for the creation and mandates of the various advisory panels and planning groups and their membership, which must be approved by EXCOM. In addition, SCICOM may assign special tasks to such advisory panels and planning groups. The SCICOM Chair convenes the panel meetings and approves the meeting dates, locations, and agendas of all the science advisory committees, panels, and groups. SCICOM sponsors and convenes COSOD-type conferences at intervals determined by long-term science plans for ODP. SCICOM, through the JOIDES Office, assigns proposals to Science Steering and Evaluation Panels, Program Planning Groups and, if relevant, to Service Panels, for review. SCICOM ranks the scientific objectives of the proposals into final priority after they are reviewed by the panels. SCICOM approves by a majority (e-mail) vote the annual drilling schedule as determined by OPCOM. The Science Committee proposes Chief Scientists to the Science Operator, who makes the final selection.

SCICOM periodically reviews the JOIDES advisory structure in the light of developments in science and technology, and recommends to EXCOM amendment of its panel structure and mandates. Much of the work of SCICOM is carried out by the commissioning of reports from OPCOM and the other science advisory panels, including Detailed Planning Groups, ad hoc subcommittees of its own membership, and by its Chair at the JOIDES Office.

3.3 Structure. SCICOM 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 PPGs and DPGs is maintained by having their Chairs meet with the Committee annually, and by assigning committee members as non-voting liaison members to its panels and planning 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 Meetings. SCICOM meets at least twice a year, normally in March and early September. Robert's Rules of Order will govern its meetings, and those of all of its subcommittees.

3.5 Membership. SCICOM will consist of sixteen members proportionally representing the ODP partners (10 US and 6 full non-US). Each full non-US member shall designate one member of the Science Committee and an alternate to serve in the absence of the designated member. US members of the Science Committee will be appointed by the JOI Board of Governors. The term of membership will be three years and at least one third of SCICOM members shall rotate off the Committee annually, so that the SCICOM membership is replaced every three years. Re-appointment shall be made only in exceptional circumstances. All appointees to SCICOM 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 Science Committee shall be maintained as far as possible by requests to member committees.

3.6 Liaison. The Director of ODP at JOI, and the Directors, or nominees thereof, of the Science Operator and the Wireline Logging Services Operator, and a nominee of NSF, are permanent, non-voting liaison observers, as is the TEDCOM Chair. The SCICOM Chair is the liaison to EXCOM.

3.7 Vote and Quorum. Within the framework of the Memoranda of Understanding with each non-US member, 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.

3.8 Chair. The SCICOM Chair (and the JOIDES Office) rotates between US and non-US JOIDES institutions, excluding the Science Operator and Wireline Logging Service Operator institutions. The term of office is usually two years.

4. Operations Committee

4.1 General Purpose. The Operations Committee (OPCOM) is a sub-committee of the Science Committee. The Operations Committee reports to the Science Committee on the implementation of science and technological development plans required to achieve the goals of the ODP Long Range Plan.

4.2 Mandate. OPCOM is responsible for recommending the schedule of the drilling vessel over a period that may exceed one year, based on SCICOM's ranking of proposals. It will receive, and act upon, reports from the service panels and TEDCOM, and under guidance from the Chair, advise JOI accordingly. OPCOM will advise SCICOM on

short-term logistical, technological, and budgetary implications of scientific programs highly ranked by SCICOM, and on longer-term technological requirements for implementing the ODP Long Range Plan.

4.4 Meetings. OPCOM shall meet at least twice per year. Dates, locations, and agendas will be approved by the SCICOM Chair. The spring meeting will precede SCICOM to allow formulation of reports; the summer/fall meeting will follow SCICOM to allow a drilling schedule to be constructed from SCICOM's proposal ranking. This will be sent to SCICOM for approval. If a proposed drilling schedule is not approved, OPCOM will reconvene and formulate a new schedule.

4.4 Membership. The Operations Committee will consist of the SCICOM Chair plus two other SCICOM members plus 3 other members from the marine geoscience community and should have regard to the US non-US balance. Membership will be determined by SCICOM. The term of membership will be for 1 year, renewable by SCICOM for up to 3 years. Additional expertise required to address specific issues may be brought in with the approval of SCICOM. Invited specialists will provide advice and will not serve as members of OPCOM.

4.5 Liaison. The Director of ODP at JOI, or a nominee thereof, and the Directors, or nominees thereof, of the Science Operator and the Wireline Logging Services Operator and the Wireline Services Operator, and a nominee of NSF, are permanent, non-voting liaison observers, as are the Chairs of TEDCOM, SSP, PPSP and SciMP.

4.5 Vote and Quorum. A quorum shall be at least two SCICOM members and two other members. The Operations Committee will reach all decisions by consensus. 4.7 Chair. The SCICOM Chair will be the OPCOM Chair.

5. Science Steering and Evaluation Panels

5.1 General Purpose. The Science Steering and Evaluation Panels (SSEPs) are established by the Science Committee to interact with proponents and Program Planning Groups in nurturing selected drilling proposals to maturity, evaluating those proposals, and then recommending mature proposals for external comment. The Science Steering and Evaluation Panels advise SCICOM on thematic development within the Ocean Drilling Program. Based on the 1996 ODP Long Range Plan there shall be initially two SSEPs.

Dynamics of Earth's Environment SSEP: Area of Interest

The interests of Dynamics of Earth's Environment SSEP are explained in detail in the ODP Long Range Plan. In particular, important themes of investigation are:

- Understanding Earth's changing climate: this explores the causes, effects, and interrelations between climate change and oceanic circulation patterns which is essential to understanding our climate system and predicting its response to such factors as global warming from greenhouse gases.
- Causes and effects of sea-level change: this investigates the complex interactions between climate, orbital dynamics, and the vigor of thermal convection within the Earth's asthenosphere and their effects on the timing, rates and magnitude of sea-level changes.
- Sediments, fluids and bacteria as agents of change: this examines the complex interactions between organic and inorganic material from the continents, deposition from the marine biosphere, and circulation of fluids through the deposited material.

Dynamics of Earth's Interior SSEP: Area of Interest

The interests of Dynamics of Earth's Interior SSEP are explained in detail in the ODP Long Range Plan. In particular, important themes of investigation are:

- Exploring the transfer of heat and materials to and from Earth's interior: this attempts to quantify and model the physical and chemical processes involved in the solid Earth geochemical system through exploration of mantle dynamics, the formation and structure of oceanic crust, hydrothermal processes and sulfide mineralization, crustal aging, and recycling of material at subduction zones.
- Investigating deformation of the lithosphere and earthquake processes: this investigates deformation along extensional, translational and convergent boundaries, and examines earthquake mechanisms.

5.2 Mandate. Each Science Steering and Evaluation Panel is responsible to the Science Committee, and will respond directly to requests from it, as well as reporting to it on a regular basis. Each Science Steering and Evaluation Panel will be responsible for:

- nurturing to maturity and evaluating the scientific merits

of selected drilling proposals by interaction with Program Planning Groups and proponents
- providing Program Planning Groups, proponents, and SCICOM written with evaluations and comments on the proposals through the JOIDES Office;
- selecting proposals for external comment, suggesting reviewers, and providing SCICOM with external comments and a written evaluation of those comments before SCICOM ranks the proposal;
- alerting the Site Survey Panel to proposals that will require initial site survey evaluation;
- advising and interacting with SCICOM on thematic development with ODP;
- advising SCICOM on initiatives and themes that need further development (formation of Program Planning Groups);
- facilitating communications between SCICOM, Program Planning Groups, and proponents;
- providing SCICOM with the names of possible Co-Chief Scientists.

The Science Steering and Evaluation Panels will also act to disseminate and correlate information in the appropriate areas by:
- 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;
- encouraging its members to contribute to symposia at which the results of drilling will be discussed;
- publishing progress reports in the open literature to inform and encourage participation in the project;
- providing input to SCICOM for the summary of scientific achievements of ODP for inclusion in the ODP Program Plan. These mandates are guidelines and do not restrict panels. The Science Committee may ask Panels to take up topics not in their original mandates.

5.3 Meetings. Science Steering and Evaluation Panels meet at least twice a year, but may meet more frequently as requested by SCICOM. They will always endeavor to meet at the same time and location, and have overlapping sessions as overlap in thematic coverage is expected to continue to evolve. The SCICOM Chair approves their meeting dates, locations, and agendas.

5.4 **Membership.** Science Steering and Evaluation Panels are composed of 10

or fewer appointees from US institutions and one appointee from each full non-US member. SCICOM will advise member committees of its preferred SSEP membership, based on maintaining scientific balance of expertise. Panel members will serve a maximum of three years, with one-third of the panelists being replaced each year. Members of the Science Steering and Evaluation Panels will not be members of any Program Planning Group. Invitation to any guests must be issued by the SCICOM Chair.

5.5 Liaison. The Director of ODP at JOI, or nominee thereof, and the Directors, or nominees thereof, of the Science Operator and the Wireline Logging Services Operator and the Wireline Services Operator, the Site Survey Panel, and a member of the JOIDES Office, are permanent, non-voting liaison observers.

5.6 Vote and Quorum. A quorum shall be two-thirds of the panel membership and decisions shall be reached by majority voting.

5.7 Chair. The Chairs are appointed by SCICOM.

6. Program Planning Groups

6.1 General Purpose. Program Planning Groups (PPG) are small focused planning groups formed by SCICOM when there is a need to develop drilling programs or technological strategies to achieve the goals of the Long Range Plan.

6.2 Mandate. PPGs will advise upon drilling/ technology strategies and proposals for major scientific objectives that are not adequately covered by existing drilling strategies or proposals. Drilling proposals arising from PPG meetings must be submitted to the JOIDES Office by individual proponents or groups of proponents. PPGs will also foster communication between the ODP and other major geoscience initiatives. PPGs will report to the appropriate panel in the JOIDES Advisory Structure as directed by SCICOM.

6.3 Meetings. These will be on an as-required basis, determined by SCICOM and approved by the SCICOM Chair, who will also approve dates, locations, and agendas.

6.4 Membership. Members of PPGs will be focused groups of specialists and proponents, chosen by SCICOM through consultation with the SSEPs and community programs. Each full member of ODP will have the right of representation. A maximum number of 16 members is suggested based on current MOUs. The number of PPGs will be determined by SCICOM's need to fulfill the Long Range Plan objectives, subject to budgetary constraints. The normal term length will be three years, but is renewable by SCICOM.

6.5 Liaison. SCICOM establishes liaison with PPGs by the appointment of non-voting liaisons. A liaison from the appropriate SSEP may also be established.

6.6 Chair. The PPG Chairs are appointed by SCICOM.

7. Detailed Planning Groups

7.1 General Purpose. Detailed Planning Groups (DPGs) are short-lived planning groups that may be created by SCICOM for more intensive study of certain aspects of planning that may arise.

7.2 Mandate. DPGs will be created by SCICOM with individual mandates that may be either scientifically or technologically based. DPGs will provide written reports to SCICOM. Example tasks for DPGs include: translating highly-ranked ODP science proposals into concrete drilling plans; advising on regional and site surveys needed for future drilling; preparing drilling prospectuses which synthesize all thematic and site survey input, etc.

7.3 Meetings. Active DPGs meet at the request of SCICOM as frequently as required by ship scheduling and routing. Meeting dates, locations and agendas will be approved by the SCICOM Chair. DPGs will be disbanded once their task is completed.

7.4 Membership. Members of DPGs will be chosen by SCICOM for their expertise and experience with respect to the assigned DPG mandate. Members may be recommended by the SSEPs. Each full member of ODP will have the right of representation. The size of the DPG should be commensurate with the charge of the group; a maximum number of 16 members is suggested, based on current MOUs.

7.5 Liaison. SCICOM appoints a liaison to each standing DPG.

7.6 Chair. The DPG Chair will be appointed by SCICOM.

8. Technology and Engineering Development Committee

8.1 Purpose. The Technology and Engineering Development Committee (TEDCOM) is responsible for advising SCICOM on technological developments related to long-term science planning, over the 5-year period of ODP Phase III and beyond. TEDCOM is also responsible for recommending to SCICOM through OPCOM 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.

8.2 Meetings. TEDCOM meets twice per year or as requested by SCICOM.

8.3 Membership. Members of TEDCOM will be specialists who can provide expert advice in the fields of drilling engineering and technology. TEDCOM is composed of a number of US appointees, and one appointee from each full non-US member, with advice from SCICOM. The normal term length will be three years.

8.4 Liaison. SCICOM appoints a liaison to TEDCOM. An ODP-TAMU engineer acts as Science Operator liaison with TEDCOM. TEDCOM maintains a liaison with the Scientific Measurements Panel.

9. Service Panels

9.1 Service Panels provide advice and services to the JOIDES Science Advisory Structure, and, through JOI, 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 on these requests through OPCOM to JOI. Recommendations from the Service Panels that involve major fiscal decisions or major programmatic changes will be channeled through OPCOM to SCICOM.

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.

10. Site Survey Panel

10.1 General Purpose. The general purpose of the Site Survey Panel (SSP) is to provide information and advice to the Science Committee on the adequacy of, and need for, site surveys in relation to proposed drilling targets.

10.2 Mandate. The Site Survey Panel is mandated to:

- review site survey data packages prepared by the ODP Site Survey Data Bank and to make recommendations as to their adequacy to the Science Committee in light of the needs defined in mature proposals of the Science Steering and Evaluation Panels, Program Planning Groups and Detailed Planning Groups;

- identify data gaps in proposed future drilling areas and to recommend appropriate action to ensure that either
  (1) sufficient site survey information is available pinpointing specific drilling targets and for

interpretation of drilling results; or

(2) that sites not be drilled until specific information been reviewed;

- 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;
- promote international cooperation and coordination of site surveys for the benefit of the Ocean Drilling program, particularly between participating ODP partners' survey activities;
- promote the logging of all data used for planning drilling targets with the ODP Data Bank.

10.3 Meetings. SSP will meet twice per year or as requested by SCICOM, with one meeting usually at the location of the Site Survey Data Bank. Other acceptable meeting locations include port calls of the JOIDES Resolution and other locations appropriate to the Panel mandate.

10.4 Membership. Members of SSP will be scientists who can provide expert advice on the site survey requirements of proposed drill sites. SSP is composed of a number of US appointees, and one appointee from each full non-US member, appointed by ODP member committees with advice from SCICOM. The normal term length will be three years.

10.5 Liaison. The Panel maintains liaison with the ODP Site Survey Data Bank Manager and the JOIDES Office, who both send representatives to SSP meetings. OPCOM also maintains a liaison with SSP. SSP maintains liaisons to the SSEPs.

10.6 Chair. The Chair will be appointed by SCICOM.

11. Pollution Prevention and Safety Panel

11.1 General Purpose. The general purpose of the Pollution Prevention and Safety Panel (PPSP) is to provide independent advice to the Operations 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.

11.2 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 ODP 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.

11.3 Meetings. The panel will usually meet twice a year, generally with one meeting at the location of the Science Operator. Other acceptable meeting locations include port calls of the JOIDES Resolution and other locations appropriate to the Panel mandate, as approved by the SCICOM Chair.

11.4 Membership. Members of PPSP are specialists who can provide expert advice on the safe drilling of proposed drill sites. PPSP is composed of a number of US appointees, and one appointee from each full non-US member, appointed by ODP member committees with advice from SCICOM. Panel membership, not to exceed 16, should be maintained as small as is allowed by the range of expertise necessary to meet mandate requirements.

11.5 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 OPCOM Chair or a designate from OPCOM attends as a liaison.

11.6 Chair. The Chair is appointed by SCICOM.

12. Scientific Measurements Panel

12.1 General Purpose. The Scientific Measurements Panel (SciMP) will contribute information and advice to the JOIDES community through the Operations Committee (OPCOM) with regard to the handling of ODP data and information, on methods and techniques of ODP measurements, and downhole measurements and experiments.

12.2 Mandate. SciMP will provide advice on ODP information related to scientific measurements made onboard JOIDES Resolution and alternate platforms, within and around boreholes, and on samples collected by ODP and associated programs. Its specific mandates are to develop policies concerning said measurements and to furnish advice about scientific measurements, which will assist SCICOM and OPCOM in the formulation of annual and long term plans.

Specific responsibilities for the panel are publications, databases, curation, computers, shipboard equipment usage and needs, measurement calibrations and standards, and borehole measurements, equipment, usage, and needs.

SciMP recommendations will be sent to OPCOM. The SCICOM Chair will decide whether these are operational or scientific issues. If purely operational, the recommendations will go directly from OPCOM to JOI for action. If having scientific or budgetary implications, the recommendations will be passed to SCICOM for consideration.

12.3 Meetings. The panel will meet twice a year, usually at the location of one of the Science Operators to encourage interactions between the Panel members and Operators. Other acceptable meeting locations include port calls of the JOIDES Resolution and other locations appropriate to the Panel mandate. These meetings will be held prior to OPCOM meetings so that recommendations will be quickly acted upon.

12.4 Membership. SciMP will consist of sixteen members proportionally representing the ODP partners (10 U. S. and 6 full non-U.S), and appointed by the ODP member committees with advice from SCICOM. The term of membership will be three years. Members should have expertise representing the three core areas of the panel mandate covering information handling, downhole measurements, and shipboard measurements. Ideally, many of the panel members will have experience on board the drill ship,

JOIDES Resolution. With SCICOM approval, the panel may bring in additional information about its mandate issues by setting up ad hoc advisory committees whose lifetimes are mandated by SCICOM.

12.5 Liaison. SciMP will have non-voting liaisons from SCICOM/OPCOM, JOI, the Science Operator and the Wireline Logging Contractor. A liaison to TEDCOM is recommended for collaboration on development issues. Liaisons to other JOIDES advisory bodies may be sought with the approval of SCICOM. 12.6 Chair. The Chair will be appointed by SCICOM.

Ratified by EXCOM: 12 February, 1997
Adopted by JOI Board of Governors: 13 February,1997

APPENDIX IV

Conflict of Interest Statement

Ratified by EXCOM February 1997

If any JOIDES panel or committee member, or any individual or institution related to such member, has any interest that might be affected by, or might reasonably be perceived to be affected by, any action under consideration by the panel or committee on which he or she is serving, such member is required to declare the existence of such interest to the Chair. Such interests include (1) being a proponent of a pending drilling proposal, and (2) being proposed as a co-chief scientist. The possible existence of such interest may also be proposed to the Chair by a member or liaison other than the member having the interest.

All declared or proposed possible conflicts of interest, and the actions taken, will be recorded in the Minutes of the meeting at which the interest was considered. With respect to any such declared interest, or proposed possible interest, the Chair will make an initial determination regarding whether the circumstances constitute a direct conflict of interest.

In determining whether the circumstances constitute a direct conflict of interest, the Chair may, at his/her discretion, consult with other members of the panel or committee. The Chair's decision will be subject to review in accordance with Robert's Rules of Order.

(a) Panel or committee members who are determined by the Chair to have a direct conflict of interest with respect to a drilling proposal will not be present during any/that part of a panel or committee meeting when proposals affected by such direct conflict of interest are subject to deliberation, review and ranking. However, a conflicted panel or committee member may be permitted to participate in general discussions that do not lead directly to voting, regarding proposals in general, including discussion of his or her own proposal. Such members must restrict their comments and discussion to the scientific objectives of proposals being discussed and will refrain from making comparisons with their own proposals.

(b) SCICOM members determined to have a direct conflict of interest will not be present during deliberations leading directly to a vote and will not vote with respect to the inclusion in, or exclusion from, the upcoming recommended science plan of a proposal affected by such direct conflict of interest.

(c) During panel or committee discussions that do not lead directly to a vote, or that do not involve competitive ranking of proposals (e.g., determination of the long-term ship track at SCICOM), all members may participate in general discussions, in order to provide a full range of expertise to the decision-making process. A member having an active proposal that may form part of the long-term track of the drillship will abstain from final deliberations and voting relating to the long-term track.

(d) Panel or committee members who are determined to have a direct conflict of interest will not be present during deliberations leading directly to a vote and will not vote with respect to any other matters affected by such direct conflict of interest.

SCICOM Voting Procedures for the Global Scientific Ranking of Proposals

Ratified by EXCOM January 1998

In order to align the voting procedures with the new Science Advisory Structure, SCICOM revises PCOM Motion 96-1-5 and adopts the following three-step voting procedure for purposes of determining a drilling schedule. Conflicted SCICOM members will be excluded from this entire process.

Step 1: Choose programs to retain for purposes of an integrated global scientific ranking, based on advice from the SSEPS as to their priority and relevance to the ODP Long Range Plan:

Option 1: Panel consensus on recommendation of Chair;
Option 2: Show-of-hands vote on each drilling proposal, with retention of a proposal for ranking based on 50% or more of votes in favor.

Step 2: Rank proposals based on scientific quality and priority. Given X programs retained from the previous step, unconflicted SCICOM members will rank programs from 1 to X, on a signed paper ballot. After voting, written ranks of each program by each voter will be tabulated and the mean ranking and standard deviation of each program will be calculated. Paper allots will be retained in the records of the meeting. A list of proposals that SCICOM wishes to be scheduled will then be determined from the ranked list, and will be forwarded to OPCOM.

Step 3: OPCOM will then prepare a draft schedule which will be sent to SCICOM for consideration of quality of the proposed schedule as a whole and the budgetary implications. SCICOM will vote by e-mail to accept or reject the schedule proposed by OPCOM, based on a simple majority of votes cast. Rejection of the schedule at this stage dictates the preparation of a new schedule by OPCOM.

APPENDIX V
Site Summary Forms

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 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. The Site Summary Form is available in electronic form from the Site Survey Data Bank web site (http://www.ldeo.columbia.edu/databank/).

Please note this form is frequently updated so the web site should be checked for revisions. The following table provides information on the forms required for Preliminary and Full Proposals.

Page	Information needed	Used by	When to submit	Contact for more information
1.	General info about proposals, site location and basic operational needs	JOIDES Office, Data Bank, Logging Group, ODP/TAMU, SSP, PPSP	When submitting **preliminary proposal** and when updating information	JOIDES Office: Email: joides@whoi.edu http://www.whoi.edu/joides/
2.	Information regarding site survey data available and to-be-collected	JOIDES Office, Data Bank, SSP, PPSP	When submitting **full proposal** and when updating site survey information	Site Survey Data Bank: Email: odp@ldeo.columbia.edu http://www.ldeo.columbia.edu/databank/
3.	Detailed Logging Plan	JOIDES Office, Logging Group, ODP/TAMU	When submitting **full proposal** a d when updating logging plan	ODP-LDEO Wireline Logging Services: Email: borehole@ldeo.columbia.edu http://www.ldeo.columbia.edu/BRG/brg_home.html
4.	Lithologic Summary	JOIDES Office, Data Bank, ODP/TAMU, PPSP	When **proposal is placed on drilling schedule**, prior to PPSP review	Site Survey Data Bank: Email: odp@ldeo.columbia.edu http://www.ldeo.columbia.edu/databank
5.	Pollution and Safety Hazard Summary	JOIDES Office, data Bank, ODP/TAMU, PPSP	When **proposal is placed on drilling schedule**, prior to PPSP review	Site Survey Data Bank: Email: odp@ldeo.columbia.edu http://www.ldeo.columbia.edu/databank

ODP Site Description Forms:

Please fill out information in all gray boxes

Page 2 - Site Survey Detail

New ☐ **Revised** ☐

Proposal #:	Site #:	Date Form Submitted:

	Data Type	SSP Requir-ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection			Primary Line(s): Location of Site on line (SP or Time only) Crossing Lines(s):
2	Deep Penetration seismic reflection			Primary Line(s): Location of Site on line (SP or Time only) Crossing Lines(s):
3	Seismic Velocity†			
4	Seismic Grid			
5a	Refraction (surface)			
5b	Refraction (near bottom)			
6	3.5 kHz			Location of Site on line (Time)
7	Swath bathymetry			
8a	Side-looking sonar (surface)			
8b	Side-looking sonar (bottom)			
9	Photography or Video			
10	Heat Flow			
11a	Magnetics			
11b	Gravity			
12	Sediment cores			
13	Rock sampling			
14a	Water current data			
14b	Ice Conditions			
15	OBS microseismicity			
16	Navigation			
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

ODP Site Description Forms:

Page 3 - Detailed Logging Plan

New ☐ Revised ☐

Proposal #:	Site #:	Date Form Submitted:
Water Depth (m):	Sed. Penetration (m):	Basement Penetration (m):

Do you need to use the conical side-entry sub (CSES) at this site? Yes No

Are high temperatures expected at this site? Yes No

Are there any other special requirements for logging at this site? Yes No

If Yes Please describe requirements: _____

What do you estimate the total logging time for this site to be: _____

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP		

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of

ODP Site Description Forms:

Please fill out information in all gray boxes

Page 4 - Pollution & Safety Hazard Summary

New ☐ Revised ☐

Proposal #:	Site #:	Date Form Submitted:

1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	
4	Are there any indications of gas hydrates at this location?	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	
6	What special precautions will be taken during drilling?	
7	What abandonment procedures do you plan to follow:	
8	Please list other natural or manmade hazards which may effect ships operations: (e.g. ice, currents, cables)	
9	Summary: What do you consider the major risks in drilling at this site?	

ODP Site Description Forms:

Page 5 - Lithologic Summary

New ☐ Revised ☐

Proposal #:	Site #:	Date Form Submitted:

Sub-bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environment	Ave. rate of sediment accumulation (m/My)	Comments

APPENDIX VI:
Undergraduate Student Trainee Program

The Ocean Drilling Undergraduate Student Trainee Program provides undergraduates with a unique educational opportunity to participate in a scientific cruise on board the research vessel JOIDES Resolution. A maximum scientific and technical crew of 50 can be accommodated on the JOIDES Resolution, and the number and composition of that crew varies depending on the objectives of a particular cruise. Occasionally, berths become available for Undergraduate Student Trainees, providing them with unique opportunities for scientific growth and career development.

The intent of the Undergraduate Student Trainee Program is to provide undergraduates in the Earth Sciences with exposure and training in a variety of scientific and technical activities. Specific responsibilities of the Undergraduate Student Trainee (hereafter referred to as the "Student Trainee") will be defined by a shipboard mentor, in consultation with the Co-Chief Scientists, the Lab Officer, and the Trainee. Duties will be dependent on background and experience, but can include assisting the shipboard scientists by rotating through the laboratories and helping with processing of cores and scientific analyses.

Opportunities to fill available slots with Student Trainees will be available to all members of the Ocean Drilling Program. Nominations of students to participate in the Program will be requested from the ODP Member Country/Consortium Offices when such opportunities are available. Student Trainee positions will be available on an opportunity basis, and will not displace any scientific, technical or engineering positions on the drill ship required to meet the leg objectives or high priority engineering developments. The provision of students to the Undergraduate Student Trainee Program should not be viewed as mandatory, but rather as an opportunity.

Science Operator's Responsibilities

- The availability of Student Trainee positions will be announced by the Science Operator in the JOIDES Journal and through ODP Member Country/Consortium Offices. The application for the Undergraduate Student Trainee Program will be available on the ODP web site, and applicants will send their completed applications to their national ODP offices.
- The Science Operator will process and evaluate only those Student Trainee Program applications that have been forwarded from the national ODP offices.
- On the basis of space availability, the Science Operator will aim to identify 3 Student Trainee positions annually.
- The Science Operator will staff these positions in consultation with the Co-Chief Scientists based on the student's skills, balanced with the requirements of the leg. Student Trainee staffing decisions are made by the Supervisor of Technical Support and approved by the Manager of the Science Services Department at ODP-TAMU. Final selection of

individuals to fill these positions is the sole responsibility of the Science Operator.

- The Science Operator, in collaboration with the Co-Chief Scientists, will select a member of the shipboard scientific party to act as a mentor for the student during the cruise
- The Science Operator will assist with the students' travel arrangements. ODP can make hotel and airline reservations in the students' names, as well as assist with acquisition of visas. Student Trainees will be notified by the ODP travel office about the hotel selected for use at the port call, and they will be expected to stay at the same hotel as the scientific and technical staff.
- The Lab Officer will participate in defining the tasks to be assigned to the student in consultation with the designated shipboard mentor and the Co-Chief Scientists.
- ODP/TAMU will provide each student participating in the Undergraduate Student Trainee Program with a certificate documenting his/her participation upon completion of the ODP Leg.

ODP Member's Responsibilities

- Member countries/consortia will coordinate the advertisement of Student Trainee positions, and receive all applications.
- All applications must include a letter of endorsement from the respective ODP National office, who will also be responsible for submitting applications to ODP-TAMU for consideration
- ODP member countries/consortia will provide all travel expenses for the student. This includes flights, visas, lodging and meals in the port call both before and after the leg.
- Compensation for students participating in the Undergraduate Student Trainee Program is the responsibility of the ODP member country/consortium. Some members may choose to compensate the Student Trainee in different ways (e.g., salary, course credits, etc.); others may choose not to compensate them at all. Under either circumstance, the availability, level, and type of compensation should be clearly communicated to the student prior to acceptance of the position. It is critical (to avoid tension and morale problems on the ship) that terms of compensation are worked out with the student prior to the cruise, and that the student is made aware that he/she will be working with paid ODP scientists and technicians.
- Each ODP member may submit applications from more than one student for consideration per leg to sail in an available Student Trainee position.
- All applications must be received at ODP-TAMU no later than 6 months prior to the beginning of the requested Leg.

Student Trainee's Responsibilities

- Applicants must submit a complete application form to their ODP National Offices. This must include a letter from their primary academic adviser(s) documenting the student's academic status and accomplishments.
- The pre-participation medical physical examination (in accordance with ODP-TAMU pre-employment physical and reimbursement policies) must be successfully completed by the applicant and the results returned to the ODP-TAMU Personnel Supervisor by a specified date.
- The Student Trainee will be expected to participate in the watch system adhered to by scientists and technicians, and to carry out the tasks assigned to him/her.
- Student Trainees are expected to be involved with the science of the leg, and are expected to attend scientific meetings as possible.
- Student Trainees must provide their own steel-toed safety shoes to be available on day one of the port call.
- Student Trainees are eligible to request a limited number of shipboard core samples for scientific projects with results to be included in the leg publications. The student's sample request must be supported by a letter from his/her supervisor ensuring that necessary facilities will be available to allow the student to complete the work, and meet the requirement and deadline for submission of a data report.

Shipboard Mentor's Responsibilities

- The shipboard mentor will be responsible for advising the Student Trainee during the cruise, and ensuring that the student is exposed to a variety of scientific and technical activities.
- At the beginning of the cruise, the shipboard mentor will meet with the Co-Chief Scientists and Lab Officer to define the program of activities for the Student Trainee.
- During the cruise, the shipboard mentor will monitor the progress of the student and will be available at any time to assist the student with any problems.
- The shipboard mentor will write a short evaluation of the student and submit it to ODP-TAMU.

APPENDIX VII:
Publications

The publication strategy for ODP is divided into the following elements.

Pre-Cruise Information

Scientific Prospectus

The Scientific Prospectus is a pre-cruise plan that outlines the primary scientific objectives of each cruise. It 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. Prepared by the Co-Chief Scientists and the ODP/TAMU Staff Scientist, it is distributed two to six months before each leg begins. The report is available on the Internet (http://wwwodp.tamu.edu/ publications/SCIPROSP.HTML as the primary means of distribution. A limited number of copies are printed and distributed to NSF representatives, ODP member country offices, JOIDES Panel Chairs, repositories, and agencies or countries requiring official reports as part of drilling clearance agreements. Copies are also sent at no charge to cruise participants and shore-based sample requestors who can not access the Internet.

Shipboard Scientific Reports

The shipboard science party aboard the JOIDES Resolution prepares three informal and two formal reports. Each of the five reports is required to be completed before the ship docks.

Informal Reports

Preliminary Summary of Drilling Results (Hole Summary)

Upon completion of drilling at each site, the shipboard scientists prepare a report of the results. At the end of the cruise, these site reports, together with core description forms are assembled into one report called the Preliminary Summary of Drilling Results, or “Hole Summary”. ODP/ TAMU copies and distributes the report within 30- days post-cruise to shipboard scientists, and to shore-based scientists who have submitted sample or data requests. This report contains proprietary data that should not be accessed by anyone except participating scientists for one year post-cruise, has the status of a personal communication, and 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.

Preliminary Report

Generated by the Co-chief Scientists and the ODP/TAMU Staff Scientists, the Preliminary Report consists of a general and highly condensed discussion of preliminary scientific results of the cruise and is made available on the Internet (http:/ /wwwodp.tamu.edu/publications/ PRELREP.HTML) as the primary means of distribution. A limited number of copies are printed and distributed at no charge to NSF

representatives, ODP member country offices, JOIDES Panel Chairs, repositories, agencies or countries requiring official reports as part of drilling clearance agreements, individuals who assisted in planning the cruise by contributing knowledge and expertise, and others with special involvement in ODP activities.

News Releases

Brief summaries are generated for each ODP cruise and are made available on the ODP web site for access by news organizations. These briefs are written for the general public, media, and public and trade journals. Cruise-related news releases and news conferences are held when a cruise produces information that is of outstanding public interest. Such news releases and conferences generally include interviews of the Co-chief Scientists and shipboard participants and occur immediately before the ship's departure, or immediately upon the ship's arrival. ODP Public Affairs personnel are responsible for preparing all cruise briefs and news releases and for organizing news conferences.

Articles

General Geological Articles The publication of such articles is entirely at the discretion of the shipboard science party. As soon as possible after the cruise ends, the shipboard science party is encouraged to prepare a technical article of cruise results for a major journal such as Eos, Geotimes, Science or the Geological Society of America Bulletin. Authorship is attributed to the entire shipboard science party.

Formal Reports

Proceedings of the Ocean Drilling Program The two-volume Proceedings series was designed to provide a thorough record of the goals, results, and summaries of leg-related scientific information from all ODP cruises. The Proceedings volume serves two purposes: (1) The Initial Reports volume documents leg results and catalogs photographs of all core recovered. It also provides the scientific community-at-large with a basis for selecting samples and data for detailed study. (2) The Scientific Results volume is a compendium of leg-related post-cruise science results. 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 are also a suitable medium for papers that contain high-quality data not yet ready for final interpretation.

Beginning with Leg 160 (SR to be published in 1998), participating scientists were given the option of publishing their post-cruise publications in the SR volume or in any internationally recognized peer-reviewed scientific journal that publishes in English. The Proceedings series was designed to be preserved in case-bound, archive-quality books for use by a variety of user groups now and in the future. Beginning in 1996, the volume material was produced on a complementary CD-ROM that contains an electronic version of the book, along with supplementary material and large data sets. ODP/TAMU has begun to develop publication of Proceedings material on the Internet (http://wwwodp.tamu.edu/publications/ 150x/index.htm). As a cost saving measure, the JOIDES panel structure and JOI are currently developing a plan to move the Proceedings series to an all-electronic (CD-ROM and Internet) publication by FY01.

Proceedings volumes (US $60 each, plus postage) can be ordered via the Internet (http://www-odp.tamu.edu/publications/
ORDER.HTML) or from:

Publications Distribution Center
Ocean Drilling Program
1000 Discovery Drive
College Station, Texas 77845-9547, U.S.A.
Phone: 409-845-2016
Fax: 409-845-4857
E-mail: distribution@odp.tamu.edu

Initial Reports

This volume records the scientific and engineering results obtained on each cruise. Each volume contains a leg overview, summaries from each drill site, depth-shifted and processed log data, a visual catalogue of core images (previously black and white photographs, now also color digital images), and other digital data. This volume is published approximately one-year after the cruise ends. Volume citations and table of contents for each volume are located on the ODP Internet homepage:

Citations— http://www-odp.tamu.edu/ publications/ir/IRVREF.HTML
Table of Contents— http://www-odp.tamu.edu/publications/ir/IRVTOC.HTML

Scientific Results

Volumes 101 through 159 contain peer-reviwed papers presenting results of post-cruise research from each leg, at least one synthesis paper, and data reports (short reports of useful data that are not ready for final interpretation). Though frequently compared to geoscience journals, the design and function of this volume is very different because it serves as a compendium of the leg-related science produced within the first three- to four-years post-cruise. An external peer-review system was established in FY88 to increase the strength of the science published in the SR volume. Now all manuscripts are evaluated by a four-member editorial review board, reviewed by two external reviewers, and checked for grammar and style by ODP/TAMU.

Beginning with volume 160, publication of post-cruise science results was open to the outside literature. The SR volumes no longer contain all post-cruise, leg-related papers. Pending outside publisher's approval, papers published in the outside literature may be included in SR publications as electronic reprints. A leg-related citation list will be maintained on the Internet to ensure that a leg-related compendium reference list is still available.

Other ODP Reports

Technical Notes

This publication series is produced to keep the marine geoscience community advised as new tools, designs and techniques related to drilling engineering are developed, and to publish new laboratory guides or manuals for the JOIDES Resolution. Technical Notes (TN) are produced on an as-needed basis. Historically, they were printed and distributed by ODP/TAMU. Now, whenever possible, they are made available on the Internet (http://www-odp.tamu.edu/publications/ TECHREP.HTML) as the primary means of distribution. A limited number of copies are available at no charge for those who cannot access the Internet.

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Amendments