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JOIDES SITE SURVEY PANEL MINUTES

November 14-16, 1994
Lamont-Doherty Earth Observatory
Palisades, New York

Members: Kastens, Kim (L-DEO, USA) Chair
Casey, Jack (U. Houston, USA)
Mountain, Greg (L-DEO, USA)
Peterson, Larry (RSMAS, USA)
Scrutton, Roger (Univ. of Edinburgh, UK)
Sibuet, Jean-Claude (IFREMER, France)
Srivastava, Shiri (Atlantic Geoscience Center, Canada)
Tokuyama, Hidekazu (ORI, Japan)
Toomey, Douglas (Univ. of Oregon, USA)

Liaisons: Ellins, Kathy (JOIDES Office)
Dick, Henry (PCOM)
Quoidbach, Daniel (ODP Data Bank)
Richter, Carl (ODP/TAMU)
Shor, Alexander (NSF)

Guest: Lewis Abrams (University of Puerto Rico)

Observers: Dave Falvey (JOI)
Alain Mauffret (Univ. Paris)

Apologies: Ball, Mahlon (PPSP)
Camerlenghi, Angelo (OGS, Italy)
Farre, John (Exxon, USA)
Hinz, Karl (BGR, Germany)
Trehu, Anne (Oregon State University, USA)

ODP Site Survey Panel Meeting
November 14-16, 1994
Lamont-Doherty Earth Observatory

Note: These minutes are arranged in a logical order for ease of reading, and do not reflect the exact order in which items were discussed at the meeting.

1. PRELIMINARY MATTERS

1.1 Introductions (Kastens) & Logistics (Mountain/Quoidbach)

SSP Chair Kastens introduced new member Jack Casey and a visitor from JOI, Dave Falvey. Greg Mountain and Dan Quoidbach described logistical arrangements for the meeting.

1.2 Action items from July 1994 meeting (Kastens)

Acting ODP/TAMU liaison Holloway was to discuss with WHOI personnel what kind of visual marker could be carried by ALVIN for placement during site surveys conducted prior to the arrival of the Joides Resolution. Richter reported no new information on this issue yet; however, TAMU/ODP and WHOI/ALVIN personnel plan to discuss visual markers at the ALVIN users' group meeting prior to the December AGU meeting. Richter will report back on this issue at the April SSP meeting.

1.3 Charge and procedures for this meeting (Kastens)

The primary goal of this meeting is to evaluate the site survey readiness of proposals in the prospectus for FY'96 drilling, including programs "added to the prospectus" (i.e. highly ranked) by the thematic panels at their fall meetings. Two programs fall in this "added to the prospectus" category: Vema Fracture Zone (science), and the Blake Nose Paleogene addendum to the North West Atlantic Sediment Drifts proposal. The primary product of this meeting is advice to PCOM in preparation for the final selection of drilling legs for FY'96 drilling.

2. REPORTS

2.1 PCOM (Dick)

The PCOM liaison left without submitting his written contribution to the minutes. His oral report, however, addressed the following issues discussed at the August PCOM meeting in Iceland:

- Changes in the way ODP service panels work
- DCS development
- The archiving of video data at the SSDB at LDEO
- PCOM's motion regarding the funding of VSP experiments added to a program on an ad hoc basis.
- Budgetary concerns and the necessary revision of ODP policies to meet level funding through the continuation of the of the program

2.2 JOI (Dave Falvey)

Dave Falvey took over as ODP director on November 10, 1994. He reported that the Australia/Canada Consortium is now established. Australia and Canada contribute 1/3 of a membership each. Australia is now consortium operator and has signed an MOU with NSF. A consortium of Taiwanese universities looks promising to be a 1/6 participant by about mid 1995.

Falvey's initial priority is contributing to the new Long range Plan. Other priorities include 1) short range budget issues and 2) the computing/data management upgrade. Internationalisation is an important mid/long term priority to achieve wider participation/scientific involvement and budget enhancement. Other issues of concern include underway data quality control and archiving.

2.3 PPSP (Giarratanto)

The JOIDES PPSP Fall Meeting was held October 13-14, 1994 at the Airport Hotel, Stavanger, Norway. Tim Francis reviewed results of VICAP, Map, and TAG drilling. No safety or pollution problems appear to have been involved in connection with these legs.

Kay Emeis presented the Eastern Mediterranean, Leg 160. It was agreed that the upper, unconsolidated section of all previously approved sites could be cored for sapropel objectives, even if hydrocarbons were encountered at depth in the initial drilling at ESM-2A. A question arose concerning wording of approval for Med Sap 2B; it was resolved that Med Sap 2B was approved to APC refusal, approximately 120 m. Francis and the ODP Safety Panel will consider new data and decide whether penetration depth at ESM-3A can exceed 300m. The mudvolcano sites MVL-1A/2, were approved , but the vote was split: 5 for, 2 against, and 2 abstaining. The point was made that in connection with mud volcano drilling C1/C2 ratios will have little meaning. If inordinate volumes of gas or free oil are encountered, drilling should stop. Barry Katz agreed to check on the possible relevance of gasoline components that might be encountered in this drilling.

Menchu Comas presented the Western Mediterranean, Leg 161. Sites Alb-2B, Alb-3A and Alb-4A were all approved. However, the sites were substantially moved (as much as 4km) to avoid a structural crest with amplitude anomalies suggesting possible gas and to avoid penetration of Messinian M-unconformity and underlying Tortonian sediments (at Site Alb2B), a avoid pinchout configuration (at Alb-3A), and to put the site over a structural low (at Alb-4A).

Eystein Jansen and Anders Solheim presented the North Atlantic Arctic Gateways with assistance from Paul Grogan. The Safety Panel had requested that previously approved undrilled sites be reconsidered in light of drilling experience on Leg 151. In this connection, sites Yerm 1, 2A, 5, ICEP 3, EGM 3 and 4 were re-endorsed. New sites ICEP-1 and NAMD-1 were also approved. Additional sites up for approval lacked complete safety check sheets and it was decided that these would be reviewed at the March 1995 meeting of the Safety Panel.

Charles Paull presented the Blake Ridge and Carolina Rise Gas Hydrate drilling, Leg 163. All sites were approved. H_2S was noted as a possible problem at site BRD-1(a-d), and certain holes were required to be drilled after other holes.

Hovland led a critique of the drilling experiences at hole 893, Santa Barbara Basin, Leg 146; New Jersey Margin, Leg 150; and, North Atlantic Arctic Gateways I, Leg 151. The salient conclusions arising from this discussion were that: 1) preparations for the Santa Barbara venture were too rushed. 2) decisions made in connection with hydrocarbon shows on Leg 150 were sound; and 3) the chief scientists on Leg 151 should have emphasized the existence of a local temperature anomaly that might have forewarned against the occurrence of the hydrocarbon show encountered. Proper procedures at sea avoided any safety or pollution problems associated with the Leg 151 show.

After delivering the PPSP report, Millie Giarratanto stated that there is much confusion regarding proper site identification and positioning when the same locator number is used to designate a site once it has been moved. The ensuing discussion resulted in the following recommendation to PCOM.

SSP Recommendation to PCOM regarding designations of proposed drill sites: SSP recommends that PCOM direct the JOIDES Office to develop, promulgate, and insist upon the use of, a consistent system of designating proposed drill sites, such that each location on the seafloor proposed for drilling is identified by a unique and unchanging site designator.

Explanatory Note:

As a proposal moves through the advisory system, it occasionally becomes necessary or advisable to shift the position of a site in response to new data, new hypotheses, safety concerns, international clearance issues, or man-made seafloor hazards. In some cases, the position of the proposed site (as defined by latitude and longitude or shotpoint along a seismic line) is moved, but the site designator remains unchanged. This common practice causes great confusion for SSP, PPSP, and the Data Bank. For example, the site ALB2 has now been moved at least twice, without changing its name. The Data Bank holds dozens of maps, seismic profiles, Parasound records and side-looking sonar images annotated "ALB-2"; however, it is generally unclear which "ALB-2" the annotation refers to. As another example, at their most recent meeting, PPSP seems to have approved one site designated "MedSap2B," while the proponents actually want to drill a another nearby location, also called "MedSap2B."

We recommend that a uniform system of designating proposed sites be adopted, 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. As a starting point for discussion, we suggest the format: AAAAAAnnX, in which AAAAAA is up to 6 alphanumeric characters indicating the area of the proposed drill site, and nn is two numerals indicating the number of the site within that area, and 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 would have X=A, X=B, X=C, etc. Every time a site is moved, a new value of X would be used to identify the relocated site.

We feel that 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.

2.3 Offset Drilling Workshop at ODP/TAMU (Doug Toomey)

Doug Toomey reported on Offset Drilling Workshop which was held at ODP/TAMU in September 1994. Henry Dick and Kim Kastens also attended. Their contributions to the workshop were summarized in a draft document entitled, Site Survey Issues, which is intended for inclusion in a Workshop report to be distributed by ODP/TAMU. This draft document was circulated for review and comment among SSP members; no changes were made. This report is attached to the minutes as Appendix A.

2.3a JOIDES OFFICE (Kathy Ellins)

Kathy introduced herself and reported that Rob Kidd was recovering well from his recent surgery and would be chairing the annual PCOM meeting in College Station in December.

The scientific programs which will be considered at the DRILLOPTS meeting for drilling in the FY 1996 were identified as *Bahamas Transect, California Margin, Caribbean basalt Province, Caribbean Ocean history, Costa Rica, East Juan de Fuca Hydrothermal, Return to Iberia (Narm), Sedimented Ridges II, Vema Fracture Zone, Western North*

Atlantic Sediment Drifts and the Paleogene and Cretaceous Intermediate Water History on the Blake Plateau and Blake Nose. 1994 Fall Thematic Panel Rankings were provided.

An addendum to the *FY 1996 Ocean Drilling Program Prospectus* was distributed and discussed. Contents included: proposed alternate sites and new site locations for Bahamas Transect (412-Add4), SCORE Report on E. Juan de Fuca (440- Add2) and Sedimented RidgesII (SR-Add), Vema Fracture Zone (376-Rev3) proposal, Hans Christian Larsen's response to queries from the SSP watchdog for SE Greenland Volcanic Rifted Margin(460), plus a proposal entitled "Paleogene and Cretaceous Intermediate Water History on the Blake Plateau and Blake Nose" (462, formerly 404-Add). This last proposal was submitted as a revision to 404-Add. The JOIDES office is treating this as a new proposal and given it a different number as recommended by two thematic panels. It is included in the addendum because 404-Add was contained in the FY 1996 Ocean drilling prospectus and was highly ranked.

OHP's strong support for Benguela Current and Angola/Namibia Upwelling (354) and the South Florida Margin Sea Level program was conveyed to SSP. LITHP's disappointment that the return to hole 375B has been dropped from the FY 1995 drilling program was also noted.

Kathy is available to go to the Spring OHP meeting in Miami at minimal cost to the Ocean Drilling Program to help enhance communication between OHP and SSP.

2.4 Data Bank Report

Dan Quoidbach reported that the Data Bank received 463 pieces of data since 1 July 1994. Since the last SSP meeting, the Data Bank prepared the operations data package for Leg 158 and also copied and delivered to the Pollution Prevention and Safety Panel the safety packages for Leg 162 (NAAG II) and Leg 163 (Gas Hydrates Drilling), and addenda to the safety packages for both of the Mediterranean Legs.

In response to previous SSP recommendations to PCOM, ODP/TAMU is now sending cruise data from JOIDES Resolution Legs to the Data Bank prior to the expiration of the data moratorium. The first dataset received under this new system was for Leg 151.

It was requested that the JOIDES Office forward copies of all thematic panel minutes to the Data Bank for inclusion into the watchdog books. This is to ensure that the opinions of the thematic panels are available to each watchdog during their review of the proposals. Kathy Ellins responded to this request by providing the Fall 1994 thematic panel proposal reviews to the respective watchdogs.

2.5 TAMU (Karl Richter)

Real Time Navigation: The real-time navigation (RTN) system will be installed during the transit to dry-dock. The RTN software, WinFROG, will run under Windows. The primary acquisition computer will be a PentiumPC, with 1 gigabyte disk and a magneto-optical 256-mbyte per disk backup. The system has the capability to record DP data. This option is not implemented immediately, but will be done as soon as possible. The option of doing multiship navigation will require additional costs. The primary acquisition system will write data to the network in real-time to provide data for "smart-remote" navigation stations which will be located in the following locations: (1) Bridge, (2) dynamic positioning shack, and (3) co-chiefs office. It is intended that WinFROG will be able to run from other existing PC's throughout the ship that have the software installed. Once the RTN system is functioning as intended and navigation and magnetic data are being collected on the new RTN system the Masscomp's will no longer be needed. The panel requested additional information on the capability of WinFROG to (1) incorporate existing tracklines, (2) incorporate existing data, e.g. bathymetry, (3) output data in general (e.g., to combine with GMT graphs), (4) produce realtime hardcopy plots, and (5)

incorporate long-baseline bottom-moored acoustic transponder navigation data. A short WinFROG demo at the next meeting would be informative.

Military GPS (P-code): The Department of Defense GPS Program manager has informed ODP that it should be no problem to obtain access to P-code if ODP sends an official memo describing ODP and the intended use for the P-code. NSF liaison Shor requested that ODP coordinate their efforts to obtain access to P-code GPS with similar efforts by the UNOLS fleet.

Miscellaneous other TAMU news items of lower interest to the panel were the status of the MST update/replacement, the purchase of an additional Sun workstation to run core-core and core-log integration software, the status of the database upgrade, and various personnel changes at ODP/TAMU.

2.6 NSF (Sandy Shor)

New NSF ODP funding commitments made from the most recent panel (July '94) include:

- Work in Middle Valley, Juan de Fuca Ridge, led by Andrew Fisher of Indiana University, to study detailed hydrogeology (pore fluids, heat flow and sediment chemistry) in the vicinity of proposed Sedimented Ridges II sites;
- Cooperative studies with National University of Taiwan to study the (multichannel) seismic structure of the Taiwan margin. The NSF effort is led by Donald Reed, San Jose State University; and
- Cooperative submersible investigation, with French investigators, to carry out post-drilling flow tests and water sampling at Barbados CORKed sites drilled on Leg 156 (summer '94). The NSF effort is led by Bobb Carson, Lehigh University.

The first two of these efforts, as well as a 1993 NSF funding commitment to study the California margin (led by Mitch Lyle, Boise State University), are scheduled to take place on R/V Ewing in summer-fall 1995. Carson's program will take place in mid-1995 using the French submersible Nautile.

- The fourth program for which funding has been committed by NSF/ODP (1/94 panel) is led by Jean-Christophe Sempere, University of Washington in the Australia-Antarctic Discordance south of Australia. It is tentatively scheduled to take place in early 1996 (austral summer) on R/V Melville.

Funds for field programs and engineering development from the NSF ODP remain in the $4-5 million dollar range annually (including costs of ship time). Proposals for the first round of 1996 field program decisions have just recently been received (11/1/94 target date) and are presently being sent out for review. Changes in all Ocean Sciences Division target dates for 1995 have advanced the deadline for the second panel for considering 1996 field programs to 2/15/95.

A brief history and projection of ODP budgets was also presented, which shows the projected flat budget projections for the period '94-'98 assuming no increase in partner contributions (as decided for '96 at the June ODP Council meeting), and no increases in number of partners or NSF contribution (now >60%). These budget projections formed the basis for PCOM requests to thematic panels to identify priority budget areas, high and low, during their fall meetings, to be used by PCOM in the '96 budget planning process beginning at their December '94 meeting.

In the context of the discussion of funding of site surveys, Greg Mountain reported that ONR funding is in hand for survey work in the vicinity of the sites proposed for New Jersey Margin II (shelf sites adjacent to Leg 150 sites). Survey work will be done by a commercial contractor, John Chance, using tools which comply with the ODP shallow

water hazards guidelines. Site survey augmentation funds have been requested to ensure that ODP site-specific data is collected in addition to fullfilling the Navy's objectives. Roger Scrutton reported that survey work in the vicinity of the Caribbean impact crater and on the Iberian margin has been funded through BIRPS.

3. SITE SURVEY IMPLICATIONS OF RECENTLY DRILLED LEGS

3.1 Leg 156: North Barbados Ridge (Richter)

Leg 156 drilled 8 holes at three sites. Two cased boreholes through the decollement were sealed; one hole was dedicated to logging while drilling efforts. The leg sailed with an excellent data package and had no site survey problems.

3.2 Leg 157: VICAP-MAP (Scrutton/Richter)

The site survey package for MAP sites was complete and approved at an early stage. Drilling appears to have been straightforward with good core and log recovery. The seismic network over the abyssal plain will allow turbidite volumes to be calculated. This part of the VICAP/MAP programme has been a model example of planning and execution.

VICAP site locations changed several times during the review process, making it difficult to keep abreast of the data requirements. Two new sites, 1a and 2a, were introduced only three months before the leg, leaving no time for SSP to examine supporting data properly. In the event only four of the ten proposed sites were drilled, and these included the two new sites. The sites about which SSP has raised questions at previous meetings (sites at which drilling targets could not be seen on seismic data) were not among those drilled. Two of the sites drilled appear not to have met the data requirements of SSP, swath bathymetry being missing from 954 and 956, and velocity data appear not to have been accurate enough to predict drilling depths. Short surveys were conducted at most of the sites. Site 954 was within half a mile within the position of an underwater communication cable. The location of the cable was discovered by the Captain of the Joides Resolution during the leg on Admiralty Chart 1869. A short seismic survey was necessary to reposition the site about 1.3 nmi east of the original site. Although the drilling itself was quite successful, the preparation for VICAP was not completely satisfactory. The proposal may have suffered from being brought forward in the drilling schedule, but the number of changes and slow documentation of the sites hampered SSP consideration.

SSP's discussion of the VICAP drilling experience lead to the following two recommendations to PCOM:

SSP Recommendation to PCOM concerning early identification of man-made seafloor hazards: SSP recommends that PCOM request JOI to direct ODP/TAMU to investigate the occurrence of man-made seafloor hazards in the vicinity of proposed drillsites as part of their preparation for the DRILLOPTS meeting.

Explanatory Note:

On leg 150, a site on the New Jersey margin had to be moved to avoid a hazardous waste dump, whose existence became known to the Joides Resolution captain after the ship was at sea. More recently, on leg 157, a site in the VICAP area had to be moved to avoid a submarine cable, whose existence was also discovered by the Joides Resolution captain after the ship was at sea. In both cases, Joides Resolution shiptime had to be spent to survey an alternative site. In both cases, the alternative site had to be selected at sea without benefit of thematic, SSP or PPSP review.

We feel that information about man-made seafloor hazards should enter the system much earlier, well before the ship goes to sea. Ideally, this information should be

available for DRILLOPTS, where other operational considerations for candidate sites are weighed before specific sites and programs are scheduled. Alternatively, ODP/TAMU could assemble this information prior to each scheduled leg's PPSP review, and "manmade seafloor hazards" could become part of each leg's safety review.

SSP Recommendation to PCOM concerning new sites for scheduled legs: SSP recommends that PCOM direct the JOIDES Office to develop and enforce the use of a formal procedure for the addition of new sites to the program for scheduled legs.

Explanatory Note:

After a leg has been scheduled for drilling, it occasionally becomes necessary or desirable to add new sites to the plan for the leg. Recent examples include the addition of sites VICAP 1A and 2A to leg 157, the addition of MedSap 2D to the Eastern Mediterranean (Leg 160) program, and the addition of BRD-1a, -1b, -1c and 1d, plus BRH-4 and -5, to the Gas Hydrates program (Leg 163). The motivation for such an addition may include the availability of new data, the desire to ensure that sufficient sites are brought forward to the safety panel, a response to advice from the safety panel, or accommodating the scientific interests of the co-chiefs (who may not have been proponents). Sometimes, the co-chiefs send some data and accompanying verbiage to SSP in support of their new sites; sometimes they bring these materials direct to PPSP. There seems to be no standard procedure. Such late-added sites do not always benefit from thematic or SSP review, and data in support of such sites is not always deposited in the ODP Data Bank for use by the community.

We recommend that all changes or additions of sites to scheduled legs should be submitted as an addendum through the JOIDES Office, including new site summary forms and statement of scientific objectives. Such additions should be accepted throughout the year, independent of the January 1 and July 1 proposal deadlines. The JOIDES Office should distribute the addendum immediately to the appropriate Thematic and service panels (always SSP and PPSP, occasionally DMP or SMP) and to ODP/TAMU for comment. SSP and PPSP should only review sites which have come from the JOIDES Office, not sites that have come directly from proponents or co-chiefs.

4. SITE SURVEY STATUS OF UPCOMING SCHEDULED LEGS

The following Scheduled Legs are not on this SSP Agenda because their data sets have been approved at a previous SSP meeting: Leg 159 (Equatorial Atlantic Transform Fault) and Leg 164 (DCS Test at Vema Fracture Zone limestone cap). The history of SSP review for each scheduled and proposed future drilling leg may be found in Appendix B.

4.1 Leg 160: Eastern Mediterranean

SSP Watchdogs: Sapropels: Kastens; Med Ridge: Farre; All: Quoidbach

SSP Proponents: SSP member Camerlenghi has been involved in site surveys for Med Sap; SSP members Camerlenghi and Kastens were proponents for Med Ridge.

Target Types: Sapropel sites, Ionian Transect and Mud Volcano sites: Type A (Paleoenvironment); Eratosthenese Transect: Type B (Active Margin)

The Eastern Mediterranean drilling Leg comprises Sapropel sites (391-Rev) located east of Sicily, plus Mediterranean Ridge sites (330-Rev) that were not too close to Libya.

At their June meeting, PPSP approved: ESM-1a, 2a, 3a, and 4a with specified order of drilling; MR-1, 2, and 3; MV-1 and newly proposed MV-1alt with specified order of drilling; MedSap 2B, 3, 4a, and 4c. Approval was given to drill the ESM and MV sites, but in a specified order and with termination should elevated levels of hydrocarbons be detected during operations. PPSP also restricted the penetration of ESM-

3a to 300 m rather than the proposed 900m, as they felt that the seismic records did not image that depth. As the presence of hydrocarbons could terminate the drilling of an entire transect of holes, PPSP requested that the proponents provide a set of alternate sites.

The proponents responded by submitting an addendum to their proposal containing three additional Med Ridge sites (MR-1a, 1b, and 1c), as well as an additional site on the mud volcano (MV-1/alt2). All data for these proposed backup sites are in the Data Bank, with the exception of 3.5 kHz data over MR-1a, 1b, and 1c.

There was some confusion at the last SSP meeting over the exact location of site MedSap 2B. It appears that the location that PPSP approved was a holdover from an old version of the proposal. The Co-Chiefs feel that the cruise objectives would be better met by drilling at a newly proposed site, MedSap 2D, which is very near to 2B. The objectives are identical, the dataset is the same, and site 2B would be used as an backup site. PPSP did not review this new site at their October meeting, and they are being asked by the proponents to review this site at their March meeting while the cruise is taking place.

SSP had also asked for clarification as to the exact location of all sites, but especially the MR-1a, b, and c sites. The locations for these sites were included in the addendum to the Leg 160 safety package which was reviewed at the October '94 PPSP meeting. The Data Bank has plotted these sites on maps of the existing navigation data. However, much of the data in the Data Bank is in the form of page sized (or smaller) sketches of cruise tracks, often with annotations that do not match the seismic lines, or are absent altogether (the Valdivia lines around the MR-1, 2 and 3 sites are an example). The Co-chiefs have managed to locate some digital navigation data, but more is needed. It is vital that this navigation data be in the Data Bank in time for the cruise operations package to be assembled. The dataset for Leg 160 has also been improved through the submission of newly processed versions of Strakhov and TREDMAR seismic lines on the Eratosthenes Seamount.

Finally, SSP had asked for interpretive sections to be developed for the recently collected data from the Eratosthenes Seamount in time for PPSP review. If they were presented at PPSP, these sections should be submitted to the Data Bank for archiving.

SSP Consensus #1: Most data are in hand for the eastern Mediterranean (Leg 160). 3.5 kHz data are still needed for MR-1a, b and c. Any available interpretive sections at the ESM sites should be submitted to the Data Bank as soon as possible. The Co-chiefs need to aggressively search for digital navigation for those seismic lines which do not already have them, or they must at least provide well annotated track charts at a reasonably large scale. These data must be sent to the Data Bank quickly so that the cruise operations package may be assembled.

4.2 Leg 161: Western Mediterranean

SSP Watchdog: Kastens/Quoidbach

SSP Proponents: none

Target Types: Alboran Basin tectonic sites: B: passive margin; Sapropel sites: A: paleoceanographic

At our last meeting, we noted a strong data package, lacking only heatflow data and Parasound data across one site. An informative report about the heatflow data has been submitted to the Data Bank. With guidance from co-chief Comas, the "missing" Parasound data has been found in the Data Bank. These items complete the data package for leg 161.

SSP Consensus #2: The data package for the Western Mediterranean (Leg 161) is now complete.

4.3 Leg 162: North Atlantic Arctic Gateways II (Peterson/Quoidbach)

SSP Watchdog: Peterson/Quoidbach

SSP Proponents: None

Target Type(s): all sites A (Paleoenvironment)

The NAAG II program (Leg 162) contains sites previously approved for, but never drilled by, Leg 151, plus additional new sites proposed in ODP proposals 372, 406, and 416. As noted in the minutes of the last SSP meeting, holdover sites from Leg 151 are considered currently ready for drilling by virtue of their earlier approval. However, the Data Bank stills lack data which are normally considered vital for paleoceanographic objectives at a number of sites. This situation has improved since the July meeting, but largely because of the efforts of Data Bank personnel to track down in-house records (mostly 3.5 kHz) and not as a result of proponent action.

At their last meeting, PPSP requested that previously approved undrilled sites from Leg 151 be reconsidered in light of the Leg 151 drilling experience. Sites that were reapproved were YERM-1, YERM-2A (a return to Site 912 and back-up for YERM-1), YERM-5, ICEP-3, ICEP-1 (redrill of Site 907; approved to 300 m), and EGM-3 and -4. Though considered approved by virtue of earlier actions, from the SSP perspective the status of these sites are as follows:

EGM-3 - Still lacking vital high resolution SCS and core data. 3.5 kHz data from RC 2412 now in Data Bank. Lat/Long position in the prospectus does not match the position of the shotpoint on which the site was chosen. Correspondence from E. Jansen indicates this site will probably not be drilled.

EGM-4 - Still lacking high resolution SCS and core data. 3.5 kHz data from Vema and Conrad lines have been added by Data Bank personnel. Previous communications indicate 3.5 kHz and core data are available from GEOMAR, but these don't appear to have ever been sent. Again, the position information in the prospectus does not seem to match the shotpoint location at which the site is targeted.

YERM-1 - Data Bank lacks high resolution SCS, 3.5 kHz and core data for this site. Correspondence indicates that the recent high-resolution SCS survey of A. Solheim was stopped 18 miles short of the proposed site by ice, but does not make clear if a new site location was chosen. The minutes of the Safety Panel meeting indicate that it is the original site which has been reapproved. The data from the Solheim survey are not yet in the Data Bank.

YERM-2A - This site, which is a return to Site 912, has apparently crept into the Leg 162 drilling program as an alternate to YERM-1. PPSP reapproved this site based on the data in the Leg 151 package. By current standards, the site would be required to have high resolution SCS data, which it does not. However there is MCS coverage over the site, as well as poor quality Parasound nearby.

YERM-5 - Status of Data Bank holdings for this site unchanged since last time (see last watchdog report). Correspondence from E. Jansen indicates this site not likely to be drilled.

ICEP-1 - Data Bank has added 3.5 kHz data to data package from Conrad 2114 and Vema 2910. This is a redrill of Site 907, so core requirements are satisfied. PPSP has approved for 300 m. This site looks to be in good shape.

ICEP-3 - This site has crossing high resolution SCS lines in the Data Bank. 3.5 kHz records from Conrad and Vema cruises have been added to the data package, so a core on location is the only missing vital data type.

NIFR-1 and SIFR-1 - Data packages for both these sites contain several low quality airgun profiles. 3.5 kHz data from Ewing 9006 (NIFR-1) and Vema 2804 (SIFR-1) have been added from the Lamont archives. No core data have been submitted. Correspondence from E. Jansen indicates these sites are not likely to be drilled.

Sites that were newly proposed for the Leg 162 program, and that don't come from the recycled Leg 151 sites, seem to be in moderately good shape. The following comments summarize their current status:

BJORN-1 and GARDAR-1 - All vital data were in the Data Bank as of July 1994; these sites have not yet been approved by PPSP but are considered ready to drill by SSP.

FENI-1 and FENI-2 - High resolution SCS and core data are in the Data Bank for these sites. 3.5 kHz data, however, have not yet been submitted and are considered critical because of the emphasis on studying sub-Milankovitch scale climate variability from these high deposition rate drift deposits. Data from a Jean Charcot cruise apparently exist but have not yet been submitted to the Data Bank. The last watchdog report notes concern over these two sites having exactly the same location specified in the NAAG II DPG report. This seems to have been a mistake, as the site positions given in the NAAG II Safety Package are as follows:

FENI-1	55° 30' N	14° 42' W
FENI-2	55° 28.2' N	14° 40' W

The Co-chiefs should confirm that these are the final positions of the Feni Drift sites.

NAMD-1 - Since the last SSP meeting, 3.5 kHz data from DSDP Leg 12 and Vema 2804 have been added to the Data Bank. This site is intended as a redrill of DSDP Site 116, so the core requirement is thus satisfied. SSP had previously noted a subsurface disturbance at this site in the MCS data on file, and suggested a slight shift in the target to a less disturbed area. PPSP apparently agreed, approving the site to 820 mbsf but specifying a move to SP 4530 on line MH90-2 (from SP 4593). This site seems to now have all vital site requirements satisfied.

SVAL-1 - SSP had previously noted mud diapirs at the proposed location and raised concerns about possible safety issues. New high resolution SCS, 3.5 kHz, and core data from the recent site survey by A. Solheim were presented to PPSP by E. Jansen, and a new site location has apparently been identified. These data have not been submitted to the Data Bank and the new site location is not even known to SSP. New survey data should be deposited at the Data Bank ASAP.

SSP Consensus #3: SSP considers the recycled Leg 151 sites of the NAAG-II (Leg 162) program to be ready for drilling by virtue of their prior approval. However, SSP would like to see additions to the data packages for some of these sites (EGM-3 and -4, YERM-1, -2A, and -5, ICEP-3, NIFR-1 and SIFR-1) in order to bring them up to the current data standards and to aid in the relocation of sites due to inclement weather or ice conditions. The newly proposed sites are in much better shape. The BJORN and GARDAR sites are ready to drill. The confusion over the location of the FENI sites seems to have been resolved, but the sites still need 3.5 kHz data to complete their packages. NAMD-1 has been moved to a location away from an apparent subsurface disturbance, and the site is ready to drill. The new site survey data over SVAL-1 has not been submitted to the Data Bank, and no response has been received from the Co-chiefs regarding a move of the site away from an apparent mud diapir field. The Co-chiefs are again urged to submit all remaining data in time for preparation of the operations data package.

4.4 Leg 163: Gas Hydrates

SSP Watchdog: permanent: Camerlenghi; Acting: Quoidbach

SSP Proponents: None

Target Types: A (Paleoceanographic)

At the last SSP meeting it was noted that the data package for Leg 163 was nearly complete, lacking only side looking sonar data over some of the sites, and velocities from OBH recordings. It was also suggested that color amplitude plots be submitted for those lines crossing sites at which the BSR is to be penetrated. It was noted that the quality of the data package had decreased somewhat due to the submission of new, cluttered navigation plots over the revised sites. The Co-chiefs were urged to resubmit the navigation data, preferably in an electronic format, as soon as possible. Since the July meeting, new track maps have been received for BRD-1, and CFD-5, 6, 7, and 8. These maps also show the locations of cores taken near the drill sites. The side looking sonar data, velocity determinations and color amplitude plots have yet to be received, but an October 1 letter from the Co-chiefs indicates that they are to be sent soon.

PPSP reviewed Leg 163 at their October '94 meeting and approved all proposed sites, with some restrictions on order and depth of drilling. Details of the restrictions can be found in the PPSP minutes.

It appears that in addition to the sites SSP had reviewed, the proponents presented PPSP with five new sites within their study area. These sites do not appear in the report to the safety panel which the Co-chiefs had prepared, and must have been developed just prior to the PPSP review. Based upon data which the were presented at the meeting, PPSP approved these new sites for drilling. The two new sites on the Blake Ridge have been designated BRH-4 and 5, and the three new sites on the Blake Ridge Diapir are now designated BRD-1a, b, c and d. Since these sites did not exist prior to the Safety Panel meeting, information about them comes solely from the PPSP minutes. The minutes indicate that the two new BRH sites are on CH-6-92, Line 31 at SP 32970 (BRH-4) and SP 32930 (BRH-5), near the crossing of USGS Line BT-1. They appear to be an extension of the BRH transect from three holes to five. No information is provided for the additional BRD sites other than a single Lat/Lon position, which is identical to the location the originally proposed BRD-1. The Co-chiefs must provide the Data Bank with the details of these new sites as soon as possible, along with all necessary data. However it does appear that the new sites are covered by the existing dataset.

SSP Consensus #4: The dataset for Leg 163 (Gas Hydrates) has been improved through the submission of clearer navigation plots for the site survey data. SSP awaits the submission of the side looking sonar and velocity data, as well as color amplitude plots of key seismic lines for sites at which the BSR will be penetrated. SSP notes that several new sites were proposed during the PPSP review of Leg 163, and the Co-chiefs are urged to submit site summary forms and relevant data for all of these new sites as soon as possible.

5. POTENTIAL FUTURE DRILLING: OHP

5.1 Caribbean OHP

SSP Watchdog: Mountain

SSP Proponents: none

Target Type(s): all sites "A: Paleoenvironment"

Caribbean proponent Lew Abrams summarized the scientific background and drilling objectives of the 411-Rev1 and 415-Rev2 proposals that are of high interest to LITHP and OHP, respectively. The following minutes summarize the SSP response to the OHP sites only. With the help of the Data Bank staff during several days before the meeting, Abrams compiled a location map showing proposed site locations, relevant tracks, piston cores and bathymetry. He distributed a table to all panel members identifying the thematic interests and priorities of each of the 17 sites in 411-Rev1 and415-Rev2 (Appendix C). Survey data for several of the proposed sites were previously found by SSP to be adequate; Abrams concentrated his site-by-site discussion on those sites needing additional information or that might be crossed by survey cruises within the next several months.

Primary OHP Sites

S-2a: The proponents agree that the thinned sediment seen a few km SE of the proposed location on MCS line UTIG GT2-52E should be avoided; in the interest of Neogene objectives the site will be moved towards the NW. The characteristic A" and B" reflector pattern (lower Eocene and lower Cretaceous, respectively) seen in the Venezuelan Basin and elsewhere in the Caribbean has not been identified in the Yucatan Basin. Hence on the basis of seismic data one is unable to say with certainty that sediments as old as Late Cretaceous are present at site S-2a. Furthermore, basement ages are difficult to predict with precision; this was in a Late Cretaceous back-arc that now lacks identifiable magnetic anomalies. This age is supported by rocks dredged from the south-facing wall of the Cayman Trough 400 km south of S-2a. This site will be surveyed by Droxler with a site-survey augmentation grant from JOI/USSAC, sailing on the Ewing two weeks from now in late November. Data types that could be used will include 3.5 kHz and SCS (either single GI or multiple water guns), Hydrosweep, gravity coring, magnetics and gravity. The 3.5 kHz and the SCS data will be recorded on an 2-channel digitizing system that Droxler will supply. SSP strongly supports this choice and acknowledges the effort and support provided by all those involved in getting this data gap filled. SSP cites the critical need for a 3.5 kHz and swath topography to locate the optimum site for a thick and undisturbed Neogene section, and a grid of high-quality SCS profiles to provide structural control at depth for optimal location of a K/T target. A long piston core at the chosen site would be helpful; a gravity core would provide a less valuable gauge of recent sedimentation rates and processes. Watchdog Mountain will discuss survey plans directly with Droxler immediately after the SSP meeting and report back to the panel in April the outcome of this survey.

S-3, S-3a: Proponent Abrams stressed that Neogene objectives at this site were much less important than those of the Paleogene and Late Cretaceous. Consequently, SSP revises its previous negative assessment of S-3a that was thought to be too steep, disturbed, and/or truncated for shallow sub-bottom Neogene paleoceanography. In fact, site S-3 and its alternate SA-3a were chosen because the minimum Neogene cover indicates the Paleogene section probably was never buried to any great extent and also was deposited at relatively shallow paleodepths. S-3 would re-drill DSDP Site 152 where the target stratigraphic interval was inadequately recovered; S-3a is 70 km SW in a similar setting, but where there is an existing MCS line that provides greater interest for LITHP objectives. SSP agrees that OHP objectives could be reasonably addressed at S-3a, but reiterates that additional survey data are needed. Fortunately, from 1 to 3 upcoming cruises are likely to cross this site. The most acute data shortage is a grid of high-quality seismic data that could specify the 3-D geometry of reflectors A" and B". This could be augmented as well with swath topography that would indicate areas of high relief where operations and Neogene interests could be compromised. Droxler (JOI/USSAC Site Survey Augmentation funds), Diebold and Driscoll (NSF funds) and Mauffret (IFREMER transit) will all pass this region before our next meeting. SSP strongly encourages the proponents to contact the principals

of each cruise and suggest coordinating the surveys of each. The first will be with the Ewingand SCS recording, the second with the same vessel but MCS, while the third will be aboard the Atalante without seismic gear. SSP suggests the first should concent rate on a grid with hi-res definition of A" at S-3a, the second should focus on a tie to DSDP 152, and the third with swath bathymetry along the Hess Escarpment between 152 and S-3a. As a fall-back to additional SCS data at S-3a, the Casis MCS line C-01 across this site could be re-processed with a higher band pass, but this still would not provide the valuable grid of data needed to define the structural relief in the sub-bottom.

S-6: This site on the Mono Rise could also be crossed by from 1 to 3 of the same upcoming cruises described above. Though SSP considers the existing data adequate, it is hoped that some swath topography could be collected to define better the 3-D structure of seafloor adjacent to the proposed drill site. At present there is only one seismic line of good quality across this feature to locate S-6; any additional SCS data, even if an analog paper record, would greatly improve the likelihood that a representative and reasonably intact sedimentary section will be drilled. SSP suggests the proponents consider moving S-6 a few km NW along line CT1-12 to where the depositional layering has been less affected by underlying basement topography.

S-7: This is a reoccupation of DSDP Site 146/149. The track chart showing the proposed site and Conrad 2103 MCS lines 119 and 120 have been prepared by the Data Bank staff. SSP stands corrected re: the trackchart and paper copy of Gulfrex MCS line 120VB5 across DSDP Site 146; it was deposited in the Data Bank last spring and was available at our July '94 meeting. Companion line 120VB4 was deposited during the Nov '94 meeting.

NR1/2 + NR4: Both sites were determined at the July meeting to have adequate data coverage, but were lacking navigation. Digital navigation data has since been deposited, and the Data Bank staff has prepared track charts. Though both sites fall within the good-quality Cape Hatteras SCS data, the navigation compilation now reveals that MCS lines CT1-29 and CT1-16 approach no closer than 18 km from either proposed site location.

CB-1: SSP reiterates that with the relatively dense network of SCS, 3.5 kHz and piston core data in the Cariaco Basin that the proponents consider site locations that are optimal for their objectives. Drillsites not at a crossing(but of course still on a single line within the data grid) can be acceptable if the 3-D geometry provided by this grid is determined with a reasonable amount of mapping effort.

Alternate OHP Sites

S-1: Lew Abrams began discussion of this site by saying the proponents have withdrawn it from their list because of the inadequate available survey data. However, SSP chose to evaluate alternatives because of the scientific importance of this site and the chance of its being surveyed in the upcoming months. Of all the proposed Caribbean sites, this is the closest to the Chixculub impact crater, and it holds special interest for the K/T boundary objectives and the goal of learning more about ejecta transport processes. Unfortunately, the site is in such an isolated setting (no ties to known stratigraphic records are available) that the risk of not encountering an intact K/T surface is still of serious concern to SSP. The one available seismic line CT1-140 shows the site is in a small basin with about 500 m of sediment, separated by a basement structure from a more landward basin that is several times thicker. This east coast of Yucatan was a Mesozoic and Paleogene transform margin, and consequently one must question whether or not marine sediments as old as Late Cretaceous actually are to be found here. The panel weighed the pros and cons of including this region in the upcoming 2 days of surveying that Droxler plans for S-2a, and it was decided that without detailed sampling and regional mapping -- on land and off -- a marine survey could not dismiss the concern that drilling would reach basement before sediments

dating from the critical K/T boundary. Hence SSP still maintains that this site does not have an adequate survey package.

NR7: The proponents have dropped this as a proposed site.

S5/NR8: This site has adequate survey and piston core information in the Data Bank.

S-3a: Discussed above with primary site S3/152.

NR9: Adequate data lacking only a good track chart were reviewed in July. A paper copy of the essential Cape Hatteras navigation has since been deposited; digital data has yet to arrive.

In conclusion, SSP appreciates the effort that Lew Abrams and Alain Mauffret expended in compiling the complex data package for the Caribbean Ocean History proposal. It is clear that in the case of a drilling proposal as diverse as this, and with data arriving at the Data Bank from so many different institutions across such a long period of time, that proponents should visit the Data Bank to become familiar with what is on hand and how the Data Bank and SSP handle this information.

SSP Consensus #5: In general, the primary sites for Caribbean Ocean History drilling are in good shape from an SSP standpoint, though details of having good-quality navigation in the Data Bank are in some cases lacking. Three upcoming cruises may cross one or more Caribbean sites, and the proponents are strongly urged to remain in close contact with the leaders of each cruise and offer to help coordinate plans. A well-conceived assembly of survey data would be very beneficial to proposed sites S-3, S-3a, and S-6 in particular. S-2a should be moved slightly after the crucial Droxler survey. S -3/S-3a needs the additional survey data coming from Droxler, Diebold/Driscoll, and/or Mauffret. S-6 could benefit from swath topography and an additional SCS line. S-7, NR-1/2, NR-4, CB-1, S-5/NR-8 and NR-9 are adequately surveyed. S-1 and NR-7 have been dropped by the proponents.

5.2 California Margin (386-Rev3,422-Rev,386-add2)

SSP Watchdog: Camerlenghi (permanent), Peterson (acting 11/94)

SSP Proponents: None

Target Type(s): A (paleoenvironment)

The principal objectives of the California Margin drilling program are to obtain sediment records of late Neogene productivity and to study the evolution of an eastern boundary current and the associated coastal upwelling systems during this period of time. The program calls for the drilling of a series of east-west and north-south overlapping transects that will reconstruct offshore and alongshore gradients in oceanographic properties and their response to climate events of the late Neogene. The total package consists of twenty identified sites, fourteen of which are included in the present one-leg drilling plan. Site survey data packages for the individual sites currently range from being essentially complete and of high quality, to incomplete and still missing vital data types. A funded cruise aboard the R/V Ewing in May 1995 plans to acquire survey data that should largely fill in the gaps and complete the data package for this program. Provided that the planned data are successfully collected, we anticipate that most sites should be considered ready for drilling by the summer 1995 SSP meeting.

Since our last meeting, the proponents have submitted a large body of survey data from R/V Wecoma cruise W9406A (June 1994) in support of Sites CA-1, CA-2, CA-4, and CA-7 near the northern end of the program's geographic range. High-resolution SCS

and 3.5 kHz data from well-executed grids are of very good quality and have been used to optimize site locations. Core data, considered vital for paleoenvironmental targets, are still not available from Sites CA-1, CA-4, and CA-7, although available cores in the vicinity are identified. The May 1995 survey cruise will collect piston cores at each of these sites and this should complete the survey requirements for these locations. As noted in our last review, the sediment section recovered at DSDP Site 173 will be considered as satisfying core requirements for Site CA-2, despite the latter's slight repositioning to a more optimal location.

Sites BA-1, BA-2, BA-4, BA-5, BA-6, CA-5, CA-6, CA-8, CA-9, CA-11, CA-12, CA-13, CA-14, and CA-15 will all be surveyed as part of the May 1995 Ewing cruise. At present, most of these sites lack cores and many are located on single tracklines without nearby crossings. Seismic and 3.5 kHz records already in the Site Survey Data Bank are, in a number of cases, noisy and of poor quality. On the basis of existing data, a few of these sites (e.g., CA-9, CA-15, BA-2) probably have sufficient control for site approval. However, given the variable nature of margin sedimentation, and the issues associated with the drilling of organic-rich sediments, the currently existing data packages for most of these sites are considered technically inadequate to support drilling. Planned data acquisition for 1995 (high-resolution SCS, 3.5 kHz, cores) should remedy these deficiencies and allow for fine-tuning of site locations. Assuming data quality similar to the Wecoma results, and prompt submission of results to the Data Bank, we anticipate that a completed data package for the California Margin program will be available for final review at the summer 1995 SSP meeting. Given the large number of sites involved in the final survey effort, prospects for the total program clearly hinge on the success of the May 1995 Ewing cruise. In the unlikely event of a complete survey failure, there at least remains the possibility of approving enough sites with existing data to construct a less than one-leg program with commensurately reduced objectives.

Site CA-10 is planned as a reoccupation of existing Site 893 in the Santa Barbara Basin. The goal here is to recover a third complete sediment section (0-200 mbsf) at this valuable high-resolution paleoclimate reference site. SSP considers the previous survey data from Site 893 to be adequate for the proposed redrilling, and recommends against using valuable survey time in 1995 to acquire additional data. Site CA-14, the southernmost site in the California Margin program, is a proposed reoccupation of DSDP Site 470 with the goal being to recover a complete middle Miocene-Recent sequence at this older rotary cored site. Site CA-14 is listed as a contingency site in the 1995 Ewing cruise plan, to be surveyed if time and conditions permit. We encourage the proponents to include this site in their SCS and 3.5 kHz survey plan, if possible, as the older Leg 63 survey data are of only average quality and lack a direct crossing. We also note that the Site 470 descriptions record a hiatus at this site between ~5-8 Ma, which does not seem to appear in the proponent's discussion of site characteristics; it is not clear how/if this affects science objectives planned for this site.

Site positions for several of the Gorda transect sites have already been adjusted based on results of the recent Wecoma survey cruise. Additional shifting and optimization of site locations is to be expected based on the upcoming Ewing cruise. As sites are relocated, we ask that proponents rename or distinguish them in some way to avoid confusion by panels and in the Data Bank. All pieces of survey data are marked by site name in the latter; as site positions shift, even slightly, older data may become irrelevant yet still be identified by the same site number. In the present case, it is best to adopt this habit beginning with the anticipated results of the Ewing cruise.

Finally, SSP wishes to commend the proponents and express appreciation for their efforts to pull together and present essential data from the Wecoma cruise, along with their overall program summary, in an exceptionally clear and user-friendly form (data

submission of 26 October 1994). We look forward to reviewing results of the 1995 survey cruise and wish the proponents the best of luck in their final data collection effort.

SSP Consensus #6: The site survey data package for the 20 identified sites of the California Margin program is still far from being complete, though acquisition plans for the remaining critical data are firmly fixed. Recently submitted data from Wecoma Cruise W9406A for the northern Gorda transect sites are of very good quality, and the remaining data are scheduled to be collected on a funded May 1995 cruise of the R/V Ewing. Assuming data quality comparable to that obtained on the Wecoma cruise, plus prompt processing and submission, SSP is optimistic that a complete data package with fine-tuned site locations can be available by the summer 1995 SSP meeting for final review and approval. On the basis of data currently in hand, 8 sites (CA-1, CA-2, CA-4, CA-7, CA-9, CA-10, CA-15, and BA-2) could be considered ready for drilling from SSP's perspective.

5.3 NW Atlantic Sediment Drifts (404) (Mountain)

SSP Watchdog: Mountain

SSP Proponents: none

Target Type(s): all sites "A: Paleoenvironment"

The major changes in this data package since July '94 are that locations of alternate sites have been chosen, new sites have been selected, and a complete set of ODP Site Summary forms have been prepared (and submitted to the Data Bank only; nothing new has been delivered to the JOIDES Office.) SSP emphasizes that despite the many sites (23 total), all are entirely consistent with the objectives of proposal 404, and they all fall within the primary survey grids described in the first submission of 1991.

This proposal has been in the system for over 3 years, but essential data identified in SSP's first review are still lacking. This issue is especially acute on the NE Bermuda Rise. The proponents have yet to provide a summary track chart that contains all relevant data and proposed drillsites on the NE Bermuda Rise at a workable scale. While proposal 404 contains thoughtful discussion of Pleistocene paleoceanography and the implications of long piston cores and prior DSDP results in this region, the proponents have not deposited data or text that describes the local or regional stratigraphic setting to provide some assurance that drillsites are optimally located. For example, if 3.5 kHz or hi-res seismic data in the immediate vicinity of the proposed drillsites were assembled they could demonstrate that abnormal local topography will not skew the paleoceanographic record; similarly, a more extensive regional summary would demonstrate that the proposed drillsites are indeed a safe distance from and height above potential turbidity current paths that would contaminate the record. It may be that there is insufficient data with which to assemble these background summaries. If so, SSP wishes to make clear to the thematic panels and to PCOM what risks must be weighed against the very sizable benefits that would come from a successful drilling campaign on the NE Bermuda Rise. Furthermore, SSP reiterates to the proponents that its data requirements serve multiple purposes. Among these are: (1) a demonstration to the drilling community that the objectives are worthy and obtainable, (2) that the strategy is a sound use of the drillship, and (3) that when drilling is completed the findings can be placed into a regional context in ways that may have never been anticipated by the proponents or the leg participants.

To summarize the status of the NE Bermuda Rise: since July '94 no new data has arrived re: site BR-1 and its new alternate BR-1A. Data readiness for drilling this region is as before -- the proposed sites are located on Kn31 3.5 kHz profiles (though not adequately labeled on the data segments thus far deposited) for which no reliable navigation has been

submitted. Neither drill site is on a hi-res seismic line. A good-quality IFP MCS line is nearby, and its digital navigation would be useful if delivered to the Data Bank. An impressive late Pleistocene oceanographic record has been documented by GPC5 at proposed site BR-1.

Despite new alternate sites on the NE Bermuda Rise, Blake-Bahama Outer Ridge, Carolina Slope, plus several new primary sites, the proponents have not submitted a table summarizing site statistics. A 1-page list of site names, positions, water depths, critical crossing lines, accompanying piston or gravity cores, etc. would ensure clarity in site identification and survey readiness.

With only a few exceptions, all sites are re-occupations of piston or gravity core locations from Kn31 or Kn140 that presumably show acceptably complete and rapid Pleistocene accumulation histories. SSP urges the proponents supply the age-depth plots that have prompted the selection of these sites. This piston or gravity core information is especially important because the proposed TD's are not particularly deep. BR-1 and its new alternate on the Bermuda Rise are the deepest at 300 m; only BBOR-3 and its alternate on the Blake Ridge are 200 m; BBOR-4 through -6 are 150 m each, and the rest are 100 m. These penetrations reduce significantly the usefulness of deep penetrating seismic data and even most hi-res seismic data, and emphasize the importance of 3.5 kHz echograms and the reliability of existing core data. Hence SSP is taking a relaxed stance regarding seismic survey requirements until these shallow targets are critiqued by the thematic panels. However, SSP is simultaneously placing more urgency on the need to be supplied with age-depth plots from cores, as well as with labeled, interpreted 3.5 kHz records.

Scripps MPL deep-tow data were collected across proposed sites BBOR-1, -1A and -2 (there is no alternate for the latter.) SSP requests that pertinent data elements from this Deep tow data set be assembled and deposited in the Data Bank by the proponent.

GLORIA side-scan sonar data have been collected across all BBOR and CS sites, though hard copy mosaics for only a few have been supplied. The proponents sent a CD-ROM of GLORIA data that crosses about half of their proposed BBOR- and CS- sites, but it would be more useful if they submitted a hard copy with text describing the site locations relative to inferences derived from these backscatter data. This was an SSP request at its first review of this proposal in April 1993.

The status of navigation across the BBOR and CS sites is more hopeful than it is across the BR sites. Hard copies of Farnella and Cape Hatteras tracks have been deposited, and digital navigation for both have been sent/retrieved via ftp. Regional Conrad and Vema tracks have been plotted (by the Data Bank staff). Kn140 navigation arrived on a disk Nov 1, but no hard copy navigation chart. The proponents state they do not have the resources to make such maps at WHOI.

SSP Consensus #7a: Survey readiness for the North West Atlantic Sediment Drifts proposal is still lacking in fundamental matters such as a useable trackchart of 3.5 kHz echograms, the primary drilling-related data. Navigation for Kn31 on the NE Bermuda Rise, and Kn140 on the Blake-Bahama Outer Ridge and Carolina Slope are the most urgently needed. A Kn140 map is being prepared by the Data Bank staff. GLORIA data could provide regional context, and the proponents are once again urged to assemble these mosaics and discuss site selections against these data. Piston or gravity cores exist at every proposed site; the proponents are urged to submit a table describing statistics of each drillsite that wherever possible includes accumulation rates measured in these cores. SSP awaits further comment from thematic panels concerning the strategy of drilling 100-150 mbsf TD's. Such modest penetrations, if endorsed from a thematic perspective, would encourage

SSP to relax our usual insistence on seismic data control, and to insist more stringently on 3.5 kHz data and knowledge of local depositional processes.

5.4 Blake Nose Paleogene (404-Add/462)

SSP Watchdog: Mountain

SSP Proponents: none

Target Type(s): all sites "B: Passive Margin"

SSP was initially reluctant to consider survey adequacy of proposal 462 because it has not been reviewed by thematic panels. However, the JOIDES office sent a copy of 462 to watchdog Mountain who reported to the panel that there is only one substantive difference between 404-Add and 462 that affects SSP review: in 462 a 6th objective has been added that concerns recovering information about low latitude thermocline and intermediate water column structure of lower Cretaceous age. To reach these sediments, the proponent indicates that several proposed sites must be drilled 150 to 200 m deeper than described previously in 404-Add; otherwise, all site locations are identical and survey data requirements remain unchanged. SSP chose to evaluate the readiness of these sites with the anticipation of drilling to depths and with objectives outlined in proposal 462.

The proposed leg consists of a depth transect of 5 holes across the Blake Nose, a salient seaward of the outer Blake Plateau. The deepest site BN-1 is located on MCS line TD-5, and is a near (~ 15 km separation) re-occupation of DSDP Site 390. Site BN-2 is placed at the intersection of Farnella line 18 and Gilliss line 26, roughly 3 km north of the closest approach to TD-5; all other sites are located by shotpoint on TD-5 and are crossed by either Farnella, Eastward or Glomar Challenger profiles.

Although the objectives of 404-Add/462 are "paleoceanographic", SSP considers that with the target depths as much as 600 mbsf, data readiness ought to be considered with reference to the guidelines for a "passive margin" setting. This places greater emphasis on (1) deep-penetrating seismic data and (2) reliable sound velocities for calculating target depths in meters than would be the case for shallower targets accessed entirely by APC techniques. Furthermore, because of this hybrid between paleoceanographic objectives with relatively deep targets, SSP has chosen to apply the "options" in its data guidelines (see JOIDES Journal June '94, p. 27) by requiring (vs. "recommending") that sites be located within a grid of both hi-res and deep-penetrating seismic data. The proponent has supplied data that meet this guideline. The only requirement imposed by SSP not yet provided is sound velocity data. This information could be assembled from regional refraction/wide angle reflection data, stacking velocities used on TD-5, sonic log measurements, and/or core-seismic correlations at Site 390. In all other respects the proponent has done a good job of assembling relevant data to the five proposed sites BN-1 through BN-5, and SSP is certain that a completely adequate package can be pulled together.

Several comments can be made about the survey data adequacy as a whole. First, there appear to be a few small discrepancies between shotpoint locations, line crossings, and the lat/lons of sites discussed in the text. For example, the position of DSDP 390 does not coincide exactly with the lat/lon of proposed site BN-1, though it is referred to as a "re-occupation"; site BN-4 is described as at the intersection of Farnella line 19 and sp 1438 of TD-5, but the supplied navigation shows the intersection at roughly sp 1370; there are ambiguities in the line drawing interpretation of TD-5 discussed below. SSP is certain these can all be clarified.

Second, the proponent is to be commended for delivering the one MCS and the several SCS and 3.5 kHz profiles thus far received at the Data Bank. The quality of the TD line is excellent; the Farnella and Gillis SCS data are good; the Eastward and Glomar

Challenger SCS data are acceptable. In most cases the 3.5 kHz data looks adequate, though as described below its applicability in terms of searching for sediment vs. hardground may be as much in what cannot be detected as what can.

Third, the proponent acknowledges the operational challenge of phosphorite and manganese pavement that may armor the seabed at the proposed drillsites. (It appears these conditions led to the failure to spud in at Site 389 on Leg 44.) SSP encourages the proponent to provide information that would demonstrate a sedimented seafloor at each drillsite. This could come from 3.5 kHz echograms, submersible observations, bottom photographs, or near-bottom side-scan imagery. In addition to identifying areas of pavement it would be necessary to provide an estimate of their typical size and an assessment of the navigational precision of the observational data. To improve the chances of avoiding especially hard seabed with the JOIDES Resolution, either these hardgrounds must cover a small fraction of the Blake Nose or their latitudes and longitudes must be well determined.

Fourth, (as mentioned earlier), the interpreted line drawing of TD-5 with each of the proposed drill sites superimposed contains three ambiguities or errors. First, Reflector Green in proposal 462 is not completely drawn (the drawing in 404-Add is correct.) Second, the TD drawn at BN-1 will reach reflector Blue of Barremian age at roughly 350 mbsf, whereas the text of proposal 404-Add/462 says 170 mbsf. This may relate to the ambiguity of whether or not BN-1 is to exactly re-occupy DSDP 390 or not. Third, the drawing shows downlapping clinoforms comprise much of the post-Blue section landward of BN-1. If Reflector Blue is indeed an intra-Barremian surface and Reflector Purple truncates successively older strata landward from BN-1, then a very thick lower Cretaceous section lies beneath BN-4 and -5. The proponent acknowledges this possibility, but the TD's as drawn will not reach a stratigraphic level any older than was reached at DSDP 390, nor will they exploit this potentially high-resolution lower Cretaceous record. SSP requests the proponent clarify these issues concerning the line drawing interpretation.

Last, the proponent is encouraged to prepare structural contour maps of key reflecting surfaces. The seismic grid is both sufficiently dense and of adequate quality to accomplish this task and demonstrate that actually drilling on TD-5 (or 3 km N as at BN-2) is the optimum strategy for reaching his objectives. While drillsites at exact line crossings are preferred, SSP does not consider this absolutely necessary, so long as they are located within the seismic grid that defines sub-bottom structural relief.

SSP Consensus #7b: Proposal 404-Add/462 seeks to drill ocean history targets below APC (and possibly XCB) range, and is evaluated by SSP in terms of data readiness as a combined paleoceanographic/passive margin setting. The proponent has done a good job assembling a grid of hi-res as well as deep penetration reflection data, and is encouraged to check for small errors in site locations, etc. that examination during our meeting appear to have uncovered. Sound velocity data has yet to be submitted. SSP requests clarification of anticipated stratigraphies along the transect. A map of potential phosphorite/manganese hardgrounds and supporting data is needed. The proponent is encouraged to prepare structural contour maps to target reflectors to select the optimum drillsite locations.

6. POTENTIAL FUTURE DRILLING: LITHP

6.1 Caribbean (384rev3/408/411/434/415rev)

SSP Watchdog: permanent: Hinz; acting: Scrutton

SSP Proponents: None

Target types: D: ocean crust with >400m sediment

We received an excellent presentation from Lou Abrams, supported by Alain Mauffret, explaining how several Caribbean proposals had been rationalised into two. These minutes concern the proposal to LITHP to explore the temporal, spatial and compositional variability of the Creataceous basalt province (a LIP) that is thought to extend throughout the Caribbean, mapped on adjacent islands at outcrop and offshore as refelector B".

At the July SSP meeting the four site (A1, B1, C1, S6) drilling plan was considered. The proponents have acknowledged and responded to the SSP July minutes and continued to lodge relevant data in the Data Bank. Concerning the specific points from July, Lamont and DSDP core information has been submitted where necessary for possible re-entry sites, the possibility of sampling a "layered basement" that does not truly represent the basalt horizon has been addressed by identifying possible alternative sites along existing seismic profiles which could be better documented on upcoming site-survey cruises, CASIS seismic lines around A1 and B1 have been migrated, and well-researched velocity information is beginning to be submitted for all sites. The proponents are congratulated on working hard to bring together relevant site survey data.

Two scheduled and one probable site-survey cruises are due - R/V EWING, Feb-Mar '95; A. Droxler cruise, late Nov '94; A. Mauffret proposal, decision late Nov '94. Of these, the EWING high-resolution, deep-penetration MCS cruise is expected to produce very high-quality profiles over sites C1, and S3 and S3A (both alternates to B1), and the proposed cruise of Mauffret will cross A1, B1, C1, S3A and S6 with 3.5kHz, grav., mag. and swath bathymetry profiles. Over and above these new data, which should be submitted as soon as possible, existing data from sources such as Lamont and IFP continues to be assembled and submitted to the Data Bank.

Outstanding items that SSP would recommend to the proponents concern site S6, the westernmost site of the four, situated on a basement high, where only one old UTIG MCS line has been submitted for deep structure and the EWING cruise is not expected to go. Reprocessing the UTIG line should be investigated and nearby IFP profiles used, together with Mauffret cruise results, to establish the three dimensional setting of the site. Site S7A, alternate for C1, is still poorly documented.

Site Survey Worksheets documenting the data status on a data-type by data-type, site-by-site basis are included in the Appendix.

SSP consensus #8: In support of Caribbean Basement drilling objectives, there is enough data in the Data Bank for the four priority sites (A1, B1, C1, S6) to be located, but one or two items are of poor quality. Outstanding, improved velocity data, the EWING MCS over C1 and a compilation of data around site S6 should be submitted. Alternate sites A1(alternate), S3 and S3A are adequately documented, but S7A is not.

6.2 Sedimented Ridges II (SR-DPG)

SSP Watchdog: Casey/Srivastava

SSP Proponents: None

Target Types: E Open Ocean environment (<400 m sediment) with additional requirements for high temperature environment.

The recent amendment to the proposal calls for CORK redeployments for Holes 857D and 858G drilled on Leg 139, deepening of Hole 857D, and drilling a set of holes in two distinctly different hydrothermal settings. Two sets of holes will be in the Middle

Valley of the Juan de Fuca Ridge and the other set to the south in the Escanaba Trough of the Gorda Ridge. Since consideration of the proposal by SSP, a number of concerns have been raised by the panel. The proponents have responded to most of the concerns. However, a few of the concerns still remain outstanding and SSP urges the proponents to keep SSP informed as the answers to some of these evolve. In particular, reference is made to the calculation of the expected thickness of sulfide expected at their prime site in the Middle Valley. Another point concerns the acquisition of the additional data in the two regions on two separate cruises which will be on cruises passing close to the proposed sites. SSP notes there also may be a problem in placing Site BH6 accurately along the 856 Fault Zone. SSP notes the current plans call for collection of additional data in the two regions on two separate cruises in 1995. However, no plans exist for use of submersibles for marking the chosen sites for ease of locating them from J/R at present. The proponent has inquired if SSP knows of any cruise in the region taking place where such work could be carried out. The only such cruise known to us is from the University of Hawaii in 1995.

A number of sites have been proposed to be drilled in the Middle Valley of the Juan de Fuca as well as the Escanaba Trough. The sites in the Middle Valley (Bent Hill and Dead Dog) lie in close vicinity of the sites approved for drilling in the Middle Valley and therefore be covered by the data package prepared for 139. However a closer inspection of the holdings during our July, 1994 meeting showed a lack of some of the data. The proponents were requested to supply the required data together with the proper seismic reflection track chart showing the locations of each site. A more critical situation existed for the Escanaba Sites which lacked most of the data. In response to the suggestions made during the July meeting , the main proponent has responded outlining the available data sets from these sites and supplying some of the data together with track charts for the Escanaba Trough. The following is a summary of the data evaluated from these two regions. While SSP considers the data packages complete in terms of required data sets, there are some data sets that are available and recommended to be placed in the data bank, but not yet deposited.

Middle Valley. Site 857D; Site 858G; Site DD 1,2, 3 ; Sites BH 1-8 : The data package for leg 139 covers these sites adequately. However, the drilling strategy and sites have been revised since the submission of Sedimented Ridges I proposal and data packages. This means that the Site names and positions plotted on the seismic lines and track charts are not compatible with those in the Sedimented Ridge II-Rev 3 proposal. While all the data needed to drill the site is available in the DB , SSP encourages the proponents to submit a revised track charts with the appropriate sites plotted and a table with the positions and nearest seismic coverage and approximate shot point or time position for each site. SSP requests any video or photo coverage of the hydrothermal sites proposed for drilling be placed in the data bank. This is especially true for sites that would drill directly into sulfide or reentry sites. This may also prove important if markers cannot be placed prior to drilling. SSP also feels that Hole BH6 on the hanging wall block of the 856 Fault zone may be difficult to locate accurately enough to drill into the fault zone as there is no surface expression of the fault, and thus no feature that can be detected from the drillship while navigating relative to the acoustic beacon. The proponents should address the feasibility of placing this site based on the ship speed during seismic data collection, expected navigation accuracy, and the fact that only a few traces image the fault zone.

Escanaba Trough (ET1-7): SSP notes that the data package submitted in October, 1994 is sufficient to ready the site for drilling and the addition of USGS Bull. 2022 to be submitted in December will strengthen this view. The proponents have responded well to SSP's requests. Two recommended data sets not yet included in the data package for Escanaba Trough are the Gloria Data and submersible or photographic documentation of

the hydrothermal sites. The data is apparently available based on references in the proposal. The proponents are encouraged to submit this data which will help in final placement of the sites.

SSP consensus #9: Most required and some recommended data in support of Sedimented Ridges II are in the Data Bank, and SSP appreciates the efforts made by the proponents in responding to its concerns and in keeping the panel fully informed of new developments and amendments to the drilling strategies. SSP request the addition of "recommended" Gloria data for the Escanaba Trough region and available submersible or ROV video/photographic imagery for the hydrothermal drill sites in the Middle Valley and Escanaba Trough, plus the addition of the USGS Bull 2022 is expected in December upon publication. SSP recommends that the proponents make every effort to place passive markers at proposed drill sites with funded submersible or ROV cruises to the region. SSP would also like an updated seismic track map for the Middle Valley sites with the Sedimented Ridge II -Rev3 proposed sites located on this map. Lastly, SSP would like the proponents to address questions regarding the accurate location of Site BH6 in order to meet the objective of penetration of the 856 fault zone.

6.3 East Juan de Fuca Hydrothermal (440)

SSP Watchdog: Srivastava/Casey

SSP Proponents: none

Target Types(s): E.and D. Open ocean environment (<400m and > 400 m sediment respectively) with additional requirements for high temperature environments.

This proposal was discussed during our April and July 94 meetings. The proposal addresses investigation of hydrothermal circulation on the eastern flank of the Juan de Fuca Ridge along a transect consisting of three sections representing three different settings. During these previous meetings, SSP expressed two concerns; one, the lack of site specific data in the DB and two, the time allotted for drilling a large number of holes requiring re-entry cones and the possibility of using hard-rock-guidebase. The latter concern was also expressed by PCOM. The proponents have responded to each of these concerns now; by providing a significant amount of site specific data to the DB and an updated table outlining their order of preference for these holes and a scenario where lesser number of re-entry holes will be needed. The reason for requesting use of so many re-entry cones is due to the use of CORK packages needed at these holes. It was planned to modify these packages (with ODP/TAMU help) which would have required a simpler re-entry system. However, it now appears that such modification may not be feasible due to financial reasons unless outside help can be obtained. Therefore, a minimum of two CORK packages will be needed to obtain necessary and essential data for this leg. The proponents realise the time constraints in using a Hard-Rock-Guidebase and drilling a deep hole here. They have now suggested a scenario giving a lower priority to its use during this leg should further modifications to CORK do not take place. SSP appreciates proponent's effort in keeping SSP watchdog informed about these developments.

Two surveys have been planned to be carried out in the region of proposed drilling during 1995. One of this survey will be carried out using submersible. If radar reflectors or some other devices are to be left at the chosen sites during this survey, it is suggested that the proponents be in direct contact with the engineering department of TAMU as much ahead of time as possible to ensure that proper equipment will be available to the proponents for their cruise. It is also important to deposit copies of video data together with

navigational data with the DB soon after the cruise, if this data is to be used to locate this site from J/R.

Since our July meeting a large amount of data has been supplied to the DB. This include high resolution seismic, 3.5 kHZ data for each of the site, gravity, magnetic and bathymetry maps together with track maps of the lines along which the sites have been chosen. Also supplied are two high quality MCS lines which lie in this region. Our assessment of this data as follows:

PP1 to PP3 sites: These sites lie along a high resolution line 80-3. No cross lines through these sites or lines which run close to the sites have been provided to the data bank, although the track maps shown in the proposal as well the thickness of sediment map provided to the DB indicate the presence of such lines. Data from these cross lines should be added the data package to constrain the two dimensionality of basement and of the overlying sediments. It is not necessary, however, for the sites to be located exactly at cross lines.

PP4 & PP5 sites: These sites are analogous to Sites PP1 and PP3. If cross lines exist please supply them to the data bank.

PP6 Site: This site is located on a single channel high resolution seismic line. Apparently a number of cross lines exist through this site as shown in the depth to basement but none of these have yet been supplied to the DB. The drilling plan for this site is undergoing revision. The proponents have outlined a scenario of collecting sediments only along a set of holes radiating away from this site if this site is not considered as a deep basement site. It would be desirable to supply copies of most of these lines which cross this site should the plans call for drilling along these lines. If the earlier plan of a deep hole using a hard-rock guidebase is followed, then the data package will need to meet the bare-rock drilling data guidelines; in particular, visual data (e.g. videotapes with accompanying navigation from submersible dives) will be required.

Detailed heat flow and coring information have been supplied to the DB.

HT1 to HT3 sites: These sites have been chosen along a high resolution line where the thickness of sediment gradually increases to the east away from the ridge. Site HT3, which is supposed to lie in region of uniform sediment thickness, lies close to a basement high. The thickness of sediment map shows that this high is an isolated feature and SSP wonders if it would be possible or desirable to move this site away from this basement high.

CC1 to CC4 sites: These sites are located on a single channel high resolution seismic line. As the main objective of drilling these sites is to see if the cellular circulation is the main driving mechanism of hydrothermal circulation in this region, the location of these sites is rather critical. No cross lines are supplied to the data bank. This region will be surveyed in detail in 1995 and SSP awaits to review this data package when available.

General comment: From SSP perspective the quality of data on which these sites have been located are high. However, none of these sites have been located on cross lines. It is our understanding that a cruise is planned for 1995 to collect high resolution seismic, heat flow and OBS data in this region. This may result in alteration of location of some of these sites specially CC sites. For other sites it would be desirable to have cross lines to ensure two dimensionality of the structure present in the region. If cross lines exist at or in the vicinity of these sites these should be supplied to the data bank.

The proposal calls for deepening of some the proposed sites in subsequent years to drill to layer 2A/2B boundary. None of the proposed sites, with the exception of site HT3, lie on the multichannel seismic lines which run through this region. Though one can assume wide occurrence of the strong reflector visible below the basement corresponding to this boundary, it is nonetheless not imaged in SCS lines below the sites which are to be

deepened. This may require running additional MCS lines below the deep sites at some later date. Also no velocity information is supplied for these sites. It is expected that the planned OBS work will provide this information. SSP urges that the data resulting from the planned cruise be supplied to the DB soon after its collection.

SSP Consensus #10: All required and some recommended data in support of the East Juan de Fuca hydrothermal drilling (proposal 440) has been submitted to the Data Bank, and the proponents have been very helpful in responding to SSP's concerns and keeping the panel fully informed about the amendments proposed to this proposal. For the scenario in which a hard-rock guidebase is to be used at site PP-6, visual data would be required. Existing seismic data from lines which cross or parallel the proposed drilling transect should also be submitted to the Data Bank.

7. POTENTIAL FUTURE DRILLING: TECP

7.1 Costa Rica Accretionary Wedge (400rev/add2)

SSP Watchdog: Tokayama

SSP Proponents: none

Target Type: C: active margin

At our July 1994 meeting, SSP noted that the geophysical data package was perfect, but piston/gravity cores and visual data sets were requested. Core data are required for re-entry sites, the visual data obtained by the recent Alvin dives are very useful to understand fluid venting. However, the ODP Data Bank has not received either data set yet. So, we request again to send to ODP Data Bank core logs and selected photographs and video tapes which support fluid venting.

SSP Consensus #11: The Costa Rica Accretionary Wedge (400-Rev2) data set is complete for the structural objectives. However, cores and visual data sets for fluid objectives are still lacking.

7.2 NARM Nonvolcanic-II: Return to Iberia (NARM-Add3)

SSP Watchdog: Mountain

SSP Proponents: none

Target Type(s): all sites "B: Passive Margin"

All sites were approved at the July '94 meeting. Since then a microfilm of the Leg 149 SCS data has been deposited in the Data Bank. Though a modest help to future Iberia margin drilling, especially at Site 901, these data are photographs of the unprocessed analog monitor profiles. They would be more useful if annotated with drillsite crossings or points of closest approach. Furthermore, processed displays would be a great improvement. Discussion of the Leg 149 data deposit led to the following recommendation to PCOM:

SSP Recommendation to PCOM concerning format of JOIDES Resolution seismic data: SSP recommends that PCOM request JOI to direct ODP/TAMU to make every reasonable effort to deposit processed copies of underway SCS data collected during surveys aboard the JOIDES Resolution into the ODP Data Bank.

Explanatory Note: The leg 149 single channel seismic data, a crucial part of the data package for the return to Iberia proposal, were deposited in the ODP Data Bank as

microfilms of unprocessed analog monitor profiles. This data presentation does not conform to the ODP guidelines for data submission, and is not well suited for examination by SSP, PPSP, or members of the ODP community who visit the Data Bank to work with the full suite of regional and site-specific seismic data. JOIDES Resolution seismic data are routinely acquired with a "user-friendly" package (SioSeis is used currently) in standard SEG-Y format by the underway geophysical technician. The capability exists to process this data at sea with a few hours effort. With a modest amount of input from a Co-Chief (such as useful display scales, helpful annotations, etc.) these data could be processed and displayed during the cruise, become part of the "bluebook" shipboard hole summary that comprises the Initital Reports volume, and could be provided to the Data Bank shortly (days to weeks) after the end of the cruise. In recent years it has become commonplace for highly-ranked proposals to include a revisit to a previously-drilled field area (i.e. Barbados, Mediterranean Sapropels, NAAG-II, East Greenland extension, California margin, Caribbean, as well as Iberia). Thus it is common for Resolution survey data to be recycled into the data package for a subsequent leg--and SSP feels that the archived version of this data should be of the best quality possible.

TECP noted the limited extent of the seismic grid surrounding the proposed Iberia margin sites "makes it difficult to get a good 3-D understanding of the basement highs to be drilled." As stated in previous minutes, SSP agrees. Nonetheless, maps of traveltime to basement have been submitted to the Data Bank and have been reviewed by SSP. Given the precision with which the drill ship can re-position future holes and the size of the basement features revealed by these structural contour maps, SSP considers the risk of drilling blindly into undetected terrain are acceptably small.

Jean-Claude Sibuet reported that French deep towed magnetics and deep towed seismics have recently been collected on the Iberia margin. Although these are not required data types, this data would be a valuable addition to the data package if the leg is scheduled for drilling.

SSP Consensus #12: All sites are adequately surveyed for a return to Iberia.

7.3 NARM Volcanic-II: E. Greenland transect ext. (NARM-add2)

SSP Watchdog: permanent: Trehu; Acting: Scrutton

SSP Proponents: none, however Srivastava and Hinz were members of the NARM-DPG

Target type: (B) Passive margin

SSP further considered the July 1st proposal addendum, concentrating on the problem of whether sites EG63-5, EG63-6 and EG66-1 might be bare rock sites, necessitating the use of the bare rock SSP guidelines and a guidebase for drilling. The proponents are now clear that they believe all three sites have 5-10m glaciomarine sediment cover. They have still not submitted to the Data Bank 3.5kHz profiles that might confirm this, on the grounds that these profiles show no subbottom penetration at all. SSP has received an argued case in support of sediment cover, however, making the following points:

- high-resolution MCS profiles through the sites can be interpreted to show about 10m cover,

- the seismic character of the seabed at the sites is similar to that where sediments were drilled on Leg 152,

- in general, sediment cover has been found to be more widespread than at first thought,

- even if volcanic rocks are at the sea floor they have proved soft enough to spud into on both Legs 152 and 153, and

- a site survey with video camera is possible in 1995 to confirm the type of sea floor.

The MCS interpretation submitted with these comments was carefully examined and we concluded that sediment cover is present at EG63-6, probable at EG63-5, but unlikely at EG66-1, although in this last case there may be cover nearby . It would have been of further use to compare 3.5kHz records at known sediment-covered sites with the proposed sites to see if there is any difference in character.

The question of whether a hard rock guide base is carried on the ship in case it is needed is referred to PCOM.

Sites "return to 915", EG66-1A and EG66-2 are ready to drill.

SSP Consensus #13: The East Greenland extension proposal (NARM-add2) is now ready for drilling with the proviso that sediment cover above basement may not be present at EG63-5 and is unlikely at EG66-1. The proponents are again encouraged to submit 3.5kHz data to the Data Bank and are further encouraged to secure a site survey to acquire visual data of seabed character. In addition, the strength of currents that may affect drilling should be checked.

7.4 Vema Fracture Zone (science leg):

SSP Watchdog: Toomey

SSP Proponents: Kastens

Target Types: VE-1 and VE-2: H: Offset drilling; VE-3: G: Topographically elevated feature

Since our last meeting, the Vema DCS test cruise seems almost certain to be postponed or cancelled (due to delays with the development and testing of the DCS). The current proposal (376-Rev3) is not an engineering leg. It is a scientific proposal with several objectives: 1) drilling a 500 m hole in the upper lithosphere, including the uppermost mantle and perhaps the Moho and gabbroic section (Site VE-1; not synonymous with VeDCS-1), 2) drilling a 500 m hole in the transition between gabbros and dikes (Site VE-2; not synonymous with VeDCS-2), and 3) drilling a 600 m hole on top of the transverse ridge through a 500-m-thick limestone cap and 100 m into basement (Site VE-3; not synonymous with VeDCS-3, but near to VeDCS-2). The first two holes are evaluated as offset drilling into "tectonic" windows, while the third is considered a "topographically elevated" feature.

The discovery of a complete section of oceanic crust exposed along the walls of the Vema transverse ridge is indeed exciting and presents an important target for offset drilling. The proposal, however, is vague with respect to the number and depths of holes to be drilled at each site. For example, Site VE-1 on the proposal log sheet is described as a 500 m hole into peridotite. In contrast, the text of the proposal indicates that perhaps several deep or shallow holes are intended to be drilled at this site. It is important that this inconsistency be resolved, not just for reasons of clarity, but also because it makes the task of SSP difficult with respect to identifying specific sites on the seafloor that are acceptable targets for offset drilling.

To elaborate on this latter point, a recent meeting on offset drilling held at TAMU gave the strong indication that several physical or geologic features of the seafloor could impact severely the success of an offset drilling effort. In particular, the slope of the seafloor must be less than 20° over an area approximately 100 m (or several tens of meters, perhaps) in diameter to allow placement of the hard rock guide base. Secondly, flat lying areas covered with sediment or talus are not presumed to be acceptable because in the course of drilling the flushing of material from underneath the guide base by mud from the

drilling operation is thought to give rise to progressive tilting of the guidebase. When tilt exceeds ~20° the base is unusable. In view of the limited success in drilling deep holes at sites such as Hess Deep, the MARK area, and the TAG hydrothermal field, it is important that proponents of bare rock sites give due consideration to identifying specific, well-navigated sites that are both flat (<20° in slope) and free of sediment or talus coverage.

Sites VE-1 and VE-2 of the revised proposal 376-Rev3 are located on the northern flank of the southern transverse ridge, where a cross-section through the oceanic crust and upper lithosphere has allegedly been exposed by vertical tectonics. Sites VE-1 and VE-2, the lower crust/upper mantle targets, were last discussed at the August 1992 meeting. Since that time new dredge data from the peridotite section and an extended multibeam bathymetry map have been added to the data package. An Italian multichannel seismic profile crossing the sites perpendicular to the transverse ridge is shown in the most recent proposal revision, but has not been submitted to the Data Bank at large scale. Deep-towed SLS was to be collected on the Ewing in 1994; however, because of instrument failure this data is unavailable. The Data Bank has recently received video coverage collected during dives of the submersible Nautile; previously SSP had seen only dive transcripts and interpretive drawings of the divers' visual observations. These videos were examined by SSP in an attempt to identify sites suitable for the placement of the hard rock guidebase.

Site VE-1 video summary: Sections of the video were analyzed to determine if a site suitable for placement of a guidebase could be identified. The characteristics of such a site are one that is less than 20° in slope, relatively free of sediment or talus coverage, and of sufficient area to allow drilling operations to place a guidebase (nominally 100 m in diameter). Video from Dive 1, Tape 2 were examined between the times of 14:00 to 15:00 (time is on the video). This time window traverses the approximate area of Site VE-1. During this time period no sites were identified that were suitable for emplacement of a guidebase. In all instances the seafloor slope was either steep (a qualitative estimate since accurate numbers cannot be derived from visual inspection alone) or blanketed by talus and sediment.

Site VE-2 video summary: Video from Dive 2, tape 3, times between 14:43 to 15:20 were examined. This section of video covers the approximate location of Site VE-2, a target near the dike-gabbro transition. Exposures of sheeted dikes were observed to be very steep. The only flat lying area (~15:16 in time) was blanketed by talus and sediment. Again, no sites were identified that were acceptable for drilling from an engineering point of view.

Comments and suggestions on video: SSP thanks the proponents for submitting video near the proposed sites. Such data is exceedingly useful for evaluating the drillibility of a site, and in retrospect it is unfortunate that SSP did not carry out a similar examination of videotapes from previous offset drilling proposals. In reviewing the Vema video, however, we came across several issues or questions that require attention:

Navigation: To identify an acceptable site for bare rock drilling requires excellent navigation. From the available logs of the Nautile dives it was not evident that the navigation was sufficient to allow the drill ship to return to a position observed in the video. The track charts for the Nautile dives include only occasional time annotations, and the video tape for dive #3 (which parallels dive #2 across the sheeted dikes) has no time of day annotations on the tape. Precise navigation is an important consideration. Assuming that a site is identified that is suitable for emplacement of a guidebase, it is of utmost importance that the site be well navigated, perhaps by a seafloor marker. It is suggested that the proponents examine the draft minutes from the Offset Drilling Workshop held at TAMU to get some idea of proposed methods of marking a site that are acceptable to drilling operations.

Video Documentation: It is suggested that the proponents examine the video tape and identify a site they deem suitable for drilling. The precise location (lat, long) and the time on the video of the site should be forwarded to SSP so that we can evaluate their recommendation. Otherwise, there may be some confusion if SSP identifies one postage stamp while the proponents identify another.

Regional site survey data: The above discussion addresses primarily the site survey data required to identify a drillible site. The following comments address site survey data that would improve the scientific return of potential drilling at Sites VE-1 and VE-2. For both sites the proponents suggest that drilling will improve our understanding of the major lithologic transitions in oceanic crust (gabbro-Moho-peridotite, and dike-gabbro). While it is clear that the Vema transverse ridge exposes these lithologic units in the order expected for normal oceanic crust, it is uncertain whether the transitions between lithologic units represents processes related to differentiation and emplacement of oceanic crust or, on the other hand, whether the transitions are fault controlled. Resolving the nature of these transitions is important to the interpretation of any potential drill core recovered from this site. It would be beneficial to have either more detailed geologic or geophysical mapping done in this area to ascertain the location and nature of lithologic contacts.

Site VE-3: This site is located at the shallowest point of the transverse ridge, where dredging has yielded shallow water limestone. The proposed hole would penetrate the limestone cap, to examine paleodepth versus time, and thus constrain the uplift/subsidence history of the transverse ridge. This is the site that was previous approved for drilling as the DCS test site, and the data package is fine for a scientific site as well. The most recent proposal revision illustrates Italian seismic data that has been collected along and across the transverse ridge by Bonatti et al. The Data Bank has a cruise report and a monitor record of the Italian seismic lines across VE-3; SSP requests that large scale processed profiles be submitted to the data bank as well.

SSP Consensus 14: Except for processed version of the Italian seismic data collected by Bonatti et al., all requested data for sites compatible with the objectives of VE-3 have been received by the Data Bank, and the site is ready to be drilled. This potential site is on the crest of the southern transverse ridge of the Vema Fracture Zone at a water depth of about 500 m. At this site the seafloor is flat, free of sediment and a limestone cap is evident. For both sites VE-1 and VE-2, SSP has been unable to identify sites that are a good risk for deployment and operation of a bare rock guidebase in light of the experience of Hess and MARK; either the seafloor slope is large or the seafloor is blanketed by talus and/or sediment. Reference is made to the draft report of the TAMU Workshop on Offset Drilling for survey strategies with which to identify acceptable sites that are sufficiently well navigated to be re-occupied by the drill ship.

8. POTENTIAL FUTURE DRILLING: SGPP

8.1 Bahamas Transect (412-add2) (Sibuet)

SSP Watchdog: Sibuet

SSP Proponents: none

Target types: fluid flow sites; target A: Paleoceanographic. Sealevel sites: target B: Passive Margin

Acquisition of vital (high-resolution SCS) data have been made in June 1994. Copies of all monitors were deposited in the Data Bank in early July 94.

Once again SSP appreciates the considerable amount of work done by the proponents since the July meeting to answer specific questions but also to increase the scientific value of the proposal. During our July meeting, SSP encouraged proponents to quickly process their seismic data and to propose a final location for all sites. These have been done. 26 brute stack lines have been deposited in the DB. Though the multiple is still visible, reflectors are apparent below the multiple and the processing sequence is good enough to allow an analysis of the prograding sequences. Further processing to better eliminate multiples will be done in the coming year. The final site locations have been proposed by moving previous site locations in the best position taken into account both the informations coming from the June survey and recommendations from OHP and SGPP. In particular, they have defined the extent of prograding slopes versus current deposits. Consequently the most distal site has been proposed at the eastern boundary of this mound, that is outside of the current deposits.

Core data are available from the Clino and Unda drill holes. Two cores have also been taken during the July cruise in the proximal part of the transect. Core and smear slide descriptions have been done and are in the DB. In addition, several other cores are available in the area from an earlier cruise from Schlager and Droxler. SSP requests that descriptions of additional nearby cores be added to the data packages, especially any cores in the vicinity of the fluid-flow transect.

In summary, all vital data are in the DB.

SSP consensus #15: All required and some recommended data in support of the Bahamas transect sites are in the Data Bank, and the site positions have been revised to account for new seismic data and thematic advice. Further seismic processing to better eliminate multiples is planned for the coming year, and SSP urges the proponents to submit the reprocessed data as it becomes available, as well as descriptions of any additional cores near the fluid flow transect.

9. OTHER BUSINESS

9.1 Feedback to Proponents

Kim Kastens distributed a set of guidelines to SSP members on what to include as feedback when preparing WATCHDOG letters to proponents (attached as Appendix D).

Action Item #1: Each panel member to send a watchdog letter to the lead proponent of each watchdogged proposal for a potential future drilling leg, reporting the sense of the SSP discussion and enclosing the appropriate section of the minutes. Quoidbach to send a watchdog letter to the Co-Chiefs of each scheduled leg. Copies of all watchdog letters to be sent to the Data Bank. Data Bank to forward a copy of the complete packet of watchdog letters to the JOIDES Office.

9.2 SSP Guidelines

The panel discussed the write up prepared by Leon Holloway at the July SSP meeting, concerning physical properties measurements taken on cores collected at or near proposed re-entry sites (included as an appendix to the July SSP minutes). A core has long been a required data type at all re-entry sites. The rationale is that the core is needed for the operations people for planning the casing and re-entry cone emplacement. Proponents occasionally ask what measurements should be performed on the core, and we haven't had a good answer for them. The sense of the discussion was that the full suite of measurements advocated by Holloway is too much to impose on all proponents for all re-entry sites. Furthermore, some of the measurements need to be performed on freshly-split

cores, and thus such requirements could be exceptionally difficult for proponents to comply with. However, we did know, anecdotally, of instances in which the sediments have not been suitable for the re-entry cone/casing combination that was employed--for example, at least one site in which the re-entry cone sank into the sediments and disappeared entirely except for the sonar reflectors. We thought that there might be a limited set of circumstances (specific lithologies, for example) which were known to be problematic from an operational perspective in which it might make sense to ask proponents for physical properties measurements on cores.

Action Item #2: ODP/TAMU liaison Richter to discuss with ODP operations superintendents the circumstances under which re-entry cone emplacement has been difficult or unsuccessful.

If a pattern emerges from this investigation, SSP may consider asking for a limited suite of physical properties measurements from surficial sediments at proposed re-entry sites, under specific circumstances where there is reason to fear difficult re-entry operations.

9.3 Panel membership

The replacement of John Farre, an SSP industry member who has rotated off the panel, was discussed. The SSP consensus is that a replacement from industry is desirable as such a person taps into a different grapevine than academics do, and may also be able to provide valuable insights into potential concerns likely to arise at PPSP. Kathy Ellins (JOIDES Office) conveyed PCOM Chair Rob Kidd's view that the prospective member's country (US vs. non-US) was not an important criterion for selection.

Ten names were put forth as nominees by panel members. In addition, Kastens reported that Hans Christian Larsen, the ESF PCOM member, had offered to provide a nominee from the ESF. After discussion, the list was narrowed down to three candidates.

Action Item #3: SSP Chair Kastens to contact the three candidates for industry member of SSP, ask if they are willing to be considered, obtain cv's of the willing candidates, and present candidates to PCOM.

9.4 Next Meeting

The next SSP meeting will be requested for April 5, 6, and 7, in Halifax, Nova Scotia, to be hosted by Shiri Srivastava.

Action Item #4: SSP Chair Kastens to request permission for next meeting.

Appendix A

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(Contribution to the report of the Offset Drilling Workshop, Sept, 1994, ODP/TAMU)

SITE SURVEY ISSUES

Where we are now:

The current ODP site survey data guidelines (approved by PCOM August 1994) require swathmapped bathymetry, photographic or video data, a regional magnetic anomaly survey, and rock sampling for tectonic window drillsites. In addition, the current site survey data guidelines recommend, under certain circumstances, several additional data types: gravity, OBS microseismicity, side-looking sonar, high resolution seismic reflection or 3.5kHz, and deep penetration or surface ship refraction. Proponents/co-chiefs are expected to submit "recommended" data types to the ODP Data Bank if such data exists, but they are not expected to acquire such data if it doesn't already exist. The seismic data are intended regional rather than site-specific data types, and, in fact, need not cross the site at all. The high resolution seismic reflection or 3.5kHz data are intended for use in the selection of backup sites in sediment ponds in the event of failure of the bare rock drilling equipment. Deep penetration seismic reflection or surface-source refraction data are recommended in cases where it is possible to identify and survey an adjacent or conjugate piece of undismembered crust that is expected to have nearly the same crustal structure as that possessed by the targeted crust prior to tectonic disruption.

Each of the "required" data types for tectonic window drilling was available for the Hess and MARK drillsites. In each case the visual data came from submersible dives, typically with one dive actually crossing the drillsite. The visual data were presented as interpretive sketches with structures and lithologies indicated as symbols along a profile or map-view track line. The Hess data package included two additional "recommended" data sets: gravity and deep penetration seismic reflection. The MARK data package included the following "recommended" data types: gravity, deep penetration seismic reflection, and side-looking sonar (nearby but not over the sites). In the case of MARK, only two potential drillsites were documented with site-specific data.

In general, data of the sort submitted for Hess and MARK, in combination with a modest amount of Resolution VIT surveying, proved to be sufficient for finding drillable sites, of high scientific interest, for single-bit, shallow (<200m) penetration sites, with unsupported spud-in. No substantive adjustments of existing site survey procedures would be needed to drill more holes of this sort, although it would be a prudent to document a larger number of potential drillsites than was done for MARK or Hess.

However, both Hess and MARK experienced great difficulty and limited success at finding spots in which to place a guidebase and drill a deep hole. It would appear that successful *a priori* identification of deep-drillable sites in tectonically dismembered terrains involves three dimensional characterization of surface and subsurface microenvironments around candidate drillsites of a better quality than the community has yet accomplished. The engineers at this workshop have described their problems at MARK and Hess in two categories: (1) to put down the guidebase, (2) to "dig the hole." The remainder of this document discusses ways in which better site characterization might help with these two types of problems. Predrilling techniques for seafloor characterization can help find the right place to put down the guidebase. Predrilling techniques for subsurface characterization can help find the right place to "dig the hole." An iterative process, involving close coordination between the drilling and surveying communities, will be

needed to find the most useful combination of data acquisition, processing, display and interpretation strategies to reliably find deep-drillable sites.

The remainder of this document deals only with site-specific data, with the expectation that the regional geological and geophysical setting is already well-characterized by broader scale surveys.

Seafloor site characterization:

Visual data (typically from a submersible) and high quality swathmapped bathymetry (typically from a hull-mounted multibeam echosounder) are universally recognized as absolute prerequisites for siting any borehole in a tectonically dismembered terrain. In addition, the Hess and MARK experiences have shown the importance of detailed pre-drilling characterization of the local seafloor *slope* and *sediment cover* around prospective hardrock guidebase sites.

At this workshop, the engineers have asked the surveying community to find and document hardrock guidebase targets 100m in diameter, throughout which the seafloor slope is less than 20° and the sediment cover is less than 1m. It is clear that such sites are not very common in areas like Hess or MARK. But it is also clear that we haven't come close to exhausting every available strategy for finding and documenting such sites.

Seafloor Slope: In typical open ocean water depths, the footprint of a single beam of a hull-mounted multibeam echosounder is more than an order of magnitude larger than ODP's bare rock guidebase. Thus multibeam bathymetric maps are not an adequate database on which to identify locations where the seafloor slope will be flatter than the ~20° maximum slope on which a guidebase can be placed. Better slope information can be obtained through a combination of several techniques:

* *nearbottom-towed bathymetric mapping sonars:* Higher resolution bathymetric maps can be produced with a near-bottom towed multibeam echosounder (such as that under development for the MPL/SIO Deep Tow) or near-bottom towed interferometric swathmapping sonar (such as that on SeaMARC CL). Such data won't single-handedly document an appropriately flat area, but it could be used to rule out many areas that are not worth consideration as prospective guidebase sites.

* *quantitative stereo photogrammetry:* It is possible to produce extremely fine-scale (decimeter vertical) resolution microtopographic data from digital stereo pairs of vertically-incident photographs shot from a near-bottom towed vehicle. Bill Ryan, of Lamont-Doherty Earth Observatory, has completed such an analysis of a few selected stereo pairs from the East Pacific Rise. To complete such an analysis for a 100m diameter photomosaic would be labor-intensive, but the resulting map would certainly provide the desired documentation of seafloor slope.

* *submersible water depth measurements:* Submersibles typically measure their depth with a pressure sensor, and their altitude above the seafloor with a high-frequency echosounder. These two measurements can be summed to produce a high-resolution bathymetric profile along the submersible track. If a potential drill site were criss-crossed with a network of well-navigated submersible dives, a high-quality bathymetric or slope map could be produced. Even in the case of a single dive traverse, accurate seafloor slopes can be calculated for those portions of the dive where the sub is driving directly upslope (typically a large fraction of the time for most dives), provided that the submersible navigation is of high quality. The submersible data for MARK and Hess, as submitted to the ODP Data Bank, were not presented in such a way that seafloor slopes could be accurately or precisely computed.

* *Geocompass:* The Geocompass, developed by Jeff Karson and associates, is a kind of underwater Brunton compass. When held in the submersible's claw, and placed

against a seafloor surface, one can measure the dip and strike of the surface. Whereas the techniques described above have the problem of integrating seafloor slope over a larger area than the guidebase footprint, the Geocompass has the opposite problem: it measures slope over a tiny area compared to the guidebase footprint. In the site characterization context, Geocompass measurements can be useful as spot checks or ground truth for the broader-scale slope-measuring techniques. Geocompass measurements could also be very valuable in calibrating engineers' eyes for the interpretation of submersible videos: "that's what a 17° slope looks like."

Sediment Cover: A fundamental problem is that a site can exhibit absolutely no penetration on a hull-mounted 3.5kHz subbottom profiler, and yet have too much sediment to emplace a hard-rock guidebase. Improved knowledge of distribution of sediment cover could be obtained through several existing or viable techniques:

* *photomosaicking* from a towed vehicle or ROV: A reasonably large area can be photographed with vertically-incident cameras mounted on a towed vehicle or remotely operated vehicle. If these data are photomosaicked, an accurate map of outcrop locations can be produced. A photography campaign with towed vehicle or ROV produces many times more areal coverage of outcrop location map than does the same amount of shiptime devoted to submersible diving.

* *quantitative photoanalysis* of visual data: On the typical interpretive sketch of dive observations, with lithologies and structures represented as symbols along a profile or track chart, the importance of outcrop is quantitatively overrepresented. This is partly an unintended side effect of trying to represent all important observations, and partly a reflection of the observer's visceral sense of a dive in which the pilot probably sped over sediment ponds and lingered over outcrops. If, instead, the percent sediment cover is estimated from the still photographs every 15 or 30 seconds, and then graphed as percent sediment cover versus distance along track, it becomes more obvious just how little outcrop there is in a specific area.

* *sediment measuring rod:* Using its claw, a submersible could stick a calibrated rod into the sediment and measure sediment thicknesses up to about a meter. Areas with more than a meter of sediment aren't interesting anyway. This method is primitive, and time consuming, but cheap and effective.

* *subbottom profiler on towed vehicle or ROV:* A typical subbottom profiler on a near-bottom towed vehicle would be a wide-beamed 3.5kHz or 4.5kHz down-looking sonar. It's not clear whether such a sonar, which might have a 50-100m footprint on the seafloor, could help much amid the complex microtopography and depositional microenvironments of a tectonically-dismembered terrain. Certainly, such a tool could be used to eliminate some areas that clearly have too much sediment. New developments in near-bottom towed subbottom-profiling sonars, including parametric sonars and swept-frequency sonars, may be able to produce the requisite combination of narrow beam width and fine resolution.

* *subbottom profiler on submersible:* Although we are not aware of any examples where this has been done, we think it should be possible to mount a subbottom profiler on a submersible. One could envision a frequency-agile, down-looking sonar with a choice of frequencies between 1 and 10kHz, so that the diving-scientists could choose what trade-off to make between resolution and penetration. The advantages of such a system are: (1) it would produce profiles of use for science, as well as for ODP site-characterizaton; (2) it would not require additional expertise on the part of the scientific party, as would, for example, the percussive or pinger-type refraction experiments described below; (3) it would not require special dives or a modification of the dive track. Disadvantages are: (1) the extra sonar would consume battery power and thus shorten the dive by a few minutes, and; (2) the system probably wouldn't penetrate very well if the sediment were a rubbly mixture containing a substantial fraction of coarse clasts.

Predrilling Subsurface Site Characterization

Marine seismic experiments that utilize bottom sources and receivers to investigate the shallowmost oceanic crust (a few meters to 100s of meters) provide the ocean drilling community with a promising new technology for evaluating the drillability and structural context of a hard rock/offset drilling site. Unfractured volcanics are known to have a seismic velocity of 4-5 km/s; velocities as low as 2-3 km/s are a direct result of increased porosity resulting from voids, cracks and fractures. This suggests that a relationship may be inferred between the drillability of a formation and its *bulk* seismic velocity (as opposed to that measured in hand specimens). On-bottom seismics might also help determine the structural context of a drill site. For example, consider the two alternative hypothesis of the emplacement of peridotite in the western wall of the MARK area proposed by Karson and Cannat (see Fig. 6, of Leg 153 Scientific Prospectus.) If the seismic velocity of the serpentinized harzburgite differs from that of the surrounding rocks it might be possible to determine whether the peridotite is an isolated body (has a bottom).

On-bottom seismic refraction and reflection experiments have the potential for addressing the following issues: (1) the thickness of sediment and/or talus overlying hard rock to an accuracy of meters and (2) lateral and vertical variations in seismic velocity resulting from changes in lithology and/or bulk porosity, the latter being affected by the distribution and density of cracks, fractures, and faults. Shallow geophysical experiments conducted on land over the past several decades have proven that high-frequency (>100 Hz) refraction and reflection experiments are a cost-effective and reliable method for measuring the thickness of overburden and the geometry of the interface between bedrock and overburden. The principle advantages of a bottom-source, bottom-receiver experiment are (1) the higher frequency content of the refracted energy permits the resolution of smaller-scale features, (2) the ability to observe crustal refraction at near-zero offset, allowing the imaging of near seafloor structures and (3) a modest but significant improvement in the accuracy of the travel time data.

On-bottom Percussive or pinger-type sources. To image structure on a scale of meters, land-based experiments often utilize a sledgehammer (or shotgun-type) source and a receiving array of 12-24 geophones deployed at intervals of meters (maximum source-receiver offset of 100-300 m). The dominant frequency of such a source may vary between 100 to 1000 Hz. Typical objectives include the thickness and composition of overburden (e.g., sediment or talus) and the topography of the contact between overburden and bedrock. The thickness of overburden can be measured to within a 1-3 m and dip of the contact can be constrained to within a few degrees. The depth of penetration of these techniques is limited to <100 m. The technology for conducting such experiments on the seafloor is not currently available; however, *Macdonald* conducted a similar type of experiment more than a decade ago on the East Pacific Rise at 21°N. It is anticipated that a well-navigated submersible (e.g., *Alvin*) would be required to position the sources and receivers. Receivers may include existing ocean-bottom hydrophones or scaled down receivers deployed for short intervals from a submersible; the latter would require design and manufacturing. Refraction experiments using a pinger source and hydrophone streamer draped on the seafloor have also been used to characterize the uppermost sediments in deep-ocean settings, suggesting that a similar experiment may be feasible at a bare rock site.

On-bottom Explosive Sources. To image structure on a scale of tens of meters over distances of hundreds of meters to kilometers, one can use on-bottom explosive sources and receivers (ocean bottom hydrophones). This technology already exists within the marine seismology community and it has been used successfully to image the shallowmost crust of the East Pacific Rise [*Christeson et al.*, 1992]. The depth of penetration of these

techniques is 1-2 km. Experiments in one-, two-, and three-dimensions are possible and would be conducted from a typical research vessel.

Reconnaissance experiments around already-drilled sites would be useful to determine: (1) which seismic methods may be used to assess drillability, and (2) whether there is a resolvable seismic signature to crustal structures such as fractured versus unfractured gabbro and peridotite, hydrothermal mineralization zones, and serpentinized regions.

Navigation and Site Marking

Drillable targets in tectonically-dismembered terrains may be very small (<50m diameter). To maximize the chances that the Resolution will be able to re-occupy the exact spot identified during pre-drilling site characterization surveys, the best possible navigation techniques must be routinely used, and a range of site marking techniques should be implemented.

All high resolution, near bottom data should be transponder navigated, and transponder nets should be tied to GPS. In areas where repeated survey and drilling cruises are anticipated, a long-life transponder network should be established and maintained. All surface ship data should be GPS navigated.

Long term coordination between site survey proponents and ODP/TAMU should be encouraged. In particular, site survey investigators should be provided with advice and materials with which to mark candidate drillsites. Appropriate markers could include passive sonar reflectors, passive visual markers, or acoustic beacons, depending on the terrain, the anticipated time before possible drilling, the numbers of anticipated sites, etc.

Drillship procedures

ODP/TAMU needs to acquire the equipment and expertise to navigate the Joides Resolution and the VIT-camera relative to the same long-baseline acoustic navigation networks used for site survey navigation.

VIT video data is useful for geological mapping, as well as for operations. The utility of VIT data ncould be maximized by improving the quality of VIT navigation and image quality. The navigation system for the VIT camera system should provide (a) realtime display of camera and ship position as track charts on an X-Y or lat/long grid, (b) logging of camera navigation data, (c) software to acquire and integrate short-baseline navigation, long-baseline navigation, and GPS navigation, (d) software to post-process DP data to provide the best possible post-facto camera track chart.

Image quality of the video could be improved with a more modern video camera, better lights and better lighting/camera geometry. A pan, tilt and zoom option is desirable.

Some aspects of these recommendations will be addressed by a scheduled, funded upgrade of the Resolution navigation system.

Site Survey Funding Structure

The site specific survey data required to reliably identify deep-drillable sites in tectonically dismembered terrains will seldom be produced as a by-product of independent science-driven survey cruises. Dedicated submersible dives, and perhaps dedicated cruises, may be required to produce the requisite density of near-bottom observations,

measurements, and samples to adequately characterize the surface and subsurface microenvironments of candidate sites.

Such dives and such surveys may not be able to compete successfully for funding as world-class science in their own right. We feel that the funding structures of ODP member nations should include mechanisms to support site-specific surveys whose main contribution is to prepare the ground for drilling, rather than to directly reveal primary truths about earth processes.

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Appendix C

ODP Site Survey Panel, November 14-16, 1994 L-DEO; Review of Caribbean proposals 415-Rev2 and 411-Rev1

This document consists of the minutes from the SSP meeting of July 13-15, 1994 pertaining to the Caribbean proposals 415-Rev2 and 411-Rev1, followed by the response of Caribbean proponents to the comments and suggestions contained in these minutes.

Excerpts from the minutes of the ODP Site Survey Panel, July 13-15, 1994 meeting are underlined.

Response or actions taken by proponents and /or data bank are in bold letters.

SSP Assessment of Primary OHP Sites:

SSP indicates that two of the seven primary sites proposed by OHP are in need of site survey improvement. These two sites are S-2a and S-3 (DSDP 152)

Site S-2a (primary OHP only):

S-2A at 3150 m on Cayman Rise in the eastern Yucatan Basin is crossed by UTIG MCS line GT2-52E. There is concurrent 3.5 kHz data as well, and though the latter is noted by time-of-day and the former by shotpoint, the proponents have responded to SSP's request and have provided marked sections that allow one to cross-reference these data.

There is an eroded section of sorts (canyon?) just SE of the proposed site; the proponents are urged to consider the merits of moving the site NW, perhaps to sp 8090.

We agree to move Site S-2A to the northwest

This is an important site regarding the K/T impact event as it is the primary site closest to the possible impact at Chicxulub. Unfortunately, the site lacks truly hi-res seismic images, any type of grid, and local piston cores. The MCS display is a 12-fold stack of 24-channel data shot with 2 large-volume, low pressure airguns and filtered to a 5-35 Hz window. Basement is imaged rather well, but this is certainly not hi-resolution seismic data. The absence of piston cores is more critical to the Neogene objectives than to those of the K/T event, as they are useful predictors of sedimentary history whose relevance clearly decreases as one extrapolates farther back in time. It is hoped that SCS, 3.5 and core data will be collected at this site by Droxler et al.

The Droxler et al. proposal to NSF Ocean Sciences MG&G, May 1, 1994 referred to in the above minutes was not funded (Sept. 1994).

A new Site Survey Augmentation Proposal to JOI/USSAC was submitted Oct. 25, 1994 (Andre Droxler PI.). This proposal takes advantage of an 8 day transit of the R/V Ewing from Panama to Tampa, Fl scheduled for Nov. 29 to Dec. 6, 1994. Three days of additional shiptime have been requested to survey Sites S-2A, S-3 (DSDP 152) and S-3A with a small grid of digital high-resolution SCS (GI gun or waterguns), digital 3.5 kHz, multibeam bathymetry (Hydrosweep), gravity, magnetics, and gravity coring. This proposal is presently in review.

The age of basement is unknown. Dredged igneous rocks from the walls of the Cayman Trough indicate basement is a Late Cretaceous volcanic arc. We

agree that the basement is well imaged. Furthermore the flat-lying conformable reflections overlying basement do not indicate any unconformities (disconformities can not be constrained) and therefore we believe these data are at the very least adequate for our K/T boundary objectives and for sampling the top of basement on the Cayman Rise for the first time.

Site S-3 (DSDP 152) - (primary OHP, Alternate to B1, LITHP)
Site S-3A (Alternate to B-1, LITHP and S-3, OHP)

Site S-3/152 is a reoccupation of Leg 15 Site 152 on the lower Nicaragua Rise at 3900 m water depth. Basalt fragments were recovered at 475 mbsf with 28% recovery in 24 cores. The K/T boundary occurs within a poorly recovered zone at about 250 mbsf.

Due to intermittent coring and poor recovery, the original DSDP site 152 is far too incomplete for reconstruction of KT, Paleogene, and Late Cretaceous paleoceanography. Coring was not initiated until 153 mbsf, several deeper intervals were not cored (295-342, 351-398, and 434-453 mbsf), and several critical intervals were poorly recovered (~ 5% recovery of lowermost Paleocene and uppermost Cretaceous).

The only data across this site were collected by the Glomar Challenger in 1971. Xerox copies made from archived microfilm are not adequate for evaluating the prospects of another drilling effort at this site. One option discussed by the SSP was to encourage the proponents to consider moving to Site 3a which is roughly 70 km SW of Site 152. The proponents report that total sediment thickness is much the same at this site. Furthermore, S3a is crossed by the deep-penetration CASIS MCS line C-01, 3.5 kHz data, a Vema SCS line, and there are reported to be piston cores in the vicinity.

Though the CASIS line is indeed good for imaging basement and assessing LITHP objectives, it is too low in resolution and the site is located on a slope not suitable for OHP objectives.

LITHP proponents all agree that locating S-3A (alternate to B-1) on CASIS MCS line C-01 is the best option with data presently available.

Site S3a was discussed earlier in reference to the primary site S3/152. Site S3a does not appear to be a suitable site for OHP objectives where located on the CASIS MCS line C-01; SSP suggests a more representative drill location could be found on more level and thickly sedimented seafloor, though the low resolution of the CASIS line and the lack of intersecting seismic control are problems.

The primary OHP objectives at Site S-3 (or S-3A) require the recovery of Late Cretaceous and Paleogene sediments (e.g. this is NOT a Neogene site). The primary concern is carbonate preservation and the isotopic record (e.g. limit sedimentary overburden above K/T to <300 m as is the case at DSDP 152). Seismic horizons A" (Eocene) and B" (L. Cret.) were sampled at DSDP 152 (S-3). The CASIS MCS line C-01 presently available can be used to clearly image A" (Eocene) and B" (L. Cret.) and identify continuous flat-lying conformable intervals between these two horizons (minimize chance for unconformities), this is true for other MCS lines crossing all other proposed sites in the Venezuela Basin (S7, S7A, B1, A1, C1). S-3A is presently located at 3400 m depth on MCS C-01 where horizon A" is at ~ 100 mbsf and total sediment thickness over volcanic basement is ~ 550m. The depth and sedimentary thickness conditions that were apparently favorable for carbonate preservation suitable for isotopic

study at Site 152 are also present at S-3A. OHP proponents would consider moving S-3A along CASIS MCS line C-01 to a more flat-lying area if the sediments overlying A' remained relatively thin.

A new Site Survey Augmentation proposal will provide additional support for S-2A, S-3, S-3A. Three days of additional shiptime have been requested to survey Sites S-2A, S-3 (DSDP 152) and S-3A with a small grid of digital high-resolution SCS (GI gun or waterguns), digital 3.5 kHz, multibeam bathymetry (Hydrosweep), gravity, magnetics, and gravity coring. This proposal is presently in review.
See explanation given in section S-2A.

A new site survey proposal to IFREMER has been submitted (11/11/94) by Alain Mauffret. This proposal takes advantage of a transit of the N/O Atalante from Panama to Martinique. Shiptime has been requested to acquire sidescan sonar / swath bathymetry (SIMRAD), 3.5 kHz, gravity and magnetics over sites S-6, S-3a, B-1, A-1, and C-1. The sidescan and bathymetry data will be especially valuable along the Hess escarpment where sites S-3 (152) and S3a are located.

CASIS MCS line C-01, in particular, can be re-processed to provide a higher resolution image of the sedimentary sequence.

There are additional Vema and Conrad SCS lines across Site 152 that the proponents have not discussed and have not requested be deposited in the Data Bank. SSP urges them to do so.

Digital navigation and paper records of the following SCS cruises have been submitted: V3208, V1903, V2807 and C1310. Descriptions and locations of cores nearby sites S-3 and S-3A have been submitted to the data bank (cores C13-151 and V32-91)

Lastly, Diebold and Driscoll may cross both site S3 and S3a with the Ewing, though their focus will be deep-penetration seismic acquisition.

The Diebold and Driscoll MCS experiment is funded and is scheduled for Feb. 16, to Mar. 21, 1994. A minimum single crossing of sites C-1, S-7 (DSDP 146), S-3 (152) or S-3A is presently included in the proposed trackline (See trackchart).

Caribbean ODP proponents John Diebold(co -PI), L. Abrams, N. Donnelly, and S. Leroy (Mauffret student) will participate on this cruise.

Though the experiment has deep-penetration objectives the tuned 20 gun array aboard the Ewing provides a high energy broad band source which will provide a high-resolution image of the sedimentary column. (see example of drift deposit from McGinnis at al.).

The remaining five primary OHP sites (CB-1, NR1/2, NR4, S6, S7) were considered acceptable by SSP. The following dialogue is given to present further improvements in site survey data for these five sites.

Site S-6 (Primary Site for both LITHP and OHP)

Site S6 is at 2750 m water depth on a basement high NE of Mono Rise in the Colombian Basin and is crossed by UTIG MCS line CT1-12A with accompanying 3.5 data. A Conrad SCS

line and piston cores are located nearby. The proposed drillsite was located on a local high to minimize turbidite accumulations; UTIG MCS line CT1-11D intersects CT1-12A several km away, off this small structure. Although the same source, receiver and processing as with proposed site S2 described above, the quality of Line CT1-12A is very much better and for the objectives described by the proponents, SSP considers the data adequate. The 3.5 data are marginal. Better topographic control and side-scan imagery would be very beneficial.

(Additional excerpt from SSP- LITHP watchdog, Hinz): Sites S-6, A-1 and B-1 have adequate seismic coverage.

We agree that data are adequate.

Location and description of piston core VM19-20 submitted to the data bank (6/24/94).

The Diebold and Driscoll MCS cruise, the proposed Site Augmentation cruise (JOI/USSAC) and the proposed site survey to IFREMER provide further opportunities for 3.5 kHz, multibeam bathymetry and sidescan sonar coverage. All three cruises will have Panama as a port and will naturally cross site S-6 in route to or from the primary survey locations. (see Trackchart)

Site S7 (DSDP Site146/149)

Site S7/146 is a re-occupation of Leg 15 Site 146 at 3950 m in the Venezuelan Basin; Site 149 was drilled 2 km SE of 146. Results of both were combined into one chapter by the Leg 15 shipboard party. The composite section was described as 750 m of sediment resting on basalt; the K/T boundary was at roughly 475 mbsf, though recovery at this level was moderate to poor. The Glomar Challenger SCS profiles across these sites, archived on microfilm at the Data Bank, are below the standards needed for OHP objectives at proposed site S7/146. The proponents report the site is at the intersection of Conrad 2103 MCS lines 119 and 120. These profiles have been deposited in the Data Bank, are excellent for LITHP objectives and acceptable for those of OHP. Unfortunately, the track chart for the latter, while close at hand, has not yet been submitted to the Data Bank. This will be completed by the Data Bank staff. Only then can the site be precisely located on these profiles.

RC2103 MCS lines 120 and 119 have been submitted to the data bank. The Data Bank has also produced a trackchart of these lines. Site 7 (DSDP 146) has been located on both profiles.

UTIG MCS lines VB-1-SA, VB-3-N, VB-3-S, VB-1-C all intersect approximately 50 km east of S-7(146). VB-1-SA intersects RC2103 line 119 and has been interpreted, annotated and submitted to the data bank. The seismic stratigraphy imaged by these profiles have been discussed by Ladd and Watkins, 1980 and can be applied to large areas of the Venezuela Basin including site S-7.
These UTIG MCS profiles also apply to S-7A alternative to C-1.
(also see comparison of Casis MCS at B-1 with RC2103 Line 120)

The proponents report that an additional Gulf oil MCS line is available through UTIG, but it has not been submitted to the Data Bank.

A paper trackchart and profiles of Gulfrex MCS line 120VB5 were deposited in data bank on 6/14/94. MCS line 120VB5 crosses DSDP Site 146/147 at ~ 03:00 3/19/74.

A paper trackchart and profiles of Gulfrex MCS line 120VB4 were deposited in the data bank on 11/14/94.

Site NR1/2 and NR4 (Primary OHP)

Proposed Site NR1/2 is in 910 m of water near Pedro Channel on the Nicaraguan Rise. Roughly 650 m of sediment are to be drilled with two objectives: (1) determine when Pedro Channel and Walton Basin were formed by recovering the contact between periplatform sediments resting on shallow water limestones of a drowned mega-bank; and (2) determine the Neogene history of the Caribbean Current that now flows across Nicaraguan Rise.

Proposed Site NR4 is a companion site to NR1/2 just described that must also be drilled to meet shared objectives. This latter site is roughly 200 km NE from NR1/2 in 1150 m of water on the northern Nicaraguan Rise. Both sites are located inside grids of Cape Hatteras SCS profiles of excellent quality, within 2 km of actual line intersections.

Navigation for these has not been submitted to the Data Bank. Both sites have accompanying 3.5 data and piston cores, all collected by the Cape Hatteras, but on two different cruises.

Paper copies of trackline locations have been submitted for both NR1/2 and NR4 (see overhead of tracklines)
Digital Navigation has been submitted for SCS across NR1/2.
Data Bank personal have digitized the navigation of portions SCS lines crossing NR4 (see trackchart)

UTIG MCS Line CT1-29 crosses NR1/2 and CT2-16 crosses NR4; both are acceptable quality, but for OHP purposes are not as valuable as the higher resolution SCS lines.

UTIG MCS Line CT1-29 is intersected by the grid of Cape Hatteras SCS lines with a CPA of approximately 18.5 km to NR1/2
UTIG MCS Line CT1-16 is intersected by the grid of Cape Hatteras SCS lines with a CPA of approximately 18.5 km to NR4.

CB-1 (Primary OHP), CB1a (OHP Alternative to CB1)

The last of the primary Caribbean OHP sites described in 415-Rev2 is at 920 m in the Cariaco Basin. While the sediments are at least 1 km thick, only 200 m of multiple APC penetration is proposed. The objectives, while clearly paleoenvironmental, differ from those of the other Caribbean sites. At CB-1 the proponents intend to recover an especially high resolution late Quaternary record of upwelling and circulation history, fluvial discharge, climatically forced anoxia, and organic carbon deposition. This will be possible due to the high accumulation rates and the related periods of water column anoxia that exclude bioturbation. A fairly dense grid (~2 km line spacing) of moderate to very good quality SCS data and 3.5 echograms collected by the Thomas Washington criss-cross the basin. Those lines most critical to proposed site CB-1 have been deposited in the Data Bank and some have recently been digitally processed at RSMS.

Numerous piston cores were taken during the Washington cruise. Due to the dramatic circulation changes, high sedimentation rates, and steep terrain, the basin has experienced a complex history of episodic sediment failure and canyon incision. Consequently, SSP points out to the proponents that optimum site location may require moving off exact line intersections; with the structural control provided by the dense seismic grid, this is an acceptable compromise.

Comment from L. Peterson?

SSP Assessment of Alternate OHP Sites:

SSP indicates that three alternate sites proposed by OHP are in need of site survey improvement. These three sites are S-1, NR7 and S-5/NR8 .

Site S1 (OHP Alternate to S-2A)

Site S-1 will be dropped from proposed sites if no further seismic data is provided.

Site NR7 (OHP Alternate to NR1/2)

Site NR7 has been dropped from proposed sites.

Site S5/NR8 (OHP Alternative to S6)

Site S5/NR8 is an alternate to proposed site S6 and is in 2050 m of water on the lower Nicaragua Rise. The site is crossed by UTIG MCS line CT1-28B with accompanying 3.5 data of low quality. Though low-pressure, large-volume airgun data, the MCS profile is good quality for the site objectives.

We agree that the MCS profile is appropriate for site objectives

There is a published Conrad piston core nearby.

Location and description of this piston core C13-134 submitted to the data bank (6/24/94). In addition, location and description of a Vema core (V24-28) has been submitted to the data bank (6/24/94).

Droxler, if funded, proposes to survey this site aboard the Cape Hatteras and collect hi-resolution SCS, 3.5 data, and piston cores. This survey data would increase greatly the odds of being able to predict the presence of the critical K/T boundary and to extrapolate the paleoceanographic record at this location to the larger context of Caribbean circulation history.

The Droxler et al. proposal to NSF Ocean Sciences MG&G, May 1, 1994 referred to in the above minutes was not funded (Sept. 1994).

Site S-3A (OHP and LITHP Alternate)

Site S3a was discussed earlier in reference to the primary site S3/152.

Site NR9 (OHP alternate)

Site NR9 does not appear to be a true alternate that could replace one of the primary sites proposed in 415-Rev2. Though located at 1200 m on the SE Pedro Bank 100 km SE of NR4, the proponents predict drill cores at NR9 could provide a unique periplatform history of metastable carbonate preservation. The site is crossed by a high-resolution Cape Hatteras SCS line of very good to excellent quality and accompanying 3.5 data. A piston core from that same cruise was taken nearby. No navigation for this cruise has been deposited in the Data Bank. Additional survey data (SCS, 3.5, cores and dredges) may be acquired by Droxler et al., if funded.

A paper copy of the navigation has been received by the data bank. Digital navigation has been requested.

Additional piston core description and location from Vema 28 (V28-119) has been submitted to data bank (6/24/94).

The Droxler et al. proposal to NSF Ocean Sciences MG&G, May 1, 1994 referred to in the above minutes was not funded (Sept. 1994).

July 13-15, SSP Consensus #16:

The Caribbean Ocean History proponents (415-rev2 sed. objectives) have responded well to several SSP requests for submission of new data sets and clarification of existing ones. The range of objectives leads SSP to request small differences in proponents' adherence to the Target A data requirements. The recovery of K/T boundary impact material is the primary objective of several sites; for these, the ability to trace known stratigraphy to the site and demonstrate that odds favor the recovery of this interval is paramount.

Neogene carbonate records are primary objectives at other sites; for these, the ability to extrapolate Quaternary-late Pleistocene information back in time and down the section is needed to determine that adequate temporal resolution and paleodepth will be present. SSP therefore emphasizes the critical nature of ties to existing wells for the K/T, while stressing the importance of cores, hi-res SCS, 3.5, and hopefully side-scan and swath topography for the Neogene goals.

K/T boundary impact material where it exists will be found between seismic horizons A" (Eocene) and B" (L. Cretaceous), which are well imaged regionally and correlated to DSDP Leg 15 sites in the Venezuela Basin. These horizons have also been sampled on the Hess Escarpment/Lower Nicaragua Rise (DSDP 152) and comparable horizons have been imaged in the Colombia Basin. No drillsites have reached sediments this old or basement in the Colombia Basin. There is no well control in the Yucatan Basin or Cayman Rise.

Paper copies of navigation have been submitted for all cruise tracks except the Cape Hatteras and the SCS track reported at NR7.

Paper copies of navigation have been submitted for all the Cape Hatteras cruise tracks. Digital navigation for NR4 has also been submitted. NR7 is no longer a proposed site.

A Ewing cruise led by J. Diebold and N. Driscoll will possibly cross sites S3, S3a and S7 in early '95. Proponents are encouraged to maintain contact with these P.I's. and contribute to planning and cruise operations wherever appropriate. It is hoped that this cruise will provide swath bathymetry, 3.5 echograms, and reflection profiles of sufficiently high resolution to be useful for OHP objectives.

The Diebold and Driscoll MCS experiment is funded and is scheduled for Feb. 16, to Mar. 21, 1994. A minimum single crossing of sites C-1, S-7 (DSDP 146), S-3 (152) or S-3A is presently included in the proposed trackline (See trackchart).

Caribbean ODP proponents John Diebold(co -PI), L. Abrams, N. Donnelly, and S. Leroy (Mauffret student) will participate on this cruise.

Though the experiment has deep-penetration objectives the tuned 20 gun array aboard the Ewing provides a high energy broad band source which will provide a high-resolution image of the sedimentary column.

The cruise plan submitted by Droxler , et al. and under review at NSF would greatly increase the data readiness across primary sites S2a, S3, S6 and alternates S1, S3a, S5/NR8, NR7 and NR9. Of these, the sites most urgently in need of such improvement are S2a, S3 or S3a, S1, S5/NR8, and NR7. In fact, at present there is nothing in the Data Bank for site NR7.

Sites S1 and NR7 are no longer proposed sites.

S-3 and/or S-3A will be crossed by Diebold and Driscoll high-resolution MCS. Multibeam bathymetry and 3.5 kHz will be acquired over S-6 in transit to Panama. (see comments for S-3 and S-3A)

A new Site Survey Augmentation Proposal to JOI/USSAC requests three days of additional shiptime to survey Sites S-2A, S-3 (DSDP 152) and S-3A with a small grid of digital high-resolution SCS (GI gun or waterguns), digital 3.5 kHz, multibeam bathymetry (Hydrosweep), gravity, magnetics, and gravity coring. (see comments for S-2A)

A new site survey proposal to IFREMER requests shiptime to acquire sidescan sonar / swath bathymetry (SIMRAD), 3.5 kHz, gravity and magnetics over sites S-6, S-3a and S-3. (see comments for S-3 and S-3A)

SSP Assessment of Primary LITHP Sites:

SSP indicates that one of the four primary sites proposed by LITHP is in need of site survey improvement. This site is C-1

Site C-1 (Primary LITHP)

The existing seismic coverage of the easternmost Site C-1 located in the northern Venezuela Basin and its alternate Sites S-7 (redrill DSDP Site146) and S-7A are of inadequate quality (one old Conrad single channel seismic line). This data package will be considerably improved by the funded MCS cruise of R/V Ewing.

Two SCS lines (C1904, and C2102) have been submitted to the data bank in support of site C-1. A third SCS line has been requested (Farnella-331), presently only a pagesize figure is available.

GLORIA sidescan data have been requested and are available at Lamont in a published volume of the EEZ surrounding Puerto Rico (Scanlon et al., 1985)

The Diebold and Driscoll MCS experiment is funded and is scheduled for Feb. 16, to Mar. 21, 1994. A minimum single crossing of sites C-1, S-7 (DSDP 146), S-3 (152) or S-3A is presently included in the proposed trackline (See trackchart).

Caribbean ODP proponents John Diebold(co -PI), L. Abrams, N. Donnelly, and S. Leroy (Mauffret student) will participate on this cruise.

Though the experiment has deep-penetration objectives the tuned 20 gun array aboard the Ewing provides a high energy broad band source which will provide a high-resolution image of the sedimentary column. (see example of drift deposit from McGinnis at al.).

There are numerous high quality MCS lines that have been submitted in support of site S-7A alternate to C-1. UTIG MCS lines VB-1-SA, VB-3-N, VB-3-S, VB-1-C all intersect approximately 50 km east of S-7(146). Site S-7A is located near this intersection and is located on VB-1-SA. VB-1-SA has been interpreted, annotated and submitted to the data bank. The seismic stratigraphy imaged by these profiles have been discussed by Ladd and Watkins, 1980 and can be applied to large areas of the Venezuela Basin including site S-7 and S-7A. Specifically, seismic horizons A' and B' are clearly imaged throughout the region.

See comment in section describing OHP primary site S-7 (DSDP 146).

SSP Consensus #12: A substantial amount of data has now been submitted in support of the Caribbean basement objectives described in proposal 411rev. Sites S-6, A-1 and B-1 have adequate seismic coverage.

We agree that sites S-6, A-1 and B-1 have adequate seismic coverage.

Site S-6 (Primary Site for both LITHP and OHP):

See comment in section discussing OHP primary sites

Sites A-1 and B-1 (Primary LITHP Sites):

The proposed Sites A-1 and B-1, located within the area of the Beata Ridge, are covered by a grid of CASIS MCS lines. The CASIS seismic data surrounding Sites A-1 and B-1 are a good quality but not yet migrated.

All the data are now migrated. Three migrated profiles (B-5, B-7 and A-5) crossing sites A-1 and B-1 and have been submitted to the data bank.

SSP has been informed by one of the proponents that more precise velocities have been determined for the sedimentary sequences around the proposed Site A-1 by applying modern processing routines including pre-stack migration on Line CASIS-A12.

We performed a statistical analysis of the velocities determined by semblance techniques. We (Alain) can present the velocity model and the pre-stack migration of CASIS 12. The velocities determined on Common Receiver Gather are more precise than those determined by semblance technique and not affected by the dip of reflector. CASIS- 03 will also be migrated before stack and we (Alain) can present the first results. The velocities determined by semblance and pre-stack migration are higher than those found in the previous DSDP Sites 146 and 153.

In addition we reprocessed one old IFP line and EXXON will send a good copy of a line presented by Hopkins in the DSDP blue book Leg 15 (these data will be deposited in the data bank as soon as possible).

An updated tectonic interpretation with compilations of depth and map thickness maps are in preparation

Page size copies of these data have been deposited in the data bank and full size versions will be submitted.

11/16/94

Appendix D

SSP Feedback to proponents

• advise proponent of existence of new data guidelines

- the name and contact information of the watchdog,
- a copy of the section of the draft minutes dealing with the proposal,
- copies of the SSP worksheets, if the data package is sufficiently mature to enable the watchdog to fill out worksheets.
- the target types within the SSP guidelines against which each site will be evaluated,
- for each data type classified as "X*" or "Y*", an indication of whether SSP will or will not require this particular data type for these particular sites,
- an indication of additional data types that SSP might require in support of secondary or non-standard drilling objective in circumstances not well covered by SSP guidelines,
- an indication of any potential safety issues,
- for sites in areas of hydrocarbon exploration or production, a reminder that data from commercial wells in the area will eventually be needed for safety review
- for sites in <200m water depth, a reminder of shallow water drilling hazard survey requirements
- for sites in heavily travelled areas or near shore sites, a reminder that information on potential manmade hazards (cable routes, dump sites) will be needed for operational planning
- advice on other investigators who may have relevant data in the region,
- advice on survey ships that may be able to visit the area.
- reminder of timing of next data deadline and next SSP meeting.

WAIT for draft minutes to arrive by email from Kim before sending out watchdog letter.

Send a copy of your watchdog letter to Dan Quoidbach, ODP Data Bank, L-DEO, Palisades, NY 10964.

Send the watchdog letter to the lead proponent of the proposal. Ask Kim for advice if there is not a single obvious lead proponent with whom to communicate.