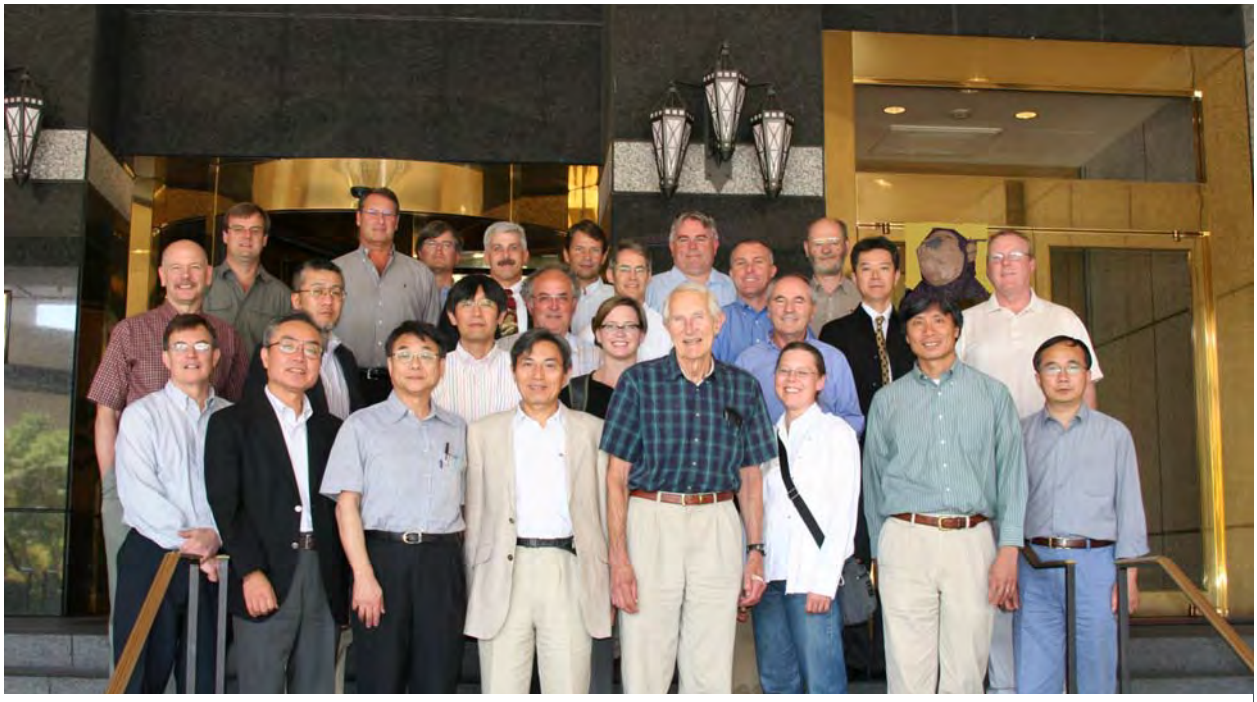
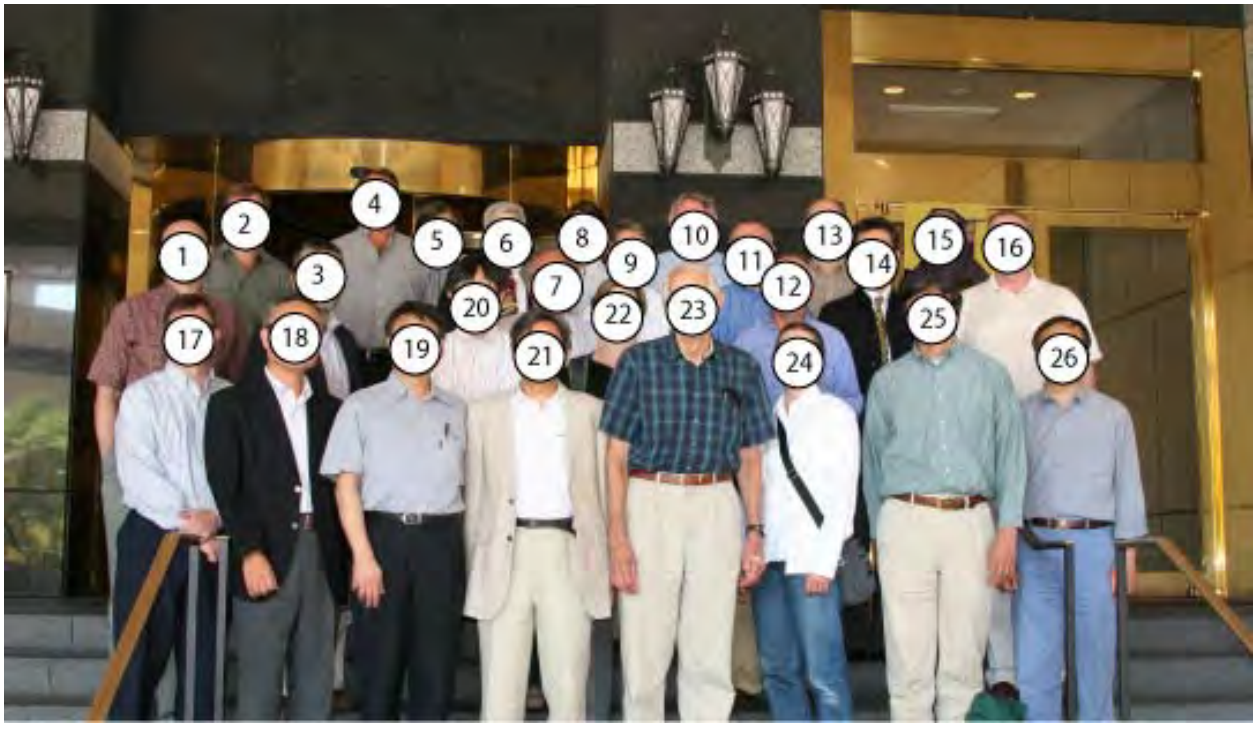
MINUTES
Seventh Meeting of the Engineering Development Panel (EDP) of the IODP

July 16 – 18, 2008
Salt Lake City, Utah





1. Tom Janecek, 2. Dave Smith, 3. Hiroshi Asanuma, 4. Leon Holloway, 5. Bill Ussler, 6. Kevin Grigar, 7. Roland Person, 8. Gabe Filippelli, 9. Rick Colwell, 10. Sean Higgins, 11. Greg Myers, 12. Lothar Wohlgemuth, 13. John Thorogood, 14. Mitsuo Tamura, 15. Grizelda, 16. Eric Meissner, 17. Jack Germaine, 18. Makoto Miyairi, 19. Hisao Ito, 20. Masafumi Fukuhara. 21. Yoshiyasu Watanabe, 22. Kelly Oskvig, 23. Dick Von Herzen, 24. Maria Ask, 25. Nori Kyo, 26. Ying Ye

LIST OF APPENDICES

A. Meeting Agenda (Oskvig)
B. Introduction Slides (Miyairi)
C. Review of EDP mandate, roles, and responsibilities (Ussler)
D. EDP 8 proposal (Ying)
E. EDP 9 proposal (Ask)
F. Status of EDP 6 Action Items (Oskvig)
G. SPC Report (Filippelli)
H. SSEP Report (Asanuma)
I. Review process of Engineering Development Proposals (Myers)
J. STP Report (Colwell)
K. CDEX Operator Report (Kyo)
L. ESO Operator Report (Smith)
M. USIO Operator Report (Grigar)
N. Impact of microbiological sampling on mud programs (Colwell)
O. Ultra-Deep Drilling Statistics (Ussler)
P. Coring Study Update (Oskvig)
Q. Technology Roadmap Matrix Analysis (Ussler)
R. Parting Comments (Ussler)
S. Technology Roadmap update version 3.0 (Ussler)

IODP Engineering Development Panel
Seventh Meeting
July 16-18, 2008
Salt Lake City, UT, USA
Members and Guests

EDP Members

Asanuma, Hiroshi	USA	asanuma@ni2.kankyo.tohoku.ac.jp
Ask, Maria	ECORD	Maria.Ask@ltu.se
Fukuhara, Masafumi	Japan	fukuhara1@slb.com
Germaine, Jack	USA	jgermain@mit.edu
Holloway, Leon	USA	G.Leon.Holloway@conocophillips.com
Miyairi, Makoto*	Japan	makoto.miyairi@japex.co.jp
Person, Roland	ECORD	Roland.person@ifremer.fr
Tamura, Mitsuo	Japan	mtamura@jodco.co.jp
Thorogood, John	ECORD	John.Thorogood@DrillingGC.com
Ussler, Bill**	USA	methane@mbari.org
Von Herzen, Richard	USA	rvonh@whoi.edu
Watanabe, Yoshiyasu	Japan	ywata@scc.u-tokai.ac.jp
Wohlegemuth, Lothar	ECORD	wohlgem@gfz-potsdam.de
Ye, Ying°	China	gsyeying@zju.edu.cn

* Chair, ** Vice-chair, ° Non-voting

Observers, Guests and Liaisons

Ito, Hisao	CDEX	hisaoito@jamstec.go.jp
Kyo, Masanori	CDEX	kyom@jamstec.go.jp
Smith, Dave	ESO	djsm@bgs.ac.uk
Janecek, Tom	IODP-MI	tjanecek@iodp.org
Myers, Greg	IODP-MI	gmyers@iodp.org
Oskvig, Kelly	IODP-MI	koskvig@iodp.org
Filippelli, Gabe	SPC	gfilippe@iupui.edu
Colwell, Rick	STP	rcolwell@coas.oregonstate.edu
Grigar, Kevin	USIO	kgrigar@iodp.tamu.edu
Higgins, Sean	USIO	shiggins@oceanleadership.org
Meissner, Eric	USIO	Meissner@ldeo.edu

Executive Summary
IODP Engineering Development Panel
Seventh Meeting
July 16-18, 2008
Salt Lake City, UT, USA

EDP Consensus Statements and Action Items

The EDP forwards the following consensus statements and actions items to the SPC, SSEP, STP or the IODP-MI as appropriate.

EDP Consensus 0807-01: Approval of Agenda
The EDP approves the agenda for EDP Meeting #7.
Routing: IODP-MI
Priority: Medium

EDP Consensus 0807-02: Approval of EDP Meeting #6 Minutes
The EDP approves the minutes from EDP Meeting #6.
Routing: IODP-MI
Priority: High

EDP Consensus 0807-03: EDP SPC Representative
EDP designates Bill Ussler as the EDP representative at the next SPC meeting to be held in August 25-28, 2008 in Sapporo, Japan.
Background: EDP chair is unable to attend.
Routing: IODP-MI and SPC
Priority: High

EDP Consensus 0807-04: EDP SSEP Liaison
EDP designates Bill Ussler as the EDP representative at the next SSEP meeting to be held November 10-13, 2008 in San Francisco, USA.
Background: Cost effective.
Routing: IODP-MI and SSEP
Routing: Medium

EDP Consensus 0807-05: EDP Meeting #8
EDP recommends that EDP Meeting #8 be held in Shanghai, China from January 14-16, 2009.
Routing: IODP-MI
Priority: High

EDP Consensus 0807-06: EDP Meeting #9
EDP recommends that EDP Meeting #9 be held in Sweden, tentatively from July 15-17, 2009, in Luleå.

Background Statement: A European location is out of the established rotation schedule, however because of weather considerations, the Japanese members have agreed to host EDP Meeting #10 in January 2010.
Routing: IODP-MI
Priority: Medium

EDP Consensus 0807-07: Pool of Qualified Alternates for Filling Vacant Positions on the EDP

The EDP desires to maintain full membership of 14 voting members at every regularly scheduled panel meeting. The EDP requests that a pool of qualified alternates to the EDP be established to fill vacancies that occur on the panel resulting from pre-mature resignation, illness, or prior commitments. This pool might comprise previous EDP members or nominees to the EDP that have not yet joined the panel.

Background: Because the EDP has now fully downsized in response to the budget realities facing the IODP, not having full membership at this reduced level will hinder our effectiveness in conducting our meetings. The tasks on our agenda are substantial, and include the annual review of engineering development proposals submitted to IODP-MI, our continuing efforts to revise and prioritize the EDP Technology Roadmap, review of funded engineering development projects when requested by IODP-MI, and evaluating technological readiness of selected active drilling proposals when requested by IODP-MI, SPC, or SSEP. With the reduced panel size, maintaining institutional knowledge, continuity, and an array of engineering expertise will be a constant challenge. Having full membership at every panel meeting will enable us to best address the needs of the IODP and not unduly burden the panel membership.
Routing: PMOs; IODP-MI
Priority: High

EDP Action Item 0807-08: Microbial Contamination of Core

EDP responds to STP Consensus 0802-06 by establishing a Microbiology Contamination Working Group (Holloway, Ussler, Tamura, and Thorogood) to investigate technologies and strategies for reducing microbial and drilling fluid contamination of cores.

Background: The EDP is responding to STP Consensus 0802-06 and the presentation by Rick Colwell on Microbial Contamination of Core.
Routing: SPC, STP, IODP-MI
Priority: High

EDP Consensus 0807-09: Comments on DSS-RMM Report

The EDP recommends that the DSS-RMM Project be suspended immediately. The EDP recognizes that WOB and TOB data from the end of the drillpipe would provide key information for better controlling drillstring stability, however this current project has enough deficiencies that successful completion of a functional tool is improbable.

Background: The EDP has examined an historical summary of the DSS-RMM project provided to IODP-MI by the USIO “Drilling Sensor Sub (DSS) and Retrievable Memory Module (RMM) Interim Project Report” dated July 2008. The DSS-RMM project is of a size and complexity that formal engineering process and procedures must be followed. Based on the history of this project and its present status, it appears that this project has evolved in an *ad hoc*

manner, and that standard practices have been absent, inadequate or misapplied. The following deficiencies are noted: (1) Functional Requirements have not been clearly defined; (2) Design Requirements have not been clearly defined; (3) Formal and effective Design Reviews appear not to have been held; (4) a Budget; (5) clearly defined Project Manager; (6) Project Team identified and areas of responsibility clearly defined; (7) Work Breakdown Structure created; (8) Risk Assessment and Mitigation plan; (9) Acceptance Testing and criteria; (10) a Calibration program; (11) a sound Integrations and Test plan; (12) clearly defined Deliverables; and (13) Operational and Maintenance costs quantified. The panel expects high standards of performance in the planning and execution of engineering development projects within the IODP.
Routing: IODP-MI, USIO
Priority: High

EDP Consensus 0807-10: Ultra-deep Boreholes
The EDP recognizes that drilling ultra-deep boreholes is a new technical domain for the IODP that is potentially beyond the capacity of the current program. Developing expedition plans for ultra-deep drilling targets is a complicated effort that will require substantial resources that are outside the scope of the EDP and current planning process of the IODP.

Background: The EDP has initiated discussions about the technological challenges associated with a future Moho drilling project (in reference to SPC Consensus 0708-30) that will continue at future panel meetings. However it is apparent that drilling of ultra-deep boreholes is a complex and challenging task. To assess the present state-of-the-art, the EDP has asked IODP-MI to prepare a scoping study on ultra-deep drilling technologies (EDP Consensus 0807-11).
Routing: SSEP, SPC, IODP-MI, IOs
Priority: High

EDP Consensus 0807-11: Ultra-deep Drilling Scoping Study
The EDP recognizes SPC's interest in understanding the technological challenges associated with a future Moho drilling project (in reference to SPC Consensus 0708-30) and has initiated discussions about this problem that will continue at future panel meetings. EDP requests that IODP-MI prepare a draft scoping study on ultra-deep drilling to be reviewed at the January 2009 EDP meeting.

Routing: SPC; IODP-MI; IOs
Priority: High

EDP Consensus 0807-12: Engineering Testing Time on IODP Platforms
At-sea engineering testing is part of any Engineering Development project in the program, whether it is a 3rd party tool development, or an internal engineering project conducted by the IOs. Allocation of engineering testing time is critical for proper engineering development and must be included in future operational planning on an as needed basis. We endorse IODP-MI efforts to develop a means for accepting formal requests for engineering testing time at sea. The EDP is willing to review requests for at sea testing forwarded by IODP-MI.

Background: The EDP is responding to a written request by the USIO-LDEO for consideration of a specific need for at-sea engineering testing time and of a general request for an at-sea engineering testing time policy. Before the specific request can be considered, a formal mechanism for accepting requests for at-sea engineering testing needs to be established by

IODP-MI. The proposed mechanism will be presented to EDP at the January 2009 meeting for review, adjustment if needed, and adoption.
Routing: IODP-MI, SPC, IOs
Priority: High

EDP Consensus 0807-13: EDP Liaison to the STP
Although the STP and EDP have distinct mandates and non-overlapping areas of responsibilities, the EDP recognizes common technological interests exist between the STP and EDP. The EDP requests permission to send an EDP liaison to each regularly scheduled STP meeting beginning at the early 2009 STP meeting.

Routing: STP, PMOs, IODP-MI, SPC
Priority: High

EDP Action Item 0807-14: Coordination of Technology Roadmaps between the STP and EDP
The EDP will send version 2.0 of the EDP Technology Roadmap to the STP for use in developing their own Technology Roadmap. The EDP will follow the development of STP's Technology Roadmap and will identify opportunities for interconnectivity of the two documents through dialogue between the panel members.

Routing: STP
Priority: High

EDP Action Item 0807-15: EDP Technology Roadmap Working Groups
The EDP has established 3 working groups to review draft version 3.0 of the Technology Roadmap to identify technological interdependencies and to show their hierarchical relationship. Working groups are: (A) Sampling/Logging/Coring – Holloway (lead), Asanuma, Ask, and Wohlgemuth; (B) Drilling/Vessel Infrastructure – Thorogood (lead), Tamura, and Watanabe; and (C) Borehole Infrastructure – Ussler (lead), Miyairi, Person, and Fukuhara.

Routing: IODP-MI
Priority: High

EDP Consensus 0807-16: EDP Technology Roadmap
The EDP re-affirms version 2.0 of the Technology Roadmap and its prioritization as the current version of the roadmap.

Routing: IODP-MI
Priority: High

EDP Consensus 0807-17: Outgoing EDP members
The EDP thanks Hideyuki Suzuki and Jack Germaine for their service to the panel.

Routing: PMOs; IODP-MI
Priority: Medium

Minutes
IODP Engineering Development Panel
Seventh Meeting
July 16-18, 2008
Salt Lake City, UT, USA

Wednesday, July 16, 2008

In these minutes, the Recommendations, Consensus Statements, and Action Items are not repeated in detail. Please refer to the Executive Summary for the full text of each, as indicated.

Meeting was convened at 0830.

Agenda Item #1: Welcoming remarks (Miyairi/Oskvig)

Makoto Miyairi, chairman of the EDP, made a few opening remarks, and reviewed Robert's Rules of Order (Appendix B). He noted that the US representation on the panel was one less than the five allotted positions, and that Professor Watanabe is Japan's newest representative. Previously, he has served on the EDP as an alternate. Miyairi requested that the following panel members take notes for the minutes: Bill Ussler—Wednesday morning, Maria Ask—Wednesday afternoon, Germaine—Thursday morning, Asanuma—Thursday afternoon, Ussler—Thursday executive session, Tamura—Friday morning, and Ussler—Friday afternoon executive session. Kelly Oskvig reviewed meeting logistics and safety. Panel members and guests were introduced.

Agenda Item #2: Approval of meeting agenda (Miyairi)

Miyairi reviewed the meeting agenda (Appendix A). Germaine made a motion to approve the meeting agenda. Thorogood provided the second. The agenda was approved by consensus.

Agenda Item #3: Quorum discussion and US vacancy discussion (Miyairi)

14 voting members were present; 10 are needed to carry a quorum (2/3 voting membership is required). Miyairi asked if any members were leaving early. No one was planning to leave before the end of the meeting. Ussler stated that efforts are underway to develop a plan for identifying potential alternates. Germaine asked if alternates would be selected from past members, or someone entirely new and wondered if a member can appoint an alternate. Janecek stated that program offices would not allow this; he emphasized that there is a need for creating a pool of qualified alternates.

Agenda Item #4: Approve minutes from EDP meeting #6 (Miyairi)

Minutes from EDP #6 were approved by consensus (Germaine 1st motion; Thorogood 2nd motion).

Agenda Item #5: Review EDP mandate and scope of EDP, what is expected and not expected; historical review (Ussler)

Ussler reviewed the mandate and scope of the EDP. The EDP is unique in the SAS because it reports to both the SPC and IODP-MI. He reviewed accomplishments of all previous meetings (see Appendix C).

Agenda Item #6: Preliminary discussion of next 2 meeting locations and times (Ying and Ask)

EDP #8 will be held in Shanghai, China, January 14-16, 2009 at Tonji University. Ye Ying will be the local host (Appendix D).

Maria Ask proposed to hold EDP #9 in Sweden, July 15-17, 2009 in Stockholm or Luleå, Sweden. She would be the host (Appendix E).

Agenda Item #7: Review status of previous meeting action items and recommendations (IODP-MI)

Greg Myers reviewed progress made on Consensus Items from the EDP#6 meeting (see Appendix F). He reviewed the Annual Program Plan (APP) for FY09. The APP includes the following engineering development projects: 1. the LTBMS; 2. SCIMPI high-level design; 3. S-CORK high-level design (which is nearly completed); 4. a simple observatory common deployment system; 5. the motion decoupled hydraulic delivery system (MDHDS); and 6. the quality/quantity coring study. The first phase of the Deep Star project has a final deliverable deadline of 12/18/08, and a report will be prepared for the January 2009 EDP meeting and Spring 2009 SPC meeting. Future scoping studies were discussed: 1. Integrated downhole coring systems; 2. Integrated surface drilling systems; and 3. The 21st century Moho. Discussion centered on how to develop these topics. One proposal was to have a small scoping workgroup meet for 1 to 2 days after the EDP meeting. Janecek agreed that a small task force would be a good idea.

Myers initiated a discussion about allocation of ship time for engineering testing. There is not a policy for this and one needs to be established. He noted that vessels of opportunity (non-IODP) would be part of the policy and were critical for proper engineering. He proposed that the EDP review formal requests for engineering testing, and the EDP would provide comments to IODP-MI. IODP-MI would take EDP advice and may forward the request to the SPC. Pending the SPC response, the request would be forwarded to the OTF for scheduling. Myers noted that during the ODP, up to 2 days were potentially available for engineering testing, but were rarely used because it would encroach on the scientific objectives. Janecek stated that he would need to see a list of engineering projects, when field-testing was required, and what platform was needed. He viewed the need for engineering time as a demand driven allocation of time; SAS and IODP-MI have agreed to have engineering development, and implicit in this is the need for field-testing on appropriate platforms.

MORNING BREAK

Agenda Item #8: SPC Report (Filippelli)

Gabe Filippelli (vice-chair SPC) presented the SPC report (see Appendix G). He reviewed the present expedition schedule for the program, and the Tier 1/ Tier 2 designation for drilling proposals sent to the OTF. The Tier 1/Tier 2 designation provides guidance to the OTF in developing a coherent expedition schedule. A Tier 1 proposal designation is made based on an ocean basin basis (Pacific, Atlantic, or Indian). All proposals at the OTF and SPC are now subject to re-ranking every 2 years, unless on the drilling schedule. He provided an update on the Asian Monsoon DPG. Noting that the current drilling program ends in 2013, Germaine asked what is being done to encourage the writing of new scientific drilling proposals. Would a White Paper approach work? Filippelli responded by saying that the program will continue to receive new proposals. Innovative ideas can still be incorporated into the present drilling program. The development of new proposals, even pre-proposals, is strongly encouraged. The biggest concern is not having sufficient proposal pressure at renewal time for the program. Filippelli noted that there is a large IODP renewal planning meeting scheduled for September 22-24, 2009 in Bremen, Germany. A steering committee has been established. He noted that there is a role for the EDP to identify new capabilities and technologies that could be implemented in the new program that would allow new science to be investigated. This information needs to be conveyed to both the scientific community and to the US Congress.

Agenda Item #9: SSEP Report (Asanuma)

The SSEP meeting was held in Busan, Korea, May 19-22, 2008 (Appendix H). 18 science proposals were evaluated—9 solid earth and 9 environmental change/deep biosphere; 2 were forwarded to the SPC. Asanuma reviewed the role of the EDP in the SAS. Two proposals were discussed at the SSEP that had technical issues: 1. 635Full-2 (Hydrate Ridge) – Development of the SCIMPI tool is essential for the success of this expedition. It is not certain when the SCIMPI will become available; and 2. 698-Full2 (Izu-Bonin-Marianas island arc) – Riser drilling 8 km into arc volcanics and plutonics is required. Thorogood noted that a significant amount of engineering would be required to drill an 8 km borehole.

Agenda Item #10: Technical review process for drilling and engineering development proposals (IODP-MI)

Myers reviewed the process by which Engineering Development proposals enter the system and are evaluated (Appendix I). He proposed adding a new step, by requesting proponents to send a Letter of Intent to IODP-MI. In the past a number of proposals have been submitted on the due date, and IODP-MI has had no way of determining how many proposals might be submitted. He reviewed the three Class B proposals that have been routed to the EDP for review at this meeting. A discussion of watchdog identity ensued without immediate resolution. The question raised was whether the identity of the lead watchdog and/or all the watchdogs should be made to proposal proponents. Myers reminded everyone that a review of each of the proposals was needed before the close of the meeting. He also reviewed the 5-star grouping criteria. The discussion then moved to technical reviews of active drilling proposals. The SSEP will now identify drilling proposals that appear to have technical needs outside the present capability of the program. Myers suggested the EDP consider three questions: 1. Is the proposed drilling feasible? 2. What are the key technological issues? 3. What recommendations can be made on how the proposed sites can be drilled?

Agenda Item #11: STP Report (Colwell)

Rick Colwell reported on the STP meeting #6 held in Sendai, Japan (Appendix J). He noted that discussions revolved around the role of microbiological sampling in the IODP, how the QA/QC Task Force Report will be implemented, and the development of a STP science and technology roadmap. Thorogood noted that massive overlap exists between the EDP technology roadmap and the STP roadmap. He asked how this overlap will be reconciled. Ussler asked if the EDP technology roadmap has been distributed to the STP. Higgins noted that just the general concept/approach for developing a roadmap has been introduced to the STP, but not the entire document. Miyairi suggested having an exchange of liaisons between the panels on a regular basis. Ussler noted that the EDP wants to send a liaison and has drafted a consensus statement for consideration at this meeting. Higgins noted that it is really critical that the EDP roadmap be available at the next STP meeting. Germaine asked if there was a desire to have two separate documents or one integrated document. Higgins stated that integration is an unresolved issue. Janecek emphasized that having the appropriate technology to accomplish science goals is essential and that the technology roadmaps provide the funding agencies (e.g., NSF) and IODP-MI with the necessary background information and material to move forward with expedition planning, especially those with technological gaps. David Smith suggested that the STP generate science drivers for technology development and send them to the EDP.

LUNCH BREAK

After lunch Miyairi conducted a brief discussion of potential conflicts of interest with the three engineering development proposals. For the record, Meissner is conflicted with the MMM; Ito and Nori with the DRST. Institutional conflicts were noted for Higgins and Greigar with the MMM.

Agenda Item #12: Review of Technology Roadmap – Session 1 (Ussler)

Ussler reviewed the status of the EDP technology roadmap and proposed changes to version 2.0 of the TR (Appendix S). Holloway suggested adding an entry covering emerging technologies like that being developed in the Deep Star program and that this approach might be suitable for drilling to the Moho. Ask suggested deleting B22 and updated Table 1. Ask was asked to provide suggested changes to Table 1. Ussler then discussed how mapping of all the drilling proposals to the technology roadmap might occur. IODP-MI has prepared an Excel table based on the matrix approach described by Miyairi during the last EDP meeting. Ussler asked the panel to consider using distribution of need as a basis for establishing ranking or prioritization of the roadmap. He noted that the panel has previously asked to see all the active drilling proposals, but for a variety of reasons, the EDP cannot access the drilling proposals. The panel was broken into 4 groups and given a paper copy (4 ft x 16 ft) of the proposal matrix for their review and consideration. The panel reconvened and discussed initial reactions. It noted that numerous proposals had no obvious technical needs. Deep drilling technical developments had not been mapped to any proposals. This was a clear deficiency. It was suggested that the numerical values 3, 2, and 1 could be assigned to the C, S, and I designation

used to map the proposals and each category summed. Also, the number of instances of each C, S, and I designation could be counted. Ussler was assigned the task of providing a summary of these two schemes later in the meeting.

Agenda Item #13: FY10 Engineering Development Proposals

Three engineering development proposals were presented by the respective lead watchdogs and discussed at length by the panel.

AFTERNOON BREAK

Agenda Item #15: Drilling Industry Presentations

The order of Agenda Items #14 and #15 were switched to accommodate needs of the presenters. Homer Robertson from Terratek gave the first presentation. He described their wellbore simulator and showed a video clip of the laboratory drill rig and simulator. They are in the process of testing ultra-high speed mini-bits and plan to move to larger bits during Phase 2 testing. The laboratory allows better control of input parameters and measurement of output parameters. Myers noted that WOB could be controlled to simulate heave. Dennis Nielsen from DOSECC gave the second presentation. He reviewed recent DOSECC lake drilling projects and their new portable drill rig built on shipping containers. Martin Rivet from Boart Longyear gave the last presentation. He reviewed their surface wireline system and coring system portfolio.

Agenda Item #14: Operator Reports

CDEX (Appendix K) – Kyo reviewed FY08 progress with the LTBMS. Engineering requirements have been defined. The telemetry system has been developed and detailed designs are being finalized. He reviewed how the u-shaped topology of the co-axial telemetry and power cable provided greater fault tolerance than a single cable. He noted that traditional connectors are not used in the system. Instead, the external mechanical connections are welded and the internal wiring is soldered directly to circuit boards. The maximum pin-count for a connection is 31 pins. A destructive testing plan is scheduled for 2009. He reviewed the recently completed risk assessment analysis.

ESO (Appendix L) – Smith reviewed plans for MSP drilling the New Jersey margin leg and the Great Barrier Reef in 2009/2010, in addition to accomplishments of previous MSP drilling on the Lomonosov Ridge (Leg 302, ACEX) and Tahiti (Leg 310). He described efforts to develop alternative drilling platforms and technologies, including a deep vibrocorer, a deep-sea hammer core, an ROV drill, and the BGS 15-m seabed rockdrill. He expects to see major changes in seabed core/drilling devices, and potentially these developments will be less expensive ways of accomplishing certain types of science.

END OF THE DAY

Thursday, July 17, 2008

Agenda Item #14: Operator Reports continued

Greigar presented an overview of the engineering development activities conducted by the USIO over the past year. His presentation included the status of the SODV, DSS, RMM, APC temperature tool, CDAQ module, Sediment Temperature Tool, Metrology Lab, Simulated Borehole Test Facility, Instrumented Water Sampler, and the Riserless Mud Recovery System. For each topic, he presented a brief history of the various stages of project, the progress over the past year, and the projected activities for the future. These minutes present a brief summary of his presentation as well has the ensuing discussion. More details can be found in Appendix M.

Grigar transferred the floor to Meissner and Higgins for the presentation of the SODV status. The ship is in a shipyard in Singapore and scheduled to leave port on Oct. 11th. The yard is working 24 hours a day and now at full strength. Progress is good and requires day-to-day decisions. Transocean has taken charge of shipyard management to provide better integration of information and more informed decision-making. The next big step is installation of the electrical system (the ship is presently on dock power) after which the ship will operate on its own power. This will be followed by installation of the control cables, and then the heave compensation system. ABS has conducted several ship inspections and things are looking good.

A team of 10 invited scientists recently tested the services in the science and logging core labs. The purpose was to review the protocols for core handling, exercise the software and collect feedback for immediate changes. Higgins reported the system provides a dramatic improvement over the previous software. Data will be available from the core measurements as well as all the rig instrumentation. All data will be available in near real time to the scientists. The data will be archived in a format that is easily accessible with most common software packages. The system includes very sophisticated graphics software to help the scientists in the data interpretation. The next step in the software development will be to integrate the various sources of information together. The final product will provide the shipboard scientists with a powerful tool for interpretation of the data while still progressing the borehole. There will need to be a significant amount of training of the shipboard party in order to make full use of the capabilities. The current plan is to do some of this training during port calls before each leg.

The logging data are handled differently from the rest of the rig and core data. This is because there is a QA/QC process and interpretation step performed before posting the results. The expectation is to have no more than a 1-day lag in availability after which the results will be posted and can be used for integration by the scientific party.

The software does not contain any standard template plotting capability at the moment. Several panel members saw this as being a useful addition. The general feeling was that template graphics (Excel, Matlab, Sigmaplot, etc.) will be generated over time, posted in a public directory, and will be routinely available.

Grigar returned to the floor and addressed the topic of heave compensation. The SODV will have passive heave compensation. The active system will be removed and stored for the time

being. This decision was reached after discussions with several experts. There was concern that the presence of the active system piggybacked on the passive system would have an adverse effect on the overall performance of the passive system. Considerable work has been expended on the passive system to re-bore and plate the cylinders, replace the pistons, and optimize the plumbing configuration. All the parts are in the yard and installation is scheduled to begin immediately. Grigar expressed optimism that the new system will provide adequate bit control. The panel noted the lack of performance criteria is still a concern and it was pointed out that refurbishment had been done once in the past with limited improvement in performance.

Grigar reported on the status of the drill string geometry. The decision was made not to acquire large diameter pipe. However, the pipe rackers have been selected and will be able to handle 2800 m of 6 5/8-inch pipe but they have not yet been purchased. This will happen soon. The elevations will also be able to handle the large diameter pipe and selection will be made soon. The system will have the capacity for 2000 m of 5 ½-inch and 4300 m of 5-inch pipe. In the event that large diameter pipe is required on a specific drilling leg, we will have two options: purchase or rent. The option to purchase will require at least a one-year lead-time. The renting option will be constrained by the availability of pipe, which is highly uncertain.

Grigar next reported on the new rig instrumentation. It is an improved version of the previous system and provided by the same company. The package is the RIGWATCH8. Final installation will be in September. The system records data on all channels at a standard default rate of 1 Hz. It can take readings as fast as 10 Hz on selected channels (not clear on how many channels). It was not clear who makes the decision to select the faster rate. Depth tracking was a problem with the previous system and the details are still being worked out. This is a difficult measurement due to all the relative movements and the motion of the drill string and appears to remain problematic. Several options are still being considered. The software has a new capability to compute the drilling efficiency, which could be used as feedback in optimizing the drilling parameters. This does not require the addition of any instrumentation. Efficiency calculations are common for stationary drilling platforms but are a relatively rare feature for ship-based operations.

Grigar presented the status of the DSS/RMM project. As a reminder the DSS measures WOB, TOB, temperature, and pressure. It is a memory tool, records data every second, and has about 4 days capacity. The data can be retrieved using either the RMM or upon recovery of the drill bit. The RMM is used in combination with the coring tools and acquires transmitted data from the DSS during the coring operation. The system has been tested several times on land at the Sugarland, TX facility. Measurements were collected successfully except on one deployment. On this problem deployment, a broken wire outside the tool on the interface connector prevented activation of data collection prior to deployment of the DSS. The entire experiment was conducted with the tool inactive. The wire problem has been solved. Based on analysis of the new data from the land testing, it was discovered that the measurements of WOB and TOB are somewhat pressure sensitive. A pressure correction is now being worked out. Final land testing is scheduled for September. Provided the testing and calibration are successful, the plan is for acceptance of the tool in November. It appears that the subcontractor responsibility will end once the tool is accepted as complete. However, Grigar did point out that they have been

very responsive to problem solving thus far. There are no specific acceptance criteria established to date. Once accepted, the tool will proceed to field-testing.

Grigar next reported that an APC temperature tool has been deployed very successfully on Leg 311 as a prototype device. The final design is called the APCT3 and fits into the cutting shoe of the APC sampler. The design is interchangeable with the standard cutting shoe. Several APCT3 tools have been constructed and calibrated by Scripps Institution of Oceanography. Three have been delivered to CDEX and have been successfully deployed on Leg 315.

Grigar reported that the new Common Data Acquisition (CDAQ) module is a small board based device built around the Persistor microcomputer/data acquisition unit. The design (hardware and software) was done in-house. The final product will fit easily into any of the existing down-hole tools. The system has been deployed three times. A small acceptance team was assembled to evaluate the system and their report is due at the end of the month. Pending a favorable review, the project will be complete.

Grigar reported that the Sediment Temperature Tool (SET) is complete and replaces the DVTP. The tool makes use of the CDAQ.

The Metrology Laboratory is a new facility that provides in-house calibration capability for temperature and pressure. The temperature is controlled with a circulation bath and the pressure is controlled with a dead weight calibrator. The standards for both systems are traceable to NIST. The pressure system has a 10,000-psi (68.95 MPa) capacity. This is recognized as a big step forward for the program as it provides a means to unify measurements from several tools by calibrating against a common standard. Calibration must be done at the facility and there is no intention to take calibration equipment out to sea. An acceptance team is being assembled to review the laboratory, documentation, and protocols. There are several benefits to having this facility in addition to the QA/QC function for in-house tools. The facility could be used to calibrate and certify 3rd party tools and might even be incorporated into the formal acceptance criteria for a new tool. While it is certainly implied that a 3rd party tool will be properly calibrated, it might be advantageous to have a traceable calibration requirement. There is interest in providing an outside calibration service. The logistics and constraints on this are being explored.

Grigar reported on the Simulated Borehole Test Facility. This is a large sediment chamber that can be used to evaluate penetration type devices. The sediment is a clay and sand mix. Consolidation pressure can be applied up to 400 psi (2.76 MPa) and the chamber pressure limit is 3,000 psi (20.7 MPa). The chamber has a number of temperature and pressure sensors. The chamber is located in a dedicated area of the lab. The project is scheduled to be complete by the end of September 2008, and an acceptance committee will be organized to review the project. There were no specific test plans presented for the near future

Grigar reported that the Interstitial Water Sampler (IWS) was deployed on Leg 208. It makes use of a syringe pump with a 40-mL capacity and collects a sample over a 20-minute period. The tool monitors the load on the pump to reduce the extraction rate in tight formations. The tool needs to be modified and a prototype is expected in FY09.

Grigar reported on the status of the riserless mud recovery (RMR) System. This is a desktop study to investigate the possibility of using this system with the SODV. The study is being conducted in collaboration with the DeepStar project. The investigation is focused on integration of the RMR components on the SODV. The system requires a considerable amount of space but it makes use of a modular design so the elements can be strategically located around the ship. The space requirements are further increased since the RMR requires the support of an ROV. In the final configuration, the SODV does not have space specifically designed to accommodate an ROV. As an alternative, the plan is to use some of the storage container space if an ROV is required on a special expedition. The combined requirement for the ROV and the RMR may require more space than is available. Staff members are not spending much time on the RMR study and it is not putting undue pressure on other projects.

Agenda Item #16: Microbiology sampling and impact on mud programs (Colwell)

Rick Colwell provided the report and background leading to the STP consensus item requesting that the EDP investigate the impact of drilling fluid on core contamination as it relates to microbiological investigations (Appendix N). Core measurements of microbiological populations have established that the drilling fluid in contact with the samples causes a large increase in populations and introduces new microbial species. This is an extremely serious problem making it very difficult to assess natural populations. Recent studies on the Chikyu have shown that drilling fluid provides a good substrate for microbial growth. The level of contamination (population numbers) increases with circulation (time) of the fluid. While this is an obvious concern for the riser operation, it is also an important concern for riserless operations. Experience with a gel coat system had limited success. It provided substantial isolation of the drill fluid from the core but created considerable difficulty in handling the gel-coated sample in the core lab.

Other solutions may be equally effective to gel coating. While it is unrealistic to expect to obtain a perfect core, a concerted effort is necessary to evaluate various options and proceed to develop the best practical solution. Colwell presented several options that were discussed by the panel in some detail. The following provides a summary of that discussion. Drilling fluid is a problem because it contains organic compounds that provide food for the bacteria. One obvious possibility is to alter the fluid composition in some way to make it unattractive to microbes. Increasing the pH (>12) will reduce growth but may have serious environmental repercussions and may enhance equipment corrosion rates. Switching to non-organic additives should reduce growth but needs to be explored with drill mud specialists. Sterilizing the mud with head treatment, microwaves, ozone, or other chemicals are all possible solutions. Heat is readily available on the ship but the requirements are unknown at this time. Ozone or other wastewater treatment alternatives may provide effective alternatives. Mechanical isolation or encasement of the core at the sampling location is another possibility. While the gel experience was not great, other sealants might be possible. The packaging industry makes use of many ingenious wrapping technologies. The Swedish piston sampler uses a rolled plastic liner in the cutting shoe that encases the sample in plastic as it enters the sampler. There is also the option of sub-sampling the core (or stripping the outside perimeter) once on deck. The sidewall sampler has been used to collect a small target sample. This is easier to isolate the small sample but has serious size limitations. Reducing the size of the sample by removing the

outside layer, taking smaller diameter cores, splitting and sampling, etc are all possibilities. They would apply to varying degrees of acceptance depending on the material type and other measurements to be made on the core. There is also a possibility of using tracers in the drilling mud to identify the degree to which the mud invades the pore space. This would at least prevent testing highly influenced areas. Drilling with seawater may reduce the contamination but is not a universal solution.

Attention turned to definition of the requirements. Colwell reported that requirements will depend on the scientific objectives. In some cases, measurements might be required on nearly a continuous basis while other expeditions might be interested in a few target locations. Also the amount of material varies (more is always better) and the cleanliness requirements will vary. Most of the emphasis would be on nonliving organisms but the perfect situation would allow examination of RNA and be able to study live specimens.

Lithology is also an important variable and different solutions will be needed for different materials. Soft sediments will be sampled with piston corers and these naturally encase the core making it easier to get high quality. Coring technologies in hard non-fractured rock are less likely to suffer from mud infiltration deep into the core. These may be more likely candidates for subsampling or reprocessing in the core lab. The real difficult problems are the fractured materials which are the hardest to sample in the first place. The fractures will most likely contain the organisms of interest and the mud will invade the cracks first. Sealing materials after contact with the mud (thinking about a mud layer under the seal) may make the problem more severe. The discussion ended with more questions than answers but set the stage for a path forward. One positive suggestion was to implement a program of systematic core and mud evaluation with the goal of building a database to help in future decision making.

COFFEE BREAK

Agenda Item #18: FY10 Engineering Devlopment Proposals (EDP Watchdogs)

The order for Agenda Items #17 and #18 were switched. Conflicted members Ito and Kyo left the room for the following discussion.

Ask presented an overview of the Gel Core Sampler proposal using the slides provided by the proponents. Her watchdog group met, discussed the proposal, and compiled a list of questions and concerns. The panel then discussed the proposal. The following provides a summary of the discussion. The equipment is covered by several patents both in the US and Japan. It is not clear how this impacts ILP. The technology is similar to other devices and does not clearly address the differences and advantages. The system is designed to work with the RCB system, which is generally used in hardrock, which is not perceived as the most difficult material to sample and may not be of greatest interest. The proposal does not establish any performance goals. It is unclear what the acceptable level of contamination or the target levels need to be for a successful device. Along the same line of discussion, the proposal did not address the concern that gel coating might not even be the best solution. This was highlighted during the previous discussion with Colwell. It was noted that the roadmap specifically identifies gel coating as an option (this should be updated). There was concern that the core is exposed to the drilling fluid as it enters the barrel and before the gel coating is applied. This means that

the core gets coated with mud and then the gel coat seals this contamination on the surface of the core.

The discussion then turned to process evaluation. Given the STP concern for contamination prevention, should this proposal be reviewed by them before making any decisions? Janecek noted this would be unlikely given the time constraints on decisions and budgets. Would it be possible to split the proposal and deal with each piece separately? Myers noted the EDP charge was to evaluate and provide comments, recommendations, etc., and that IODP-MI would take this into consideration when making decisions. There is a concern that proponents are not providing the necessary justification for the technology they are proposing. Rather than add more requirements, it is acceptable for EDP to raise these questions where appropriate and IODP-MI will seek responses from the proponents and proceed accordingly. It was suggested that a checklist be added to the proposal preparation webpage to help address this concern and save time. Another possibility is to request a letter of intent one month prior to the proposal submission date to help the Proponents collect the necessary information.

11:23 The panel closed discussion on the proposal and the conflicted parties returned to the room. The conflicted parties (Greigar, Higgins, and Meissner) left the room for discussion of the MMM proposal.

Fukuhara presented a summary of the MMM proposal using the presentation supplied by the proponents. He then presented a list of positives, major concerns, minor concerns, and questions for panel discussion. There was relatively little discussion. The tool will operate along with the Schlumberger logging tools. There is some concern that the risk of success is not as high as portrayed in the proposal because the commercial gyroscope may be more problematic that anticipated.

Agenda Item #17: Technology Roadmap Session 2 (Ussler)

a. Ultra deep drilling related to the Roadmap

Ussler used proposal 698Full-2 as a template to provide a typical scenario for the requirements for a deep drilling proposal (Appendix O). This project will require drilling to a depth of 8 km with essentially continuous core recovery. Ussler highlighted some of the major deviations, in addition to depth, from the "usual" ODP/IODP experience. These include the stability of the borehole, the large number of casing reductions (Proponents anticipate 7), the very long time period (Proponents anticipate 1 yr) and the need for deep sidewall coring. Ussler presented a short table summarizing other deep drilling experiences. The message was very clear. Not only is deep drilling beyond the experience base of IODP, there have been few deep scientific drilling experiences around the world. All have experienced difficulties during the drilling operations and all have taken much longer times than anticipated.

The panel then discussed what information, processes, technology or studies are required to prepare IODP for a future deep drilling experience. Several suggestions were made to extend the summary table to include casing strings, lithology, etc. Several members felt that existing technology (outside IODP) is capable of drilling to 8 km. The in-situ stress state will determine the level of difficulty and it will be essential to acquire the necessary information

and formulate a comprehensive casing plan. This may even require a pilot borehole to collect the necessary information. The next step for the panel is to identify the key technical issues and develop a list of questions to be addressed through focused studies. This topic will be revisited at the next EDP meeting.

LUNCH BREAK

Agenda Item #17: Technology Roadmap Session 2 continued

Discussion of proposal 698 continued.

BREAK

Agenda Item #19: Technology Roadmap Session 3 (Ussler)

Discussion was combined with Agenda Item #20.

Agenda Item #20: Technology Roadmap Prioritization (Ussler)

Ussler discussed the results from the technology roadmap matrix exercise. It was decided not to implement a drilling matrix prioritization scheme at this meeting, given important gaps in the matrix analysis and uncertainty in how to numerically weight the relative importance of technical needs. It was noted that the matrix analysis did not capture the technical needs for single, high risk drilling proposals. Miyairi suggested that a numerical analysis may need to be supplemented with expertise-weighted ranking of technical needs.

Agenda Item #21: Preliminary Agenda for EDP Meeting #8 (Miyairi)

A consensus was obtained on the next EDP meeting agenda. The EDP members will stay at the Magnolia Hotel, where SSEP #4 stayed.

Agenda Item #22: Next Meeting Location and Time (Miyairi)

A consensus was obtained to hold EDP #9 in Luleå, Sweden, July 15-17, 2009.

EXECUTIVE SESSION – 4:30 pm to 6:30 pm

Agenda Item #23: FY10 Proposal Review (Miyairi/EDP)
No minutes.

Friday, July 18, 2008

Agenda Item #19: Technology Roadmap Session 3 continued (Ussler)

Core quality & quantity assessment progress report (Oskvig)
Oskvig presented a sample quantity analysis based on the existing 37,000 records from ODP/IODP projects, broken out in terms of tool types, water depth, etc., in line with the suggestion come from the last EDP meeting (Appendix P). Lithologic data will be downloaded soon and included in the analysis. Germaine asked about the reason behind recovery factors as high as 120%. Oskvig responded that there existed unrealistic records with the recovery factor (i.e. 300%) and the records with above 120% of recovery were less than 1% of total records. 120% is the cut-off for the analysis. EDP members suggested including data such as bit type, drilling parameters, heave compensation (on/off, active versus passive), and environmental condition as much as possible in future analysis. It was highlighted that CDEX would collect extensive and comprehensive data on Legs 315 and 316 and provide these data to evaluate core quality, such as disturbance index with tomography measurements.

Scoping study for ultra-deep drilling (Ussler)

It was proposed that IODP-MI conduct a scoping study to identify technical needs for ultra-deep drilling. Thorogood, Holloway, Wohlgemuth and Tamura will review the scoping study, which will be discussed at the next EDP meeting in January 2009.

Drilling Proposal 698-Full2 (Ussler)

EDP recognized that it is a challenge to achieve the goal of the proposal. Further discussion concerned how to approach such a critical proposal where a scoping study, technical readiness, and a new technical domain for IODP-MI may be required in order to develop a comprehensive drilling, casing, coring and logging plan.

Engineering testing time (Ussler)

Ussler reported on a request from USIO-LDEO regarding a requirement for engineering testing time at sea for the RAB-LWD tool. Holloway highlighted that Fugro plans to make a geotechnical survey, which might provide opportunities for engineering testing. It was agreed that the EDP would respond to USIO-LDEO after IODP-MI develops a policy for allocating engineering testing at sea for all of the drilling platforms. The EDP requested that IODP-MI provide a proposed policy at the next EDP meeting in January 2009.

Agenda Item #26: Review Consensus Statements and Actions Items (Ussler)

EDP drafted and reviewed the consensus statements and action items for EDP #7 meeting in terms of background, routing, priority and phrasing. These will be finalized at the afternoon session.

LUNCH BREAK

EXECUTIVE SESSION

No minutes.

Meeting adjourned at 1600.

Appendices:

A. Meeting Agenda (Oskvig)
B. Introduction Slides (Miyairi)
C. Review of EDP mandate, roles, and responsibilities (Ussler)
D. EDP 8 proposal (Ying)
E. EDP 9 proposal (Ask)
F. Status of EDP 6 Action Items (Oskvig)
G. SPC Report (Filippelli)
H. SSEP Report (Asanuma)
I. Review process of Engineering Development Proposals (Myers)
J. STP Report (Colwell)
K. CDEX Operator Report (Kyo)
L. ESO Operator Report (Smith)
M. USIO Operator Report (Grigar)
N. Impact of microbiological sampling on mud programs (Colwell)
O. Ultra Deep Water Technologies (Ussler)
P. Coring Study Update (Oskvig)
Q. Technology Roadmap Matrix Analysis (Ussler)
R. Parting Comments (Ussler)
S. Review of Technology Roadmap

EDP Meeting #7 Agenda

July 16-18, 2008

Salt Lake City, UT, USA

DAY 1: Wednesday, July 16

1. Welcome, meeting logistics, safety, introduction, Robert's Rules (Miyairi/Oskvig)	08:30 – 08:50
2. Approval of meeting agenda (Miyairi)	08:50 – 09:00
3. Quorum discussion and US vacancy discussion (Miyairi)	09:00 – 09:05
4. Approve Minutes from EDP Meeting #6 (Miyairi)	09:05 – 09:15
5. Review EDP mandate and scope of EDP, what is expected and not expected; historical review (Ussler)	09:15 – 09:35
6. Preliminary discussion of next 2 meeting locations and times	09:35 – 09:55
a. EDP #8 - Shanghai, China (Ying)	
b. EDP #9 – Sweden (Ask)	
7. Review status of previous meeting action items and recommendations, discussion of engineering time on IODP platforms, ED proposal letter of intent (IODP-MI)	09:55 – 10:15

MORNING BREAK

8. SPC Report (Filippelli)	10:30 – 11:00
9. SSEP Report (Asanuma)	11:00 – 11:15
10. Technical Review Process for Drilling and Engineering Development Proposals (IODP-MI)	11:15 – 11:45
11. STP Report (Colwell)	11:45 – 12:00
a. Group discussion on sending EDP liaison to STP	

LUNCH

12. Review of Technology Roadmap - Session 1 (Ussler)	01:00 – 02:00
a. Status of draft Roadmap v. 3.0 (all)	
b. Status of mapping of Roadmap to Drilling Proposals, visa versa (all)	
13. FY 10 Engineering Development Proposals – Session 1 (EDP Watchdogs)	02:00 – 03:00

AFTERNOON BREAK

14. Operator Reports	03:15 – 04:30
a. CDEX (45 minutes)	
i. Current FY ED Projects	
ii. Other related projects	
b. ESO (15 minutes)	
i. Related ED Projects	
c. USIO (15 minutes)	
i. Related ED Projects	

15. Drilling industry presentations 04:30 – 06:00
    a. Terratek (Homer Robertson, 30 minutes)
    b. Boart Longyear (Martin Rivet, 30 minutes)
    c. DOSECC (Dennis Neilson, 30 minutes)

Day 2: Thursday, July 17

16. Microbiological sampling and impact on mud programs (Colwell) 08:30 – 09:00
17. Technology Roadmap Session 2 (Ussler) 09:00 – 10:00
    a. Ultra-deep drilling technologies
    b. Technical review of Proposal 698-Full2
    c. Develop drilling and coring plan to drill 698-Full2

MORNING BREAK

18. FY 10 Engineering Development Proposals – Session 2 (EDP Watchdogs) 10:15 – 12:15

LUNCH

19. Technology Roadmap Session 3 (Ussler) 01:15 – 02:45
    a. Coring Study update (Oskvig)
    b. LDEO request for platform time for engineering development
    c. Complete ultra-deep drilling discussion from item 17 above

AFTERNOON BREAK

20. Technology Roadmap Prioritization – Matrix Analysis (Ussler) 03:00 – 04:00
21. Preliminary Agenda for EDP Meeting #8 (Miyairi) 04:00 – 04:15
22. Next Meeting Location and Time (Miyairi / Ying) 04:15 – 04:30

EXECUTIVE SESSION (4:30 – 6:00) 04:30 – 06:00
23. FY10 Proposal Review – Grouping discussion (Miyairi/EDP)

DAY 3: Friday, July 18

24. Scoping Studies
24. Compile Technology Roadmap (Ussler/EDP) 08:30 – 09:30
25. Review critical components of Technology Roadmap. Provide prioritized list of critical long-term developments (Ussler) 09:30 – 10:30

MORNING BREAK

26. Review Consensus Items and Recommendations (Ussler) 10:45 – 12:00
    a. Background
    b. Routing
    c. Phrasing

LUNCH

EXECUTIVE SESSION 01:00 – 04:00

27. Complete FY10 Proposal Review (Miyairi/EDP) (60 minutes)
28. Final Comments on Mapping Drilling Proposals to Technology Roadmap (Miyairi) (30 minutes)
29. Finalize Consensus Items and Recommendations (Miyairi) (60 minutes)
30. Parting Comments (Miyairi) (15 minutes)

31. Field-trip to American Diamond Tools (panel, liaison, and guests) 04:00 – 06:00

EDP Meeting #7

July 16 – 18, 2008

Salt Lake City, USA

Robert's Rules of Order

- Some basic principles and procedures apply to all decision making processes; these principles and procedures are referred to formally as 'parliamentary procedure'. Parliamentary procedures are the rules that help us maintain order and fairness in all decision-making processes. Robert's Rules of Order is one man's presentation and discussion of parliamentary procedure that has become the leading authority in most organizations today. The basic principles behind Robert's Rules of Order are:

Robert's Rules of Order

- someone has to facilitate and direct the discussion and keep order.
- all members of the group have the right to bring up ideas, discuss them, and come to a conclusion.
- members should come to an agreement about what to do.
- members should understand that the majority rules, but the rights of the minority are always protected by assuring those members the right to speak and vote.

Robert's Rules of Order

- Each meeting follows an order of business (agenda)
- Only one main motion can be pending at a time
- Only one member can be assigned the floor at a time
- Members take turns speaking
- No member speaks twice about a motion until all members have had the opportunity to speak

Robert's Rules of Order

- Promote courtesy, justice, impartiality, and equality.
- This ensures that everyone is heard, that members treat each other with courtesy, that everyone has the same rights, and that no individual or special group is singled out for special favors.

Robert's Rules of Order

- Members take their seats promptly when the chair calls the meeting to order, and conversation stops
- Members raise their hands to be recognized by the chair and don't speak out of turn
- In debate, members do not 'cross talk', or talk directly to each other, when another member is speaking
- Members keep their discussion to the issues, not to personalities or other members' motives
- Members speak clearly and loudly so all can hear
- Members listen when others are speaking

Schedule for taking the meeting minutes

Day 1 morning - Ussler

Day 1 afternoon - Ask

Day 2 morning - Germaine

Day 2 afternoon - Asanuma

Day 2 executive session - Ussler

Day 3 morning - Tamura

Day 3 afternoon executive session - Ussler

EDP Meeting #7 Agenda

July 16-18, 2008

Salt Lake City, UT, USA

DAY 1: Wednesday, July 16

1. Welcome, meeting logistics, safety, introduction, Robert's Rules (Miyairi/Oskvig)
2. Approval of meeting agenda (Miyairi)
3. Quorum discussion and US vacancy discussion (Miyairi)
4. Approve Minutes from EDP Meeting #6 (Miyairi)
5. Review EDP mandate and scope of EDP, what is expected and not expected; historical review (Ussler)
6. Preliminary discussion of next 2 meeting locations and times
   a. EDP #8 - Shanghai, China (Ying)
   b. EDP #9 – Sweden (Ask)
7. Review status of previous meeting action items and recommendations, discussion of engineering time on IODP platforms, ED proposal letter of intent (IODP-MI)

MORNING BREAK

8. SPC Report (Filippelli)
9. SSEP Report (Asanuma)
10. Technical Review Process for Drilling and Engineering Development Proposals (IODP-MI)
11. STP Report (Colwell)
    a. Group discussion on sending EDP liaison to STP

LUNCH

12. Review of Technology Roadmap - Session 1 (Ussler)
    a. Status of draft Roadmap v. 3.0 (all)
    b. Status of mapping of Roadmap to Drilling Proposals, visa versa (all)
13. FY 10 Engineering Development Proposals – Session 1 (EDP Watchdogs)

AFTERNOON BREAK

14. Operator Reports
    a. CDEX (45 minutes)
       i. Current FY ED Projects
       ii. Other related projects
    b. ESO (15 minutes)
       i. Related ED Projects
    c. USIO (15 minutes)
       i. Related ED Projects
15. Drilling industry presentations
    a. Terratek (Homer Robertson, 30 minutes)
    c. DOSECC (Dennis Nielson, 30 minutes)
    b. Boart Longyear (Martin Kivet, 30 minutes)

Day 2: Thursday, July 17

16. Microbiological sampling and impact on mud programs (Colwell)
17. Technology Roadmap Session 2 (Ussler)
    a. Ultra-deep drilling technologies
    b. Technical review of Proposal 698-Full2
    c. Develop drilling and coring plan to drill 698-Full2

MORNING BREAK

18. FY 10 Engineering Development Proposals – Session 2 (EDP Watchdogs)

LUNCH

19. Technology Roadmap Session 3 (Ussler)
    a. Coring Study update (Oskvig)
    b. LDEO request for platform time for engineering development
    c. Complete ultra-deep drilling discussion from item 17 above

AFTERNOON BREAK

20. Technology Roadmap Prioritization – Matrix Analysis (Ussler)
21. Preliminary Agenda for EDP Meeting #8 (Miyairi)
22. Next Meeting Location and Time (Miyairi / Ying)

EXECUTIVE SESSION (4:30 – 6:30)

23. FY10 Proposal Review – Grouping discussion (Miyairi/EDP)

DAY 3: Friday, July 18

24. Compile Technology Roadmap (Ussler/EDP)
25. Review critical components of Technology Roadmap. Provide prioritized list of critical long-term developments (Ussler)

MORNING BREAK

26. Review Consensus Items and Recommendations (Ussler)
    a. Background
    b. Routing
    c. Phrasing

LUNCH

EXECUTIVE SESSION

27. Complete FY10 Proposal Review (Miyairi/EDP) (60 minutes)
28. Final Comments on Mapping Drilling Proposals to Technology Roadmap (Miyairi) (30 minutes)
29. Finalize Consensus Items and Recommendations (Miyairi) (60 minutes)
30. Parting Comments (Miyairi) (15 minutes)

31. Field-trip to American Diamond Tools (panel, liaison, and guests)

EDP #7 Meeting Goal

The primary goal of EDP Meeting #7 is to :

1)finalize the EDP Technology Roadmap Ver.3.0 with updating prioritized list;

2) Review ED Proposals submitted for FY2010 program fund.

The mapping between drilling proposal and ED items will be helpful for prioritization.

The Technology Roadmap Ver.3.0 will be published after this meeting or after their review at the SPC August Meeting.

- Comment on the STP consensus 0802-06: Detection and control of contamination issues during riser drilling. This consensus was endorsed by SPC consensus 0803-11.
- Initiate discussion about the technological challenges associated with a future Moho drilling project based on the EDP Recommendation 0901-16: Drilling to the Moho.
- Review ongoing IODP technical activities at the implementing organizations.
- Technical review of an active drilling proposal forwarded to us , if requested.

FY2010 Engineering Development Proposals

EDP-2010-01B : Deep Rock Stress Tester

EDP-2010-02B : Anti-contamination Coring System

EDP-2010-03B : Multisensor Magnetometer Sensor

EDP Propoosal Review Watchdog List - July 2008

Member Name	Email	Affiliation	Assigned proposal	
Thorogood	John.Thorogood@uk.bp.com	Europe	EDP-2010-01B	Deep Rock Stress Tester
Wohlgemuth	wohlgem@gfz-potsdam.de	Europe	EDP-2010-03B	Multisensor Magnetometer Sensor
Ask*	Maria.Ask@tu.se	Europe	EDP-2010-02B	Anti-contamination Coring System
Person	Roland.person@ifremer.fr	Europe	EDP-2010-01B	Deep Rock Stress Tester
Fukuhara*	fukuhara1@slb.com	Japan	EDP-2010-03B	Multisensor Magnetometer Sensor
Miyairi (C)	makoto.miyairi@japex.co.jp	Japan	EDP-2010-03B	Multisensor Magnetometer Sensor
Asanuma	asanuma@ri2.kankyo.tohoku.ac.jp	Japan	EDP-2010-02B	Anti-contamination Coring System
Tamura	mtamura@jodco.co.jp	Japan	EDP-2010-01B	Deep Rock Stress Tester
Watanabe	ywata@scc.u-tokai.ac.jp	Japan	EDP-2010-02B	Anti-contamination Coring System
Holloway	G.Leon.Holloway@conocophillips.com	US	EDP-2010-02B	Anti-contamination Coring System
Ussler (VC)	methane@mbari.org	US	EDP-2010-02B	Anti-contamination Coring System
Germaine *	jgermain@mit.edu	US	EDP-2010-01B	Deep Rock Stress Tester
Von Herzen	rvonh@whoi.edu	US	EDP-2010-03B	Multisensor Magnetometer Sensor

* denontes proposed lead watchdog

III. Watchdog responsibilities

A. Presentation of the proposal at EDP

1. The lead watchdog or their designee will present an unbiased summary of the proposal based on the presentation provided by the proponent. The presentation will be first sent to IODP-MI and then forwarded to the lead watchdog.

B. Creation of a final review document

1. The watchdogs will create a review document for their assigned proposal prior to the end of the summer EDP meeting. This report will be coordinated by the lead watchdog, or their designee and delivered to IODP-MI. The report should capture the comments made during the meeting and offer constructive suggestions to the proponents. Following the EDP meeting, this report will be sent to the proponent who will be provided an opportunity to submit a PRL (Proponent Response Letter) to IODP-MI. IODP-MI will send the final report and the PRL to all watchdogs and EDP chairs.

C. Communication with proponents

1. The lead watchdog will coordinate communication with the proponent regarding questions and clarifications to the proposal. This dialog shall be documented and be included as part of the final review document.

5. July 14-16th - Proposals presented by lead watchdogs for each proposal. Proposals are reviewed by EDP and star grouping numbers assigned. Reviews are completed by the end of the meeting and delivered to IODP-MI before departing.
6. July 23rd - Reviews are sent to proponents.
7. August 5th – Proponent response letters are received by IODP-MI and forwarded to all watchdogs and EDP chairs.

STP Consensus Statement 0802-06: Detection and Control of Contamination Issues During Riser Drilling. STP proposes that multiple contamination tests using PFT (Perfluorocarbon Tracer), and fortuitous or additional inorganic tracers (e.g., barium, lithium bromide, potassium bromide) be used during riser coring. Sampling of drilling fluids should be scheduled so that microbial communities in this medium can be compared to those in the samples. Also, STP asks EDP to investigate drilling fluids and/or techniques that are less likely to adversely impact interstitial water geochemistry, rock geochemistry, and microbiology. The best way to initiate this may be to have an appropriate presentation to EDP by Rick Colwell (STP member).

Vote: 16 For, 0 Against, 0 Abstentions
Priority: HIGH
STP suggests this be forwarded to IODP-MI, EDP, and SPC

Background to STP Consensus Statement 0802-06: *Drilling fluids contain high levels of active microbial cells and high concentrations of heavy mineral salts (e.g., barium) that are potential contaminants of microbiology and geochemistry, respectively. Growth of microbes in drilling fluids was observed during the training cruise of Chikyu (Inagaki et al. unpublished). The microbes utilize xanthan gum a common drilling fluid additive. Also, drilling fluids are highly alkaline and contain high concentrations of specific heavy mineral salts (such as $BaSO_4$). Thus, these drilling fluids may affect both the core microbiology and the inorganic geochemistry (e.g., pH, specific cation and anion concentrations, etc.) of interstitial water and could also trace element geochemistry of igneous rock core (eg lithium isotopic composition if lithium bromide is added).*

SPC Consensus 0803-11: The SPC accepts STP Consensus 0802-06 related to detection and control of contamination during riser drilling, particularly with respect to microbiology, and forwards it to IODP-MI for discussion and possible implementation.

The SPC also endorses the proposal for Rick Colwell to attend the next (July 2008) Engineering Development Panel (EDP) meeting as the Scientific Technology Panel (STP) liaison to initiate discussion of how the EDP can best provide advice on drilling fluids/techniques to minimize adverse impact on interstitial fluids.

EDP Recommendation 0801-16: Drilling to the Moho
The EDP recognizes SPC's interest in understanding the technological challenges associated with a future Moho drilling project (in reference to SPC Consensus 0708-30) and is initiating discussions about this problem.

SPC Consensus 0708-30: The SPC requests that the Engineering Development Panel (EDP) work with IODP-MI and the Implementing Organizations (IOs) to assess the technological needs required to achieve the deep penetrations required for a Mohole.

Review of the Mandate and Scope of the EDP

Bill Ussler

July 16, 2008

General Purpose

- The Engineering Development Panel (EDP) reports to the Science Planning Committee (SPC), and may communicate directly with IODP Management International (IODP-MI).
- The panel shall provide advice on matters related to the technological needs and engineering developments necessary to meet the scientific objectives of active IODP proposals and the IODP Initial Science Plan (ISP) to the SPC; through the SPC, to the Science Planning and Policy Oversight Committee (SPPOC) and IODP-MI; and, through IODP-MI, to the implementing organizations (IOs).

EDP Mandate

The EDP **shall identify long-term (two to five year lead time) technological needs** determined from active IODP proposals and the ISP, and **recommend priorities for engineering developments** to meet those needs. Appropriate topics shall include:

a. **Assessment of commercial, off-the-shelf technology** to determined if it can optimally meet identified IODP technological needs or whether research and development is required.

b. **Appropriate modes for pursuing engineering development projects** (i.e., through the IODP, universities, industry, or joint ventures).

c. **Performance requirements** for specific technological needs.

d. **Procedures to develop and evaluate program contracts** in support of technical design and innovation.

As requested by the Science Steering and Evaluation Panel (SSEP) or SPC, the EDP shall **review IODP drilling proposals to assess IODP technological readiness** to achieve the proposed objectives, and where appropriate, recommend priorities for technological approaches and necessary engineering developments.

EDP Biannual Meetings

- EDP 1 - Boston, MA (September 26-28, 2005)
- EDP 2 - Fuchinobe, Japan (January 25-27, 2006)
- EDP 3 - Windischeschenbach, Germany (June 27-29, 2006)
- EDP 4 - New York, NY (January 25-27, 2006)
- EDP 5 - Tokyo, Japan (July 9-11, 2007)
- EDP 6 - Nice, France (January 9-11, 2008)
- EDP 7 - Salt Lake City, UT (July 16-18, 2008)

Major Activities at EDP 1

- Reviewed 3 proposals forwarded by SSEP
- Established 3 working groups for developing the TR
- Recommended that IODP-MI adopt a 4-stage classification system for engineering development projects: Concept, Design, Fabrication, and Implementation
- After Concept Phase, IODP-MI has day-to-day contract management responsibility
- Report by USIO FY06 - PTM, Common BHA
- Report by CDEX FY06 - LTBMS
- Requested USIO report on DSS-RMM project

Major Activities at EDP 2

- Developed text of TR
- Reviewed USIO FY07 - LWC and telemetry proposals via post-meeting email
- Recommended a uniform Engineering Development proposal process
- Reviewed SODV project - especially vessel and drilling systems

Major Activities at EDP 3

- Approved version 1.0 TR
- Unranked ‘High Priority’ ED list obtained by voting

Major Activities at EDP 4

- Revised TR, generated draft version 2.0
- Discussed merits of expertise-weighted ranking scheme
- Firm statement about value of ROV capability on SODV
- Reviewed status of USIO PTM, DSS-RMM
- Reviewed status of CDEX long-term monitoring project

Major Activities at EDP 5

- Approved version 2.0 TR
- Unranked ‘High Priority’ ED identified using expertise-weighted ranking
- Discussed merits of Scoping Studies

Major Activities at EDP 6

- Revised TR, generated draft version 3.0
- Endorsed FY09 Engineering Development Plan

Technology Roadmap (TR)

- Linked to ISP - Major Themes and Initiatives (Table 1)
- Identified major Technology Challenges (Table 2)
- 3 Subgroupings in TR
  - Sampling/Logging/Coring
  - Drilling/Vessel Infrastructure
  - Borehole Infrastructure
- Ranking of ED priorities - identified top 10 in each TR subgrouping with no internal ranking
- Invoked variety of ranking schemes (voting; expertise weighted; mapping TR to drilling proposals)
- Consider ED needs for all 3 drilling platforms
- An evolving document (http://www.iodp.org/eng) that provides basis for soliciting engineering development proposals (April 15th each year)
- Version 3.0 to be approved and ranked at this meeting

Table 1. Major Themes and Initiatives for the IODP

1	**The Deep Biosphere and the Subseafloor Ocean**
1a	Initiative: The Deep Biosphere
1b	Initiative: Gas Hydrates
2	**Environmental Change, Processes and Effects**
2a	Internal Forcing of Environmental Change
2b	Initiative: Extreme Climates
2c	External Forcing of Environmental Change
2d	Environmental Change Induced by Internal and External Processes
2e	Initiative: Rapid Climate Change
3	**Solid Earth Cycles and Geodynamics**
3a	Formation of Rifted Continental Margins, Oceanic LIPs and Oceanic Lithosphere
3b	Initiative: Continental Breakup and Sedimentary Basin Formation
3c	Initiative: Large Igneous Provinces
3d	Initiative: 21st Century Mohole
3e	Recycling of Oceanic Lithosphere Into the Deeper Mantle and Formation of Continental Crust
3f	Initiative: Seismogenic Zone

Table 2. Technology Challenges for the IODP

1	Expand temperature tolerance
2	Drill/Instrument unstable lithologies and geo-pressures
3	Improve core recovery and quality
4	Improve depth control and cross-instrument depth correlations
5	Develop long-term borehole monitoring systems and perform in situ experiments
6	Improve well directional control
7	Make measurements under in-situ conditions
8	Sample and analyze under in situ conditions
9	Improve hard-rock drilling capabilities
10	Improve remote and post-deployment capabilities
11	Improve reliability
12	Extend depth capabilities
13	Improve operability under strong current and severe sea state

IODP-MI Role in Executing the TR and ED

- Established an Engineering Development website: http://www.iodp.org/eng
- TR posted on the IODP website
- Formulated the Engineering Development Proposal Process
- Greg Myers and Kelly Oskvig - points of contact
- April 15, 2007 - 1st ED proposal deadline for FY08 funding
- April 15, 2008 - 2nd ED proposal deadline for FY09 funding - proposals are to be reviewed at this meeting
- Prior to April 15, confidential feedback from IODP-MI was available to proponents

Three Types of ED Proposals

- Class A - unsolicited; total project costs <$100,000; +/- EDP review
- Class B - unsolicited; total project costs >$100,000; EDP review
- Class C - solicited by IODP-MI when the pool of unsolicited proposals do not meet the technical needs of the program; EDP review

- Confidentiality of proposals
  - Active drilling proposals (I.e., 698Full-2)
  - Engineering Development proposals reviewed by panel


The largest city in China.
IODP-China is there, they offered help to host this Meeting.
EDP 8# Meeting in Shanghai

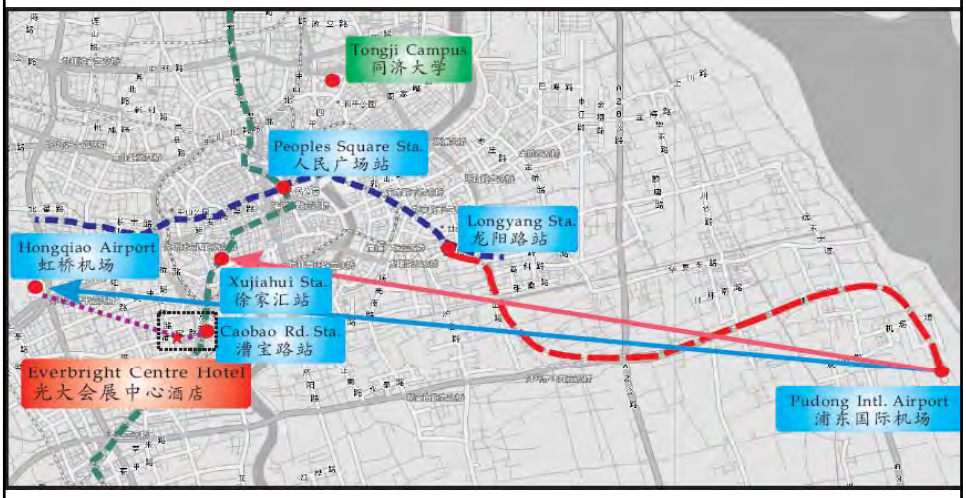

All international flights are arriving in Pudong airport (PVG)
There are 2 Terminals in the airport. When you arrive, should remember which terminal are you in.
新一
裕琳大酒店
新区一组
浦东国际机场第二餐厅
迎
宾
大
道
东
远
航
路
启
航
路
上海浦东国际机场货运站公司
上海浦东国际机场
交行空港支行
列香世界名牌折扣商场

Lodging Accommodation introduced by IODP China

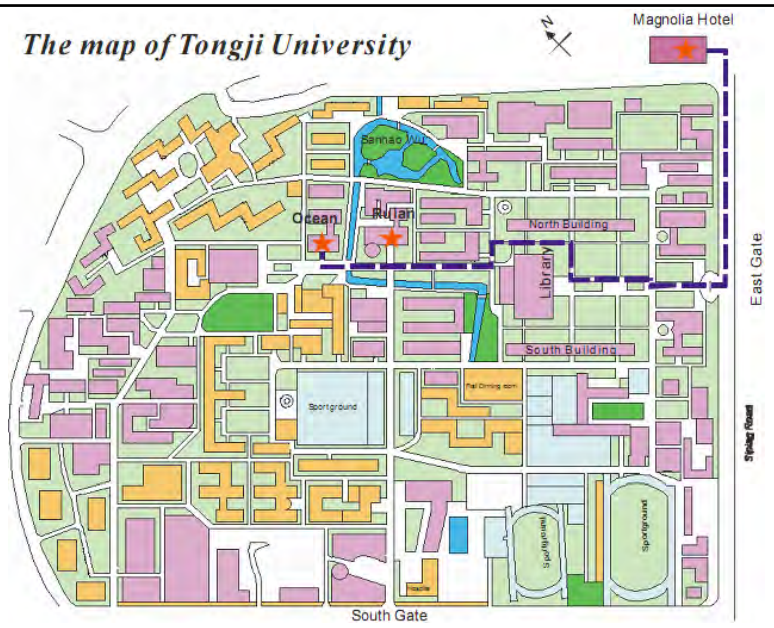
Mognolia Hotel
1251 Siping Road
Shanghai 200092, China
Tel: 86-21-6502 6888
Fax: 86-21-6502 9499

SSEP's 4# Meeting was there, in 2005

From Pudong international airport to the hotel:
It takes about 50 minutes by Taxi (70 km).



Taxi costs about 140 RMB. The driver recieves RMB only.
You need change money in the ariport on your arrival.



From hotel to the Meeting Room, it takes about 10 minutes' walk.

About the date: Jan 13 to 15, Or Jan 14 to 16?

Jan/2009:	13	14	15	16	17
	Tuse	Wed	Thus	Fri	Sat

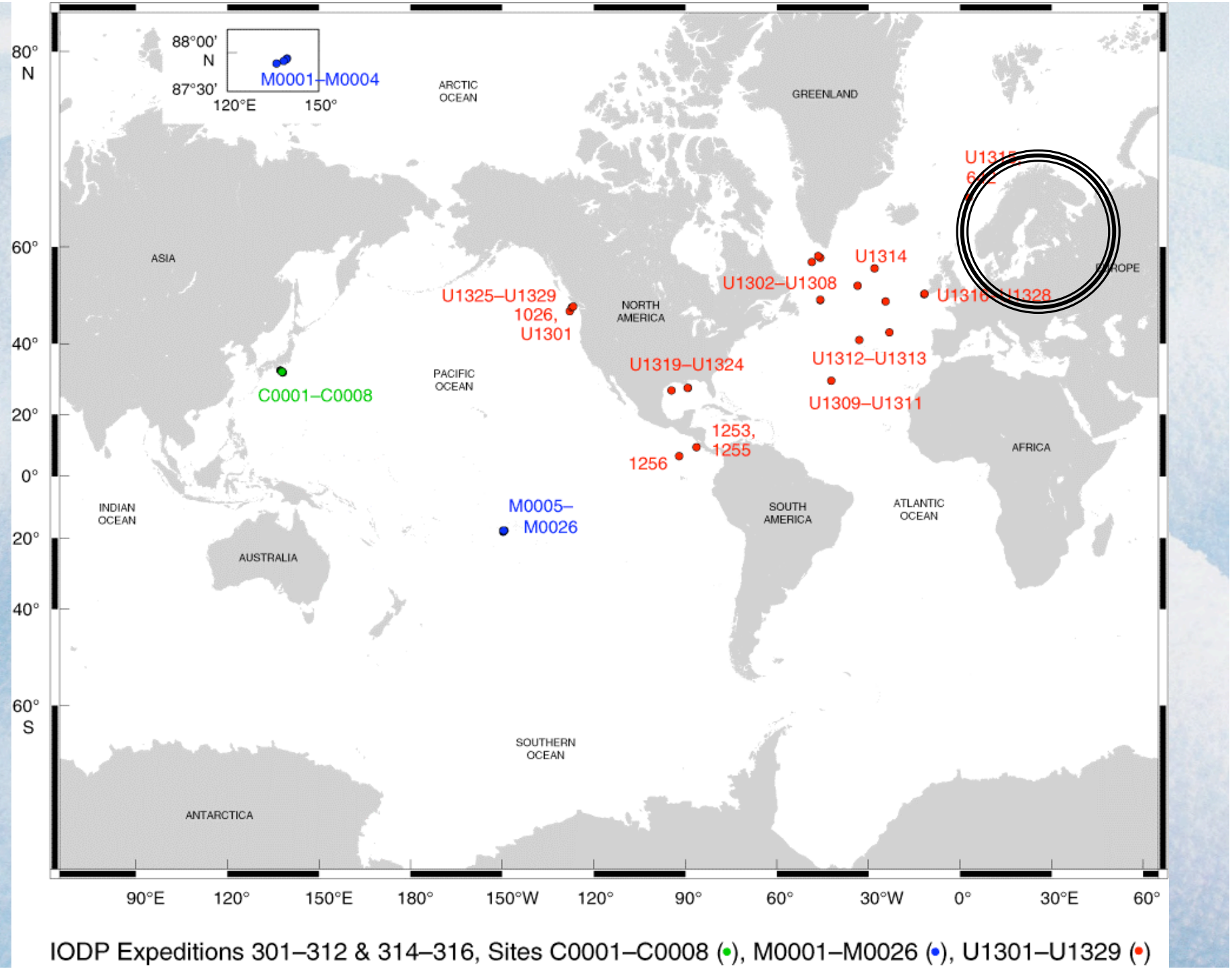
Optional field trip: After the Meeting, to Hangzhou, including half-day's seminar in Zhejiang University.

Zhejiang University offered help to cover inter-city transportation and some social events.

Sweden – potential meeting location for EDP #9 (July 2009).

Alternative 1: Stockholm
Alternative 2: Luleå

Host: Maria Ask, LTU
Support: Swedish Science Foundation

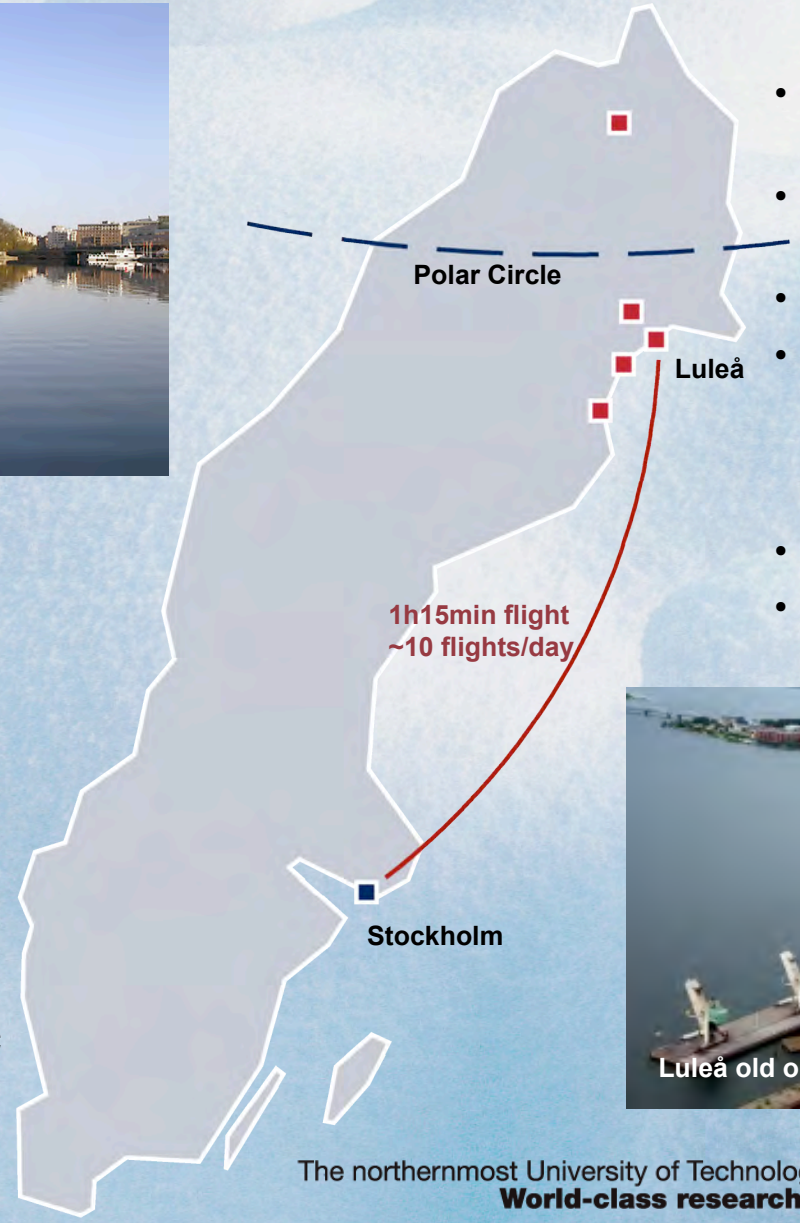


IODP Expeditions 301–312 & 314–316, Sites C0001–C0008 (•), M0001–M0026 (•), U1301–U1329 (•)

LULEÅ UNIVERSITY OF TECHNOLOGY

Stockholm

- Arlanda Nat./Int. Airport, 20/50 min to city;
- Summer likely sunny (~15-30°C/(59-86°F);
- Capital w/ wide selection of hotels, restaurants, museums, etc.;
- Beautiful city where lake Mälaren meets the Baltic Sea.



Luleå

- Kallax Nat./Int. Airport, 15 min to city;
- Summer likely sunny (~15-25°C/(15-77°F);
- Mid-night sun
- Small town w/ hotels, restaurants within walking distance (“Arctic” cuisine)
- Beautiful archipelago.
- Ice-breaker Oden

The northernmost University of Technology in Scandinavia
World-class research and education

Item No.	Title	Description	Responsible Party	Comments
0801-01	Approval of Agenda	The EDP approves the agenda for EDP Meeting #6.	EDP	**Closed**
0801-02	Approval of EDP Meeting #5 Minutes	The EDP approves the minutes from EDP Meeting #5 plus Appendix 14 (version 3.0 dated 1-4-07) - 'Summary of EDP Evaluation Process used at July 2007 EDP Meeting'.	EDP	**Closed**
0801-03	EDP SPC Representative	EDP designates Bill Ussler as the EDP representative at the next SPC meeting to be held in March 3-6, 2008 in Barcelona, Spain.	EDP	**Closed**
0801-04	EDP SSEPs Liaison	EDP designates Hiroshi Asanuma as the EDP representative at the next SSEP meeting to be held May 19-22, 2008 in Busan, Korea.	EDP	**Closed**
0801-05	EDP Chairperson	EDP nominates Makoto Miyairi for the position of Chairperson of the EDP.	EDP	**Closed**. SPC to approved in March meeting
0801-06	EDP Vice Chairperson	EDP nominates Bill Ussler for the position of Vice Chairperson of the EDP.	EDP	**Closed**. SPC to approved in March meeting.
0801-07	Modifications of Engineering Development Proposal review process	In addition to the formal evaluation statement of the engineering development proposals that are forward to IODP-MI. EDP will record concise closed session minutes that will be archived by IODP-MI for exclusive use by EDP in future proposal evaluation ses	IODP-MI	**Ongoing**. IODP-MI will record and archive minutes from EDP #7 and after.
0801-08	Large Diameter Pipe	The EDP notes that there are a number of drilling proposals within the SAS that have scientific objectives requiring water samples and specialized or innovative logging tools and experiments which would benefit from or be made possible by large diameter d	IOs	**Not started**. IOs to put togehter the cost benefits anaylsis for aquistition of large-diameter pipe vs. development of slim-hole tools.
0801-09	Engineering Development Proposal Evaluation	The EDP discussed the merits of conducting cross-comparison evaluations of proposals that address similar technologies. EDP recommends keeping the current evaluation approach that is focused on individual proposals and will not provide comparative evaluat	EDP	**Closed**
0801-12	EDP Meeting #7 Location	EDP recommends that EDP Meeting #7 be held in or near Salt Lake City, Utah on July 16-18, 2008. Secondary locations include Denver, CO, and Woods Hole, MA, in that order.	EDP	**Closed**
0801-13	EDP Meeting #8 Location	EDP recommends that EDP Meeting #8 be held in China. Possible locations include Hang Zhou and/or Shanghai. Proposed dates for EDP Meeting #8 are January 14-16, 2009.	EDP	**Closed**. Ying Ye to present details of options to EDP during meeting #7.
0801-14	VSP	EDP responds to STP Consensus Statement 0708-15 (Open Hole VSP) requesting advice. EDP believes that adopting and adapting industry standard procedures for check-shot surveys should result in high quality velocity profiles. Thus, there is no apparent nee	EDP	**Closed**. Forwarded to STP.
0801-10	Comment on Core Quality Study	The EDP recommends that the core quality and quantity study be separated into two components. The first component, which should be completed most promptly, should provide an assessment of sample quantity based on prior drilling leg experience. The second	IODP-MI	**In the process**. IODP-MI to present report on core quantity and progress on core quality study at EDP #7
0801-15	FY2009 Engineering Plan	EDP endorses the FY09 engineering plan as presented at the EDP Meeting #6 by IODP-MI. Ussler, Flemings, and Germaine were excused from the discussion due to conflict of interest. Miyairi-san served as interim chairperson.	EDP	**Closed**
0801-16	Drilling to the Moho	The EDP recognizes SPC's interest in understanding the technological challenges associated with a future Moho drilling project (in reference to SPC Consensus 0708-30) and is initiating discussions about this problem.	EDP	**Ongoing**. Include discussions during EDP Meeting #7.

SPC Report to EDP SLC 2008

SPC ToR

- Expedition scheduling
- Engineering Issues in SAS
- Tier 1 / Tier 2 Designations
- Proposal Ranking
- Asian Monsoon DPG
- Other Issues
- SPC action on EDP consensus

Jim Mori, SPC Chair
Gabriel Filippelli, SPC Vice-Chair

Summary of SPC and SASEC meeting

11th SPC meeting
March 3-6, 2008
Barcelona, Spain

6th SASEC meeting
June 23-24, 2008
Beijing, China

What is the role of Science Planning Committee?

- Chartered by the Science Advisory Structure Executive Committee (SASEC) as primary SAS committee for planning the IODP scientific drilling expedition schedule
- SPC focuses on annual process for review and ranking mature IODP proposals forwarded by SSEP, approximately one year in advance of preparation of IODP Annual Program Plans
- SPC also recommends annual engineering plan in support of science plan, after advice from EDP
- All other SAS panels report through SPC, so SPC also synthesizes SAS advice for SASEC + IODP-MI

1. Expedition Scheduling

SPC Consensus 0803-04: Should the start date for *JOIDES Resolution* operations slip beyond September 2008 the SPC recommends
- Canterbury Basin (Proposal 600-Full)
- Wilkes Land Margin (Proposal 482-Full3)
- Pacific Equatorial Age Transect II (Proposal 626-Full2)
  plus Juan de Fuca Flank Hydrogeology cementing (545-Full3)
- Bering Plio-Pleistocene (Proposal 477-Full4)

If operational factors preclude scheduling the Bering expedition at the end of the FY2009 schedule, the SPC recommends:
- Canterbury Basin (Proposal 600-Full)
- Wilkes Land Margin (Proposal 482-Full3)
- Pacific Equatorial Age Transect II (Proposal 626-Full2)
  plus Juan de Fuca Flank Hydrogeology cementing (Proposal 545-Full3)
- Pacific Equatorial Age Transect I (Proposal 626-Full2)

1. Expedition Scheduling

SPC Consensus 0803-29: Should a *Chikyu* riserless operation be feasible during March-May 2009, the **SPC designates 601-Full3 (Okinawa Trough Deep Biosphere) as the first priority expedition** for this time slot, and Proposal 605-Full2 (Asian Monsoon) as second priority.

SPC Consensus 0803-30: Due to changing operational constraints and changes in the FY2009 schedule, the SPC rescinds SPC Consensus 0708-33 on approval of the Atlantic Ocean as the top priority ocean basin for FY2010 *JOIDES Resolution* operations. Instead, the **SPC approves the Pacific Ocean as the top priority ocean basin** for FY2010 *JOIDES Resolution* operations.

2. Engineering Issues in SAS

SPC Consensus 0803-13: The SPC responds to the request from the Science Advisory Structure Executive Committee (SASEC Consensus 0801-10) to find ways to better provide technical/engineering information about proposals being considered within the Science Advisory Structure (SAS).

The SPC recognizes that the Science Steering and Evaluation Panel's (SSEP's) evaluation and SPC's ranking of proposals should consider their science quality and relevance to the Initial Science Plan (ISP).

However, having technical and logistical information available to SAS committees, panels and the proponents can improve the effectiveness and efficiency of the proposal process.

2. Engineering Issues in SAS

The SPC recommends the following process:

- IODP-MI will continue to maintain a database on the engineering and logistical issues associated with each proposal in the system.
- IODP-MI will ask the Engineering Development Panel (EDP) and/or the Scientific Technology Panel (STP) (as appropriate) to consider specific technical and logistical issues in the proposals. These panels can provide advice to IODP-MI, other SAS committees, and/or the proponents at any point in the SAS process.
- When the SSEP sends a proposal for external review, IODP-MI should review whether further EDP and/or STP input is desirable.

3. Tier 1 / Tier 2 Designation

- Currently 23 proposals sent by SPC to the Operations Task Force (OTF) await scheduling (4 to 5 non-riser expeditions will be scheduled per year)
- SPC needs to re-prioritize these proposals. Need to allow new proposals to be accommodated
- Need priorities for longer range planning of riser and other challenging programs
- Endorsed by SASEC Consensus

3. Tier 1 / Tier 2 Designation

SPC Motion 0803-19: The SPC will send a group of proposals to the Operations Task Force (OTF) with a distinction of Tier 1 or Tier 2. Tier 1 proposals represent a small subset of proposals with very high priority science to be scheduled in the current phase of IODP (i.e., prior to September 2013).

Tier 2 proposals are high quality proposals that are available for scheduling by the OTF to complete efficient ship tracks.
The four proposals currently residing at the OTF will be assessed in this new designation system and assigned a status of either Tier 1 or Tier 2.

9

3. Tier 1 / Tier 2 Designation

Other Considerations

- Tier 1 proposals remain as Tier 1 at OTF for at least 2 years

- Tier 2 proposals are re-examined at each SPC ranking meeting

- SPC members on OTF expanded from 3 to 5
  (Mori, Behrman, Filippelli, Ruppel, Ohkhouchi)

10

4. Proposal Ranking

The SPC discussed 34 proposals and 1 APL
26 proposals were ranked

Proposals not ranked
- 477-Full4 (Okhotsk/Bering Plio-Pleistocene) on a schedule for FY2008
- 551-Full (Hess Deep Plutonic Crust)
  ongoing analyses of site survey data
- 552-Full3 (Bengal Fan) and 618-Full3 (East Asia Margin)
  being considered by the Asian Monsoon DPG
- 555-Full3 (Cretan Margin) proponents' request
- 557-Full2 (Storrega Slide Gas Hydrates) waiting for an update
- 605-Full2 (Asian Monsoon) on a schedule for FY2009.
- 667-Full (NW Australian Shelf Eustasy) need to specify sites

4. Proposal Ranking

			Mean	Std	
1	724-Full	Gulf of Aden Faunal Evolution		2.94	2.82
2	601 Full3	Okinawa Trough Deep Biosphere		6.35	5.37
3	644-Full2	Mediterranean Outflow		8.06	5.26
4	662-Full3	South Pacific Gyre Microbiology		8.41	6.38
5	659-Full	Newfoundland Rifted Margin	9.47	5.64	
6	637-Full2	New England Shelf Hydrogeology		9.71	6.29
7	537B-Full4	Costa Rica Seismogenesis Project Phase B		10.18	5.66
8	633-Full2	Costa Rica Mud Mounds		10.71	7.25
9	549-Full6	Northern Arabian Sea Monsoon		11.18	5.64
10	686-Full	Southern Alaska Margin 1: Climate-Tectonics		11.82	6.52
11	537A-Full5	Costa Rica Seismogenesis Project Phase A		13.06	6.45
12	654-Full2	Shatsky Rise Origin		13.76	6.58
13	522-Full5	Superfast Spreading Crust		14.35	6.20

4. Proposal Ranking

		Mean	Std	
14	553-Full2 Cascadia Margin Hydrates		14.35	6.20
15	669-Full3 Walvis Ridge Hotspot	14.35	5.70	
16	548-Full2 Chicxulub K-T Impact Crater		14.47	9.10
17	556-Full4 Malvinas Confluence	14.71	5.95	
18	661-Full2 Newfoundland Sediment Drifts		15.00	5.49
19	703-Full Costa Rica SeisCORK	15.18	6.28	
20	581-Full2 Late Pleistocene Coralgal Banks		15.24	7.39
21	567-Full4 South Pacific Paleogene		15.65	4.17
22	589-Full3 Gulf of Mexico Overpressures		18.24	3.98
23	612-Full3 Geodynamo		19.35	8.57
24	584-Full2 TAG II Hydrothermal	19.65	6.62	
25	535-Full6 Atlantis Bank Deep		22.76	2.68
26	547-Full4 Oceanic Subsurface Biosphere		23.76	3.03

Proposals Forwarded to OTF

13 Proposals forwarded to OTF

724-Full	Gulf of Aden Faunal Evolution
601-Full3	Okinawa Trough Deep Biosphere
644-Full2	Mediterranean Outflow
662-Full3	South Pacific Gyre Microbiology
659-Full	Newfoundland Rifted Margin
537B-Full4	Costa Rica Seismogenesis Project Phase B
633-Full2	Costa Rica Mud Mounds
549-Full6	Northern Arabian Sea Monsoon
686-Full	Southern Alaska Margin 1: Climate-Tectonics
537A-Full5	Costa Rica Seismogenesis Project Phase A
654-Full2	Shatsky Rise Origin
522-Full5	Superfast Spreading Crust
581-Full2	Late Pleistocene Coralgal Banks

Tier 1 / Tier 2 Designation

Pacific Ocean

545-Full3	Juan de Fuca Flank Hydrogeology	Tier 1
601-Full3	Okinawa Trough Deep Biosphere	Tier 1
505-Full5	Mariana Convergent Margin	Tier 1
537B-Full4	Costa Rica Seismogenesis Project Phase B	Tier 1
537A-Full5	Costa Rica Seismogenesis Project Phase A	Tier 2
522-Full5	Superfast Spreading Crust	Tier 2
633-Full2	Costa Rica Mud Mounds	Tier 2
654-Full2	Shatsky Rise Origin	Tier 2
662-Full3	South Pacific Gyre Microbiology	Tier 2
686-Full	Southern Alaska Margin 1: Climate-Tectonics	Tier 2

Tier 1 / Tier 2 Designation

Atlantic Ocean

677-Full	Mid-Atlantic Ridge Microbiology	Tier 1
644-Full2	Mediterranean Outflow	Tier 1
659-Full	Newfoundland Rifted Margin	Tier 2
581-Full2	Late Pleistocene Coralgal Banks	No Tier designation (MSP)

Indian Ocean

724-Full	Gulf of Aden Faunal Evolution	Tier 1
549-Full6	Northern Arabian Sea Monsoon	Tier 2
595-Full3	Indus Fan	No Tier designation

5. Asian Monsoon DPG

SPC Motion 0712-01: The SPC appoints David Rea as chair of the Asian Monsoon and Cenozoic Tectonic History Detailed Planning Group (DPG), effective immediately.

SPC Motion 0801-01: The SPC approves the following as members of the Asian Monsoon and Cenozoic Tectonic History Detailed Planning Group (DPG) effective immediately:

Karen Bice, Peter Clift, Sidney Hemming, Matt Huber, Youngsook Huh, Warren Prell, Harutaka Sakai, Volkhard Spiess, Ryuji Tada, Hongbo Zheng.

6. Other Issues

See meeting minutes for details

- Science Steering and Evaluation Panel (**SSEP**)
  (new co-chair, Akira Ishiwatari)
- Environmental Protection and Safety Panel (**EPSP**)
  (issues with quick approvals of sites)
- Science and Technology Panel (**STP**) recommendations
  (issues on intellectual properties rights, microbiology QA/QC)
- Engineering Development Panel (**EDP**)
  (new chair Makoto Miyairi , new vice-chair Bill Ussler)
- Site Survey Panel (**SSP**)
  (new vice-chair Jin-Oh Park)
- Consideration of Hybrid Industry-IODP proposals
- SPC welcomes the new (non-voting) Australia representative

SASEC Meeting

SASEC Meeting

1. Continue to receive new proposals
2. Large planning meeting for new science plan

19

Continue to Receive Proposals

Since there are many proposals waiting to be scheduled at OTF, SASEC considered suspending receiving of new proposals. However, after discussion SASEC decided that it was better to continue to receive new proposals.

SASEC Consensus 0806-11: SASEC encourages the community to continue to submit proposals for drilling within the current program and in preparation for renewal of the Program. Truly innovative ideas can still be incorporated into the current phase of drilling. SASEC is particularly interested in receiving preliminary proposals for new and innovative projects that can influence the direction of the Program beyond renewal....

Planning Meeting

Large meeting to discuss science goals for IODP renewal
Purpose is to begin process for writing of new science plan

Meeting will be held in Bremen, Germany
Tentative planned for September 22-24, 2009

Steering Committee
Christina Ravelo (Co-chair), Wolfgang Bach (Co-chair), Jan Behrmann, Bob Duncan, Katrina Edwards, Sean Gulick, Fumio Inagaki, Heiko Pälike, Ryuji Tada, Gilbert Camoin

7. SPC response to EDP

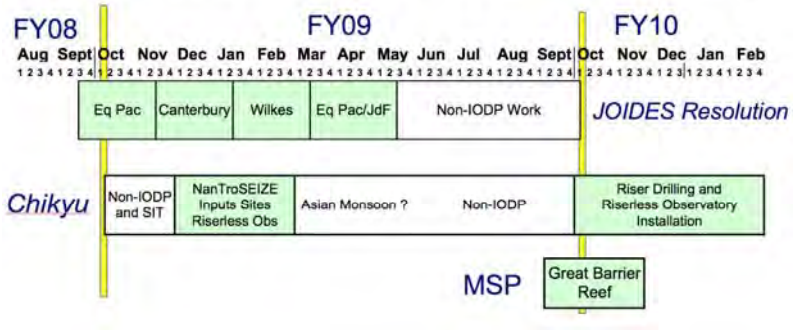
- **EDP Consensus 0801-08**: The EDP notes that there are a number of drilling proposals within the SAS that have scientific objectives requiring water samples and specialized or innovative logging tools and experiments which would benefit from or be made possible by large diameter drill pipe. The EDP also understands that the addition of this drill string has limited depth capability.
- The EDP strongly recommends the acquisition of large diameter pipe to provide enhanced logging and sampling capability.
- The cost benefits of acquisition of large diameter drill pipe versus development of slim-hole versions of existing tools should be evaluated before any new tool developments are pursued.
- **SPC Consensus 0803-12:** The SPC receives EDP Consensus 0802-08 on large diameter drill pipe. The SPC notes that large diameter drill pipe is currently being considered by the USIO and CDEX for IODP operations.

- **EDP Consensus 0801-09**: The EDP discussed the merits of conducting cross-comparison evaluations of proposals that address similar technologies. EDP recommends keeping the current evaluation approach that is focused on individual proposals and will not provide comparative evaluations. However, EDP may provide technical comments within the individual evaluations that help distinguish relative merits.
- **SPC Consensus 0803-13:** The SPC accepts EDP Consensus 0801-09 on engineering development proposal evaluation.

- **SPC Consensus 0803-15:** The SPC appoints Makoto Miyairi as chair, and Bill Ussler as vice chair of the Engineering Development Panel (EDP), effective immediately.

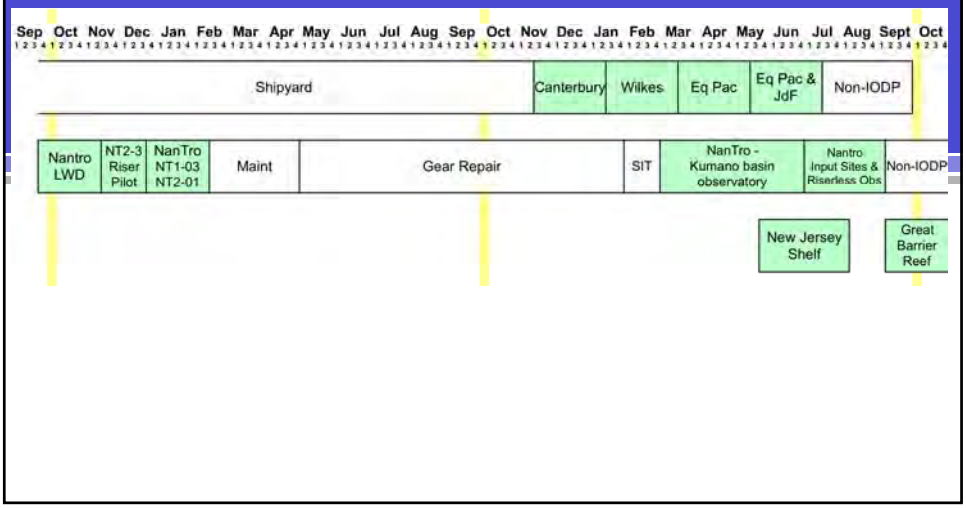
1. Expedition Scheduling

FY09 OTF Schedule Recommendations



Platform Schedules

FY2008 FY2009



Report from EDP Liaison at SSEP Mtg., Busan, Korea

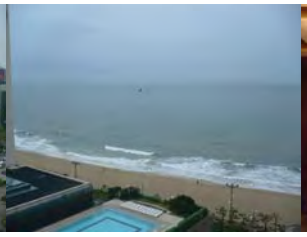
Hiroshi Asanuma
Graduate School of Environmental Studies
Tohoku University
Sendai, Japan

SSEP (Science Steering and Evaluation Panel)

SSEP Mtg., Busan, Korea

- Date: 19 – 22 May, 2008
- Venue: Novotel Hotel, Busan, Korea
- Participants: 61
- Summary:

- Reports from IODP-MI, SPC, SSP, EDP, CDEX, USIO, and ESO
- Evaluation/rating of 16 proposals (8 sold earth, 8 biology).
- (2: SPC, 4: external evaluation, 6: revision)
- Discussion (meeting location, link of SPC and SSEP etc.)


EDP presentation at SSEP, 2008, May

Role of EDP Liaison

- Review proposals for technical issues
- Summarize technical issues in drilling proposals and report to SSEP
- Update SSEP on EDP activities
- Gather technical comments from SSEP and report back to EDP

EDP presentation at SSEP, 2008, May

Technical Issues in Proposals

635-Full3 – Hydrate Ridge Observatory←will be revised

Issue: 3 SCIMPI Installations

Possible resolution: Funding of simple observatory development has been proposed for FY2009. A SCIMPI tool may not be available until 2010 or 2011.

636-Full3 – Louisville Seamount Trail ←SPC(☆ ☆ ☆☆ ☆)

Issue: 3rd party magnetometer tool deployment requested

Possible resolution: Ensure the tool is available and is integrated into the third party tool policy.

645-Full2 – North Atlantic Gateway

Issue: High quality continuous core recovery is necessary – mostly sediment drilling (clay, silt, sand)

Possible resolution: Review operational options with IO's. Highlight technological need with EDP.

698-Full2 – Izu-Bonin-Mariana Arc Middle Crust←SPC(☆ ☆ ☆ ☆)

Issue: Riser drilling to 8,000 mbsf

Possible resolution: Substantial well engineering and planning is required. Technological feasibility assessment needed. Formulation of a high-level feasibility study for ultra deep drilling is being considered by the EDP.

EDP presentation at SSEP, 2008, May

Technical Issues in Proposals

715-Full – Mediterranean Landslides

Issue: Geotechnical thin-walled sampler, logging to mudline, CPTU, in-situ vane shear tests and SCIMPI – type device

Possible resolution: Leasing of LWD , cone penetrometer and shear test tools. Simple observatories will be designed in FY2009 and possibly available in FY 2010 or 2011. Development of thin-walled sampler and geotechnical tools may be needed if tools cannot be purchased or leased.

716-Full2 – Hawaiian Drowned Reef

Issue: Small diameter vertical seismic profile tool (VSP), borehole televiewer (BHTV), air gun issues associated with VSP

Possible resolution: Investigate available tools for lease. Investigate permitting/operational requirements.

732-Full – Antarctic Peninsula Sediment Drifts

Issue: Non-magnetic core barrels, very high core quality necessary – sediment of silty clay

Possible resolution: Purchase long lead-time items such as non-magnetic core barrel. Review operational options with IO's. Highlight technology needs with EDP.

EDP presentation at SSEP, 2008, May

Handling of Technical Issues

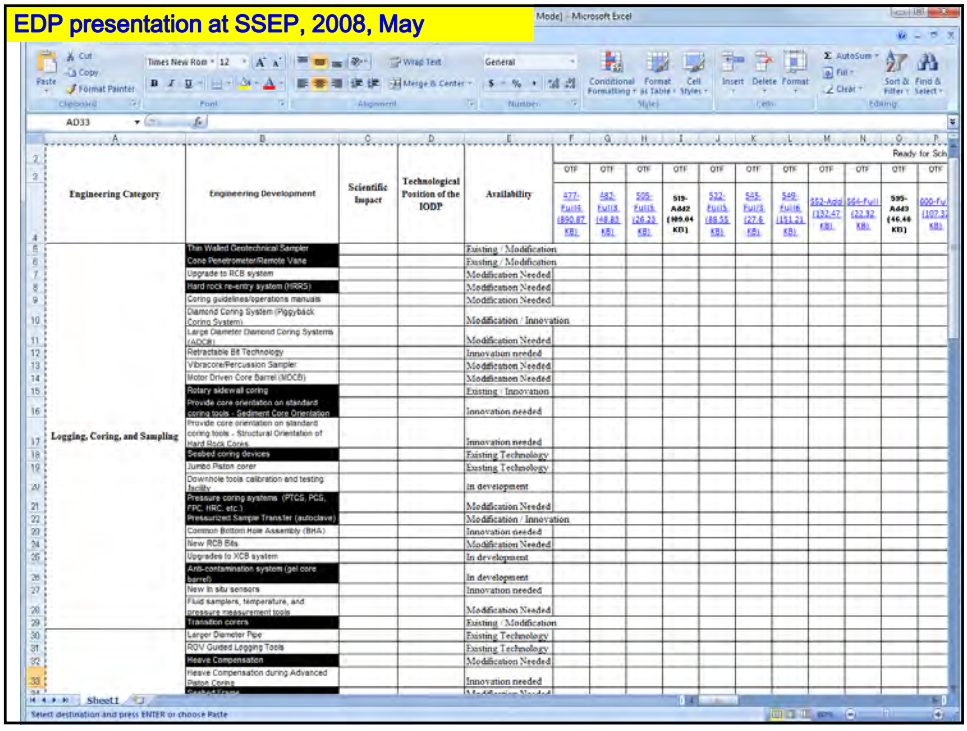
- Comments made by SSEP on these issues and related drilling proposals will be collected by me and communicated back to EDP
- EDP will utilize this information in the evaluation of its technology roadmap and in the evaluation of incoming technology proposals
- EDP may define high-level feasibility studies based on technical need

EDP presentation at SSEP, 2008, May

EDP Activities

- Updating IODP Technology Roadmap (see next slide)
  - Linking drilling proposals to technology developments to determine priorities for Engineering Development.
  - Prioritize the TR every summer meeting of the EDP.
- Monitor ongoing IODP technical activities at the implementing organizations
- Endorsed IODP-MI's FY2009 engineering development plan which includes:
  1. Continued development of the long term borehole monitoring system
  2. Development of a motion decoupled hydraulic delivery system for making accurate in-situ formation pressure measurements
  3. Create high level designs for the two simple observatory concepts
     - SCIMPI
     - S-CORK
- Reviewing new engineering development proposals forwarded to EDP from IODP-MI

EDP presentation at SSEP, 2008, May



Engineering Category	Engineering Development	Scientific Impact	Technological Position of the IODP	Availability
Logging, Coring, and Sampling	Thin Walled Geotechnical Sampler			Existing / Modification
	Cone Penetrometer/Remote Vane			Existing / Modification
	Upgrade to RCB system			Modification Needed
	Hard rock re-entry system (HRRS)			Modification Needed
	Coring guidelines/operations manuals			Modification Needed
	Diamond Coring System (Piggyback Coring System)			Modification / Innovation
	Large Diameter Diamond Coring Systems (ADCB)			Modification Needed
	Retractable Bit Technology			Innovation needed
	Vibracore/Percussion Sampler			Modification Needed
	Motor Driven Core Barrel (MDCB)			Modification Needed
	Rotary sidewall coring			Existing / Innovation
	Provide core orientation on standard coring tools - Sediment Core Orientation			Innovation needed
	Provide core orientation on standard coring tools - Structural Orientation of Hard Rock Cores			Innovation needed
	Seabed coring devices			Existing Technology
	Jumbo Piston corer			Existing Technology
	Downhole tools calibration and testing facility			In development
	Pressure coring systems (PTCS, PCS, FPC, HRC, etc.)			Modification Needed
	Pressurized Sample Transfer (autoclave)			Modification / Innovation
	Common Bottom Hole Assembly (BHA)			Innovation needed
	New RCB Bits			Modification Needed
	Upgrades to XCB system			In development
	Anti-contamination system (gel core barrel)			In development
	New in situ sensors			Innovation needed
	Fluid samplers, temperature, and pressure measurement tools			Modification Needed
	Transition corers			Existing / Modification
	Larger Diameter Pipe			Existing Technology
	ROV Guided Logging Tools			Existing Technology
	Heave Compensation			Modification Needed
	Heave Compensation during Advanced Piston Coring			Innovation needed

Engineering Development Panel

Salt Lake City, Utah
July 16-18, 2008

Greg Myers
IODP-MI

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Outline

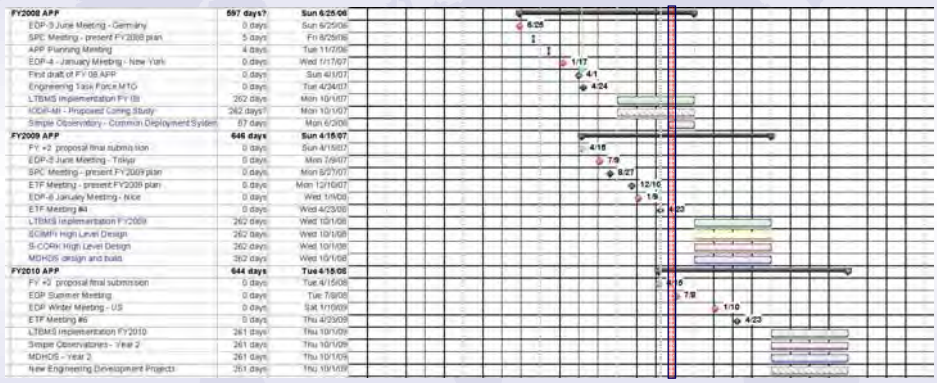
1. EDP# 6 Consensus Items
2. Engineering Time on IODP vessels
3. Proposal Review Process
4. Externally funded projects, relevant to IODP

Consensus Items from last mtg

0801-07	Modifications of Engineering Development Proposal review process	In addition to the formal evaluation statement of the engineering development proposals that are forward to IODP-MI. EDP will record concise closed session minutes that will be archived by IODP-MI for exclusive use by EDP in future proposal evaluation ses	IODP-MI	**Ongoing**. IODP-MI will record and archive minutes from EDP #7 and after.
0801-08	Large Diameter Pipe	The EDP notes that there are a number of drilling proposals within the SAS that have scientific objectives requiring water samples and specialized or innovative logging tools and experiments which would benefit from or be made possible by large diameter d	IOs	**Not started**. IOs to put togehter the cost benefits anaylsis for aquistition of large-diameter pipe vs. development of slim-hole tools.
0801-09	Engineering Development Proposal Evaluation	The EDP discussed the merits of conducting cross-comparison evaluations of proposals that address similar technologies. EDP recommends keeping the current evaluation approach that is focused on individual proposals and will not provide comparative evaluat	EDP	**Closed**
0801-12	EDP Meeting #7 Location	EDP recommends that EDP Meeting #7 be held in or near Salt Lake City, Utah on July 16-18, 2008. Secondary locations include Denver, CO, and Woods Hole, MA, in that order.	EDP	**Closed**
0801-13	EDP Meeting #8 Location	EDP recommends that EDP Meeting #8 be held in China. Possible locations include Hang Zhou and/or Shanghai. Proposed dates for EDP Meeting #8 are January 14-16, 2009.	EDP	**Closed**. Ying Ye to present details of options to EDP during meeting #7.
0801-14	VSP	EDP responds to STP Consensus Statement 0708-15 (Open Hole VSP) requesting advice. EDP believes that adopting and adapting industry standard procedures for check-shot surveys should result in high quality velocity profiles. Thus, there is no apparent nee	EDP	**Closed**. Forwarded to STP.
0801-10	Comment on Core Quality Study	The EDP recommends that the core quality and quantity study be separated into two components. The first component, which should be completed most promptly, should provide an assessment of sample quantity based on prior drilling leg experience. The second	IODP-MI	**In the process**. IODP-MI to present report on core quantity and progress on core quality study at EDP #7
0801-15	FY2009 Engineering Plan	EDP endorses the FY09 engineering plan as presented at the EDP Meeting #6 by IODP-MI. Ussler, Flemings, and Germaine were excused from the discussion due to conflict of interest. Miyairi-san served as interim chairperson.	EDP	**Closed**
0801-16	Drilling to the Moho	The EDP recognizes SPC's interest in understanding the technological challenges associated with a future Moho drilling project (in reference to SPC Consensus 0708-30) and is initiating discussions about this	EDP	**Ongoing**. Include discussions during EDP Meeting #7.

Submitted FY2009 IODP Annual Program Plan

1. **Long Term Borehole Monitoring System**
2. **SCIMPI High Level Design**
3. **S-CORK High Level Design ($0)**
4. **Simple Observatory Common Deployment System**
5. **Motion Decoupled Hydraulic Delivery System (over $100K, provided by UT)**
6. **Coring Study continuation**



FY2008 APP	**597 days?**	**Sun 6/25/06**
EDP-3 June Meeting - Germany	0 days	Sun 6/25/06
SPC Meeting - present FY2008 plan	5 days	Fri 8/25/06
APP Planning Meeting	4 days	Tue 11/7/06
EDP-4 - January Meeting - New York	0 days	Wed 1/17/07
First draft of FY 08 APP	0 days	Sun 4/1/07
Engineering Task Force MTG	0 days	Tue 4/24/07
LTBMS implementation FY 08	262 days	Mon 10/1/07
IODP-MI - Proposed Coring Study	262 days?	Mon 10/1/07
Simple Observatory - Common Deployment System	87 days	Mon 6/2/08
FY2009 APP	**646 days**	**Sun 4/15/07**
FY +2 proposal final submission	0 days	Sun 4/15/07
EDP-3 June Meeting - Tokyo	0 days	Mon 7/9/07
SPC Meeting - present FY2009 plan	0 days	Mon 8/27/07
ETF Meeting - present FY2009 plan	0 days	Mon 12/10/07
EDP-4 January Meeting - Nice	0 days	Wed 1/9/08
ETF Meeting #4	0 days	Wed 4/23/08
LTBMS Implementation FY2009	262 days	Wed 10/1/08
ECIMFI High Level Design	262 days	Wed 10/1/08
S-CORK High Level Design	262 days	Wed 10/1/08
MDHOS design and build	262 days	Wed 10/1/08
FY2010 APP	**644 days**	**Tue 4/15/08**
FY +2 proposal final submission	0 days	Tue 4/15/08
EDP Summer Meeting	0 days	Tue 7/8/08
EDP Winter Meeting - US	0 days	Sat 1/10/09
ETF Meeting #6	0 days	Thu 4/23/09
LTBMS Implementation FY2010	261 days	Thu 10/1/09
Simple Observatories - Year 2	261 days	Thu 10/1/09
MDHOS - Year 2	261 days	Thu 10/1/09
New Engineering Development Projects	261 days	Thu 10/1/09

Draft consensus item: Scoping Studies

EDP sees a requirement for engineering studies to provide high level direction on major systems issues that will be key to future improvement in quality of science results. EDP also notes SPC's interest in understanding the technological challenges associated with a future project Moho (reference SPC Consensus 0708-30). EDP requests IODP-MI consider pursuing three scoping studies that are listed below. EDP ask IODP-MI to report back in July 2008 on possible ways to resource and fund these efforts.

1. Integrated downhole coring systems:
2. Integrated Surface Drilling Systems:
3. 21st Century Mohole:

How to move forward?...Identify what, when & how….

21st Century Mohole

1. What
   - Review the technology options and possible evolutionary pathways to achieve the capability to deliver the ultra-deepwater ultra-deep scientific drilling capability. The limits to present riser technology, potential for mud-lift systems or remote seabed applications must be considered.
2. When
   - Work is occurring now on ultra-deepwater, deephole drilling through the DeepStar contract
   - Prepare summary at next meeting for submission to SPC spring meeting
3. How
   - IODP-MI to work with EDP members to generate possible well plan and report to SPC
   - Capitalize on existing works. Utilize non-confidential items of DeepStar project to scope out this project.
   - Use Moho Workshop document (2006)
   - Use Ultra-Deepwater Oil and Gas Technology Workshop Report (2005)

Integrated downhole coring systems:

1. What
   - Build on coring performance study to develop a platform-independent map of downhole coring applications showing how the different systems relate to each other and where future developments are required to overcome quantified performance shortfalls.
2. When
   - Perhaps meet a day or two before or after an EDP meeting. Next summer?
3. How
   - Gain understanding on unmet science objectives associated with downhole coring systems. Use the tools created by EDP (technology roadmap, science/engineering matrix
   - Utilize existing works studies such as the current core quality and quantity study
   - Conduct a focused workshop to integrate documents used by EDP in evaluating engineering development proposals. The report should be used by the team rewriting the ISP (Initial Science Plan) for IODP renewal
   - Budget needed to cover additional travel costs (<$25K)

Integrated surface drilling systems:

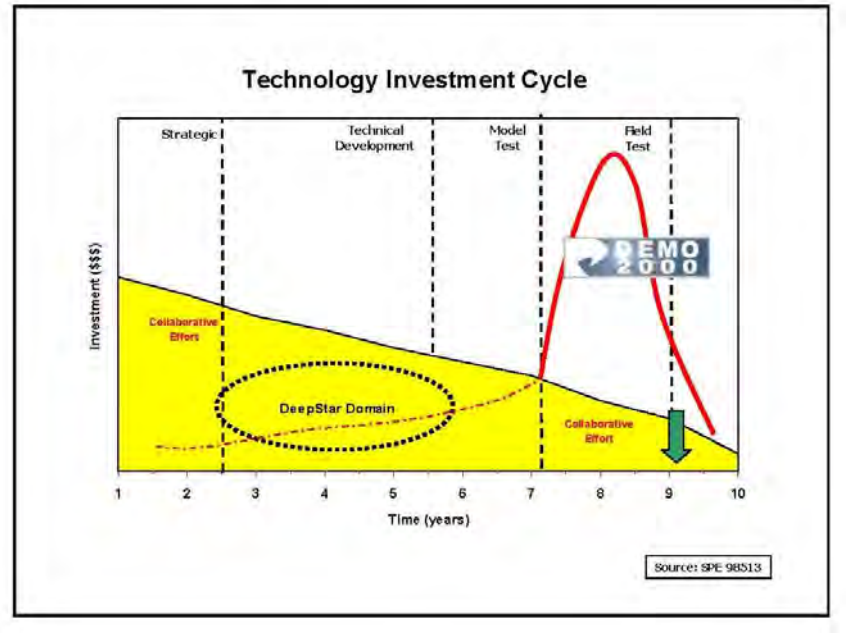
1. What
   - Build on coring performance study to develop a platform-independent map of the drilling systems performance requirements, from the mudline upwards to ensure most effective functioning of whichever downhole coring system is in use. Part of the output should include platform-specific performance requirements.
2. When
   - Perhaps meet a day or two before or after an EDP meeting
3. How
   - Gain understanding on unmet science objectives associated with surface drilling systems. Use the tools created by EDP (technology roadmap, science/engineering matrix to guide the
   - Conduct a focused workshop to integrate documents used by EDP in evaluating engineering development proposals. The report should be used by the team rewriting the ISP (Initial Science Plan) for IODP renewal
   - Budget needed to cover additional travel costs (<$25K)

Outline

1. EDP# 6 Consensus Items
2. Engineering Time on IODP vessels
3. Proposal Review Process
4. Externally funded projects, relevant to IODP

Engineering Time on IODP Platforms

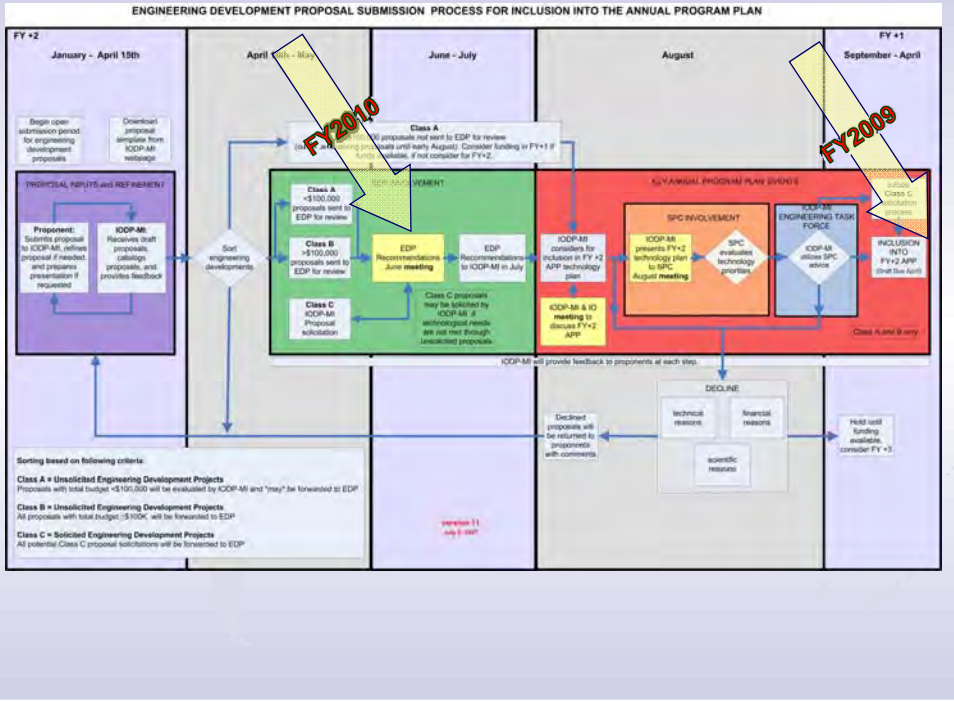
1. No adopted engineering ship time policy in existence
2. Ship time is required to complete engineering process
3. Unfavorable perception of engineering time will need some work
   - Science time is limited between now and 2013
4. We suggest:
   - Formal requests for engineering ship time be made to IODP-MI for presentation to EDP.
   - EDP will provide comments/suggestions to IODP-MI
     - Notify proponents
   - IODP-MI will take EDP advice, and depending on advice, will bring the request to for SPC consideration.
     - Notify proponents
   - Pending favorable SPC consideration, engineering time requests will be forwarded to the Operations Task Force (OTF) for scheduling
     - Notify proponents



Source: 2005 Ultra-Deepwater Oil and Gas Technology Workshop Report

Outline

1. EDP# 6 Consensus Items
2. Engineering Time on IODP vessels
3. Proposal Review Process
4. Externally funded projects, relevant to IODP



Proposal Summary

3 Proposals submitted to IODP-MI and forwarded to EDP

1. **EDP-2010-01B: Deep Rock Stress Tester**
2. **EDP 2010-02B: Anti-Contamination Coring System**
3. **EDP-2010-03B: Multi-sensor Magnetometer Module**

Engineering Development Definitions

Class A Development

- Total project less than $100,000
- Minimal proposal documentation required
  - These proposals will be further sorted by IODP-MI and may be forwarded to EDP for further review and advice.

Class B Development

- Total project greater than $100,000
- More substantial proposal required
- All Class B proposals will be forwarded to EDP for review and advice

Class C Development

- Proposals are solicited by IODP-MI following SAS consideration
- Multi-page proposal required
- All Class C proposals will be forwarded to EDP for review and advice

General Proposal Sequence

- April 15th - Engineering proposals submitted
- April 23-24 - Proposals reviewed by ETF
  - 3 Proposals received, 3 forwarded to EDP
- April 30 – ETF reviews sent to proponents, and proponents respond
- May & June - Preparation for EDP
  - Proponents create presentation for EDP
  - Watchdogs selected and proposals forwarded to EDP
- July 16-18th - Proposals reviewed by EDP and star ratings assigned

Proposal Review Discussions (From Ussler, Von Herzen, Ask, Fukahara)

- Proposal review discussions are always confidential
- Closed session proposal discussion
  - Chairman identified for closed session; does not vote, unless there is a tie
  - Formal closed session minutes (concise) prepared to document proposal review discussion; archived by IODP-MI; complete archive available at each EDP meeting by request from an IODP-MI representative
  - Non-voting observer(s) by invitation (IODP-MI); administrative function; maintain consistency
- Consensus on proposal review (not public)
- Consensus on grouping (not public)
- If no consensus, straw vote, then if no consensus, then vote; record yes, no, and abstention
- Conflicted proponents not present during discussion or when obtaining a consensus
- Watchdog identity discussion

Conflict of Interest

- **COI Overview:**
- A conflict of interest is a situation in which the interests (for example: personal, professional, or commercial) of an IODP SAS member or designated alternate involved in nurturing, evaluation, or assessment processes, or technological development, have a real or perceived impact, either positive or negative, on the results of the nurturing, evaluation, or assessment processes, or related contractual work.
- The chair/s should clearly announce and document all potential conflicts of interest and resulting actions (included in the minutes).
- In a similar fashion, members of panels who have a financial or commercial interest in tools, programs, etc, by means of their employment will be held to be in conflict of interest.
- At EDP, the specific COI issue of concern is the participation of panel members and other attendees who are proponents of active proposals.
- Panel members and other attendees who are proponents of active proposals are to be excluded from discussions of the specific proposal/s on which they are proponents. Proponents may participate in the discussion of all other proposals, including serving as watchdogs.
- Proponents may participate in nurturing and evaluating all other proposals, with such members declaring their potential conflicts, and the chair/s keeping a record of these conflicts.

Conflict of Interest - continued

- Institutional Conflicts are dealt with as follows:

- In general, this is OK.
- Does the situation prevent you from rendering an impartial (fair) assessment?
- Is there a direct supervisory role or collaboration on a larger project that includes IODP?
- Is there a personal conflict?
- If in doubt, inform Co-Chairs. Allow them to document and judge.

Star Grouping Descriptions

Proposals are grouped on the last day in Executive Session. The groupings were based on a 5-star (-*) system, with 5* being the highest and 1* being the lowest. The following describes the grouping system used.

- 5 stars: Extraordinary proposal.
  (ED impacts multiple aspects of the ISP and/or Tech Roadmap. Exceptional cost/benefit ratio: very high probability of success.)
- 4 stars: Very good
  (Impacts the ISP and/or Tech Roadmap: good cost/benefit, high probability of success)
- 3 stars: Good
  (Impacts the ISP and/or Tech Roadmap: acceptable cost/benefit, acceptable probability of success.)
- 2 stars: Could be strengthened
  (Can impact ISP: contains deficiencies in organization, and/or poor cost/benefit, and/or poor probability of success.)
- 1 star: Not Acceptable
  (It does not impact the ISP or contains deficiencies in organization, and/or poor cost/benefit, and/or poor probability of success.)

Process – continued

- **Watchdogs prepare review report prior to close of this meeting**
- IODP-MI sends review letter to proponents – by July 25th
- Proponents create proponents response letter (PRL) – by August 15th
- IODP-MI create FY2010 draft engineering plan based on EDP advice, PRL and anticipated budget and present to SPC
- Following SPC, engineering plan is edited if needed and presented to the Engineering Task Force for comment
- Engineering plan is presented to EDP at the winter meeting for final look
- Lead agencies provide budget guidance at end of January
- First draft of the Annual Program Plan (APP) is written in February
- Final draft of the APP in late spring
- Projects commence on October 1st.

Drilling Proposal Review

- SSEP Identify drilling proposal needing technological review by EDP
- Confidential drilling proposal is released to EDP
- EDP review and provide technological comment on the drilling proposal
  - Is it feasible
  - What are key technological issues
  - Recommendations on how proposal could be drilled

Outline

1. EDP# 6 Consensus Items
2. Engineering Time on IODP vessels
3. Proposal Review Process
4. Externally funded projects, relevant to IODP

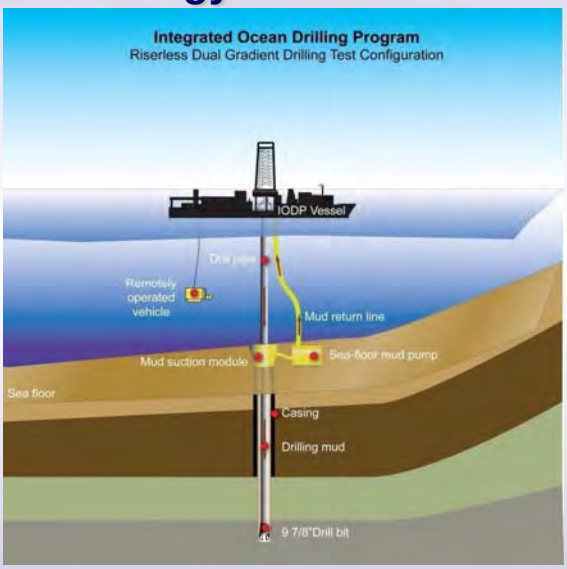
Planning has begun for an emerging mud control technology sea trial

IODP-MI has entered into a contractual relationship with the DeepStar consortium to conduct engineering feasibility studies and planning for a sea trial of emerging mud control technology.

The plan will include the requirements for deploying AGR Drilling Services' Riserless Mud Recovery system at ultra-deepwater (between 5,000ft and 12,000ft) sites in the Gulf of Mexico aboard the *JOIDES Resolution*.

If warranted by the feasibility studies, sea trials would be targeted for late FY2009 and early FY2010 at a location in the Gulf of Mexico

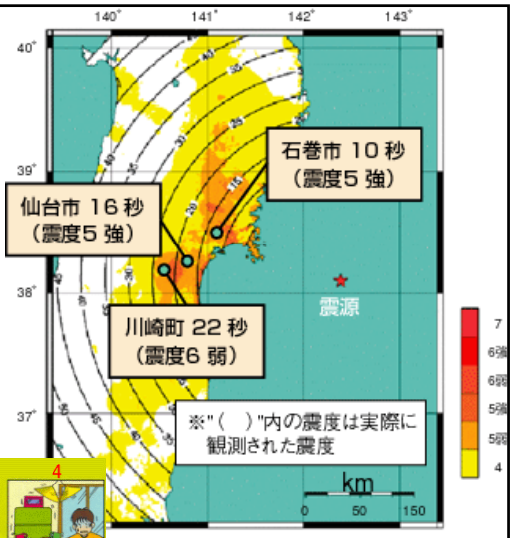
A successful sea trial of this technology would provide the impetus for drilling and exploration in environments currently beyond the technological reach of the IODP.

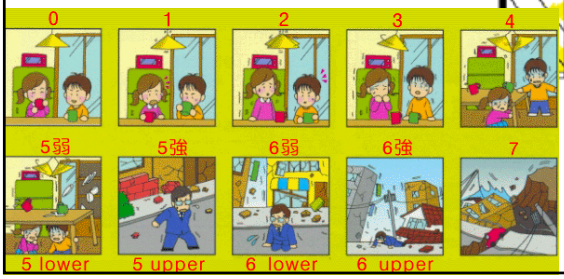


Scientific Technology Panel Report to EDP

16th-18th July 2008
Salt Lake City

6th Meeting of the IODP STP
18th-20th February 2008
Sendai, Japan
Host: Noritoshi Suzuki





STP discussions:

- Microbiology in IODP
- Implementation of QA/QC Task Force Report
- The development of an STP Roadmap, (combining community input with IODP Science Plans, budget constraints, and the need to look towards renewal of the program in 2013).

Conflicts of Interest:

Lovell temporarily involved with ESO - involvement now minimal

No major conflicts of interest were identified at the start of the meeting

During voting representatives from the Kochi Core Centre (KCC) abstained from voting on matters relating specifically to the KCC

Ishibashi and Nunoura abstained from voting on the Life Task Force recommendation as they are part of the Task Force

STP reports:

18 Recommendations & Consensus Statements

1 Action Item

STP Consensus Statement 0802-01:

Implementation of IODP-MI QA/QC TF Report

STP recommends to IODP-MI that the IOs implement the IODP-MI QA/QC Task Force Report. STP asks IODP-MI to request the IOs develop clear implementation plans including default procedures and protocols, and reporting formats (i.e. forms) for documenting deviations to QA/QC, as well as calibration and operation issues.

Voting record: 16 For, 0 Against, 0 Abstentions

Priority: High

STP suggests this be forwarded to IODP-MI and SPC.

An important aspect is the interaction of the IOs with STP (and SAS) in reviewing QA/QC for individual expeditions, and with other IOs, IODP-MI and STP in long term monitoring for single platforms and across platforms and shore based facilities.

STP is interested in receiving suggestions for how this engagement between IOs and STP can best be facilitated.

STP also asks that the IOs document the nature of standards used in calibrations to encourage dialogue between IOs and consistency across platforms.

The SPC accepts STP Consensus Statement 0802-01 on the implementation of IODP-MI QA/QC TF Report and forwards it to IODP-MI.

Issues of importance:

Quantitative data:

- Define default QA/QC procedure/protocols
- Limit change to protocols except where justified
- Science party acceptance of QA/QC…
- Capture original data/metadata – traceability.
- The need to keep QA/QC reporting simple but thorough.
- The human factor…
- CORKS, observatories, 3rd party tools?

Qualitative data

- Consistency between shifts, expeditions, platforms
- The need to be able to flag data and communicate this to the entire science party.
- Post expedition scientists often use data without looking at QA/QC – how can this be avoided?

Dictionaries

Development and maintenance, and cross-platform issues/consistency (including the Taxonomic Name List (TNL), Digital Taxonomic Dictionary, Lithology List/ Dictionary/ Catalogue).

Long term monitoring

How can SAS and the IOs work together towards long term monitoring of QA/QC?

STP Consensus Statement 0802-02: IODP Measurements Document Addendum.

STP recommends that IODP add an addendum to the current Measurements Document that shows those measurements that can affect drilling decisions.

Voting record: 16 For, 0 Against, 0 Abstentions

Priority: High

STP suggests this be forwarded to IODP-MI and/or SPC.

The SPC accepts STP Consensus Statement 0802-02 on adding an addendum to the IODP Measurements Document showing those measurements that can affect drilling decisions and forwards it to IODP-MI.

STP Consensus Statement 0802-03: Patent Issue

STP recommends that IODP-MI address issues related to intellectual property rights resulting from IODP activities. STP is particularly concerned with respect to novel materials of potential biotechnological value.

Vote: 16 For, 0 Against, 0 Abstentions

Priority: HIGH

STP suggests this be forwarded to IODP-MI and SPC

The SPC accepts STP Consensus Statement 0802-03 on intellectual property rights resulting from IODP activities and forwards it to IODP-MI and SASEC for consideration, noting the request for a clear statement of principles to be made so that expedition and shore-based participants are fully aware of their responsibilities.

STP Recommendation 0802-04: Legacy Sample Center at Kochi.

STP thanks Yuki Morono for his presentation related to the Kochi Core Center (KCC). STP also requests that IODP-MI ask the Microbiology Task Force to consider whether the KCC can be used as a center for preserving legacy samples in liquid nitrogen for the microbiological community.

Vote: 15 For, 0 Against, 1 Abstentions (Lin)

Priority: HIGH

STP suggests this be forwarded to SPC and IODP-MI

The SPC receives STP Consensus Statement 0802-04 on the proposed establishment of a Legacy Sample Centre at Kochi.

STP Consensus Statement 0802-05: Specific Proposals Related to QA/QC for Microbiology.

STP recommends that the following specific tasks be implemented during expeditions for which microbiology is a research priority:

SYBR-Green I should be adopted as the dye of preference for standard IODP direct microscopic cell counts.

- Adopt cell-counting standards for a given cruise, i.e., establish cross-scientist controls that will account for counting variability between scientists and samples.

- With respect to depth, randomize the samples for cell counts.

-Provide photographic documentation of routine and unique samples.

Vote: 16 For, 0 Against, 0 Abstentions

Priority: HIGH

STP suggests this be forwarded to IODP-MI and SPC

The SPC accepts STP Consensus Statement 0802-05 related to QA/QC for microbiology and forwards it to IODP-MI for discussion and implementation with the IOs (notes changes).

Grey text deleted; blue text added, to original text from STP

STP Consensus Statement 0802-06: Detection and Control of Contamination Issues During Riser Drilling.

STP proposes that multiple contamination tests using PFT (Perfluorocarbon Tracer), and fortuitous or additional inorganic tracers (e.g., barium, lithium bromide, potassium bromide) be used during riser coring. (Inorganic tracers should not be seen as an alternate to PFT). Sampling of drilling fluids should be scheduled so that microbial communities in this medium can be compared to those in the samples.

Vote: 16 For, 0 Against, 0 Abstentions

Priority: HIGH

STP suggests this be forwarded to IODP-MI, EDP, and SPC

Also, STP asks EDP to investigate drilling fluids and/or techniques that are less likely to adversely impact interstitial water geochemistry, rock geochemistry, and microbiology. The best way to initiate this may be to have an appropriate presentation to EDP by Rick Colwell (STP member).

The SPC accepts STP Consensus Statement 0802-06 related to detection and control of contamination during riser drilling, particularly with respect to microbiology, and forwards it to IODP-MI for discussion and implementation.

The SPC also endorses the proposal for Rick Colwell to attend EDP as STP liaison to initiate discussion of how EDP can best provide advice on drilling fluids/techniques to minimise adverse impact on interstitial fluids.

STP Consensus Statement 0802-12: IODP Drilling Proposal SSEP Review Form.

STP requests that the SSEP continue to bring to STP's attention any potential issues within a given proposal that would need STP input and comment. This could be through the re-introduction of the Review Form proposed by STP in 2005.

Defer to agenda item 17: Input of Engineering/Technical Information in Proposal Process (Mori/Janacek) 20 min

Vote: 16 For, 0 Against, 0 Abstentions

Priority: High

STP suggests this be forwarded to SSEP, SPC, and IODP-MI

The SPC receives STP Consensus Statement 0802-12 related to how proposals with potential scientific/technological issues can be identified and forwarded for STP input and comment.

SPC notes that IODP-MI plans to implement measures to address this.

STP Recommendation 0802-07: IODP-MI Subsurface Life Task Force Recommendations

STP Consensus Statement 0802-13: Open Hole VSP

STP Consensus Statement 0802-15: New down-hole magnetic susceptibility tool (MSS).

STP Recommendation 0802-18: Vice Chair

STP suggests that each be forwarded to IODP-MI

Action Item 0802-19: Scientific Technology Roadmap

- Results from a request from SPC/IODP-MI

STP Action Item 0708-32

STP Consensus Statement 0612-12

- STP members are encouraged to develop a dialogue with the IODP community in discussing possible additions and changes to the draft Scientific Technology Roadmap. This should include reviewing reports from recent IODP workshops.
- Deadline: Two weeks prior to the next STP meeting.

Science/Technology Roadmap

Accepting the current IODP situation and the start of plans for renewal in 2013…

- Examine current technology
- Identify areas for development
- Provide advice to evaluate potential impact on IODP science.
- Evolving document
- Prioritization and cost-benefit, risk analysis
- Enlist community specialist advice as appropriate

Science/Technology Roadmap

Items considered:

- Sidewall coring.
- Directional drilling.
- Enhanced core recovery.
- Deep hole penetration.
- Oriented cores.
- Logging while coring.
- Sediment grain size analysis.
- Seismics while drilling.
- Automated cell counting.
- Aseptic subsampling.
- Stress measurements.
- Core-based stress measurements.
- Multi-arm caliper.
- Pore pressure in the formation.
- Cuttings analysis for riser drilling.
- MWD/LWD tools.
- Non-magnetic core barrel especially related to core orientation (declination).
- Volume imaging.
- Enhanced core recovery in poorly sorted, poorly consolidated materials.
- Collection of formation fluids at in situ pressure and temperature.
- Oriented cores.
- Vector (3 axis) magnetometer.
- Larger diameter pipe impacts science by expanding number/type of downhole tools can be run.
- Downhole magnetometer (GHMT).
- Creation of Digital Taxonomic Dictionaries.
- Automatic age- depth model creation.
- Develop procedure for better integrating microbiology data with other shipboard data.
- Pressurized coring with temperature control.
- On-board measurement of isotopes in gases.
- Real time mud gas monitoring.
- Membrane-inlet mass spectrometry (MIMS) technology.
- Real time, on-board microbial community characterization.
- Real time, on board evaluation of contamination of cores.
- Near real time projection of digitally collected data.
- Better recovery in young oceanic crust.

Next STP meeting: July 27-30, 2008 in Edmonton, Alberta, Canada

Main focus: QA/QC Implementation, scientific roadmap
Host: ECORD

EDP07 @ Salt Lake City, July 16-18, 2008

FY08 progress

Telemetry System of Long Term Borehole Monitoring System

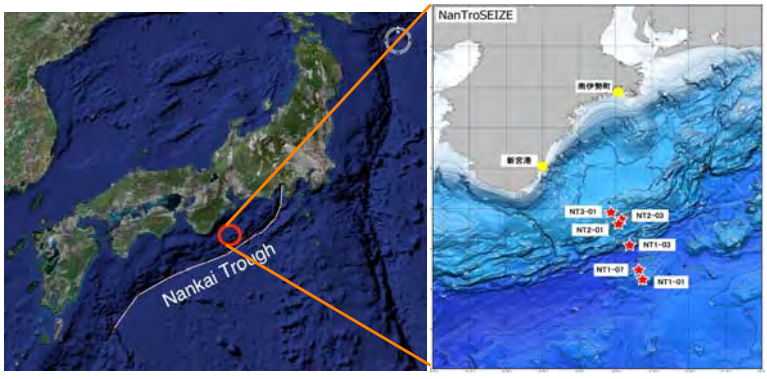
Nori KYO

CDEX, JAMSTEC

EDP07 @ Salt Lake City, July 16-18, 2008

NanTroSEIZE

- IODP scientific drilling proposal 603
- Nankai Trough Seismogenic Zone Experiment



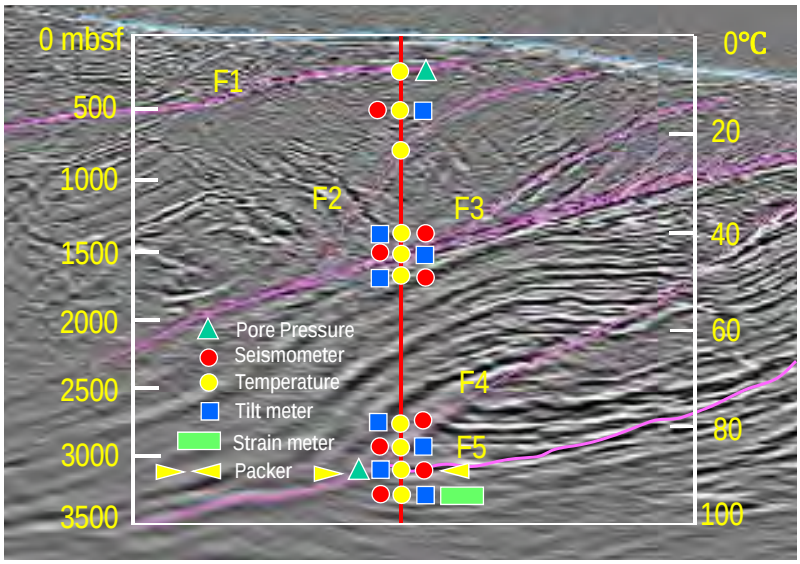
EDP07 @ Salt Lake City, July 16-18, 2008

Scientific Objectives and concept of observatory

- How systematic, progressive material and state changes control the onset of seismogenic behavior along subduction thrusts.
- Why are subduction zone megathrusts weak faults.
- Why is the relative plate motion primarily accommodated by coseismic frictional slip in a concentrated zone.
- The systematic changes in physical properties, chemistry, and state of the fault zone with time throughout the earthquake cycle.
- The mega-splay (OOST: Out of Sequence Thrust) thrust fault system that slips in discrete events which may or may not generate tsunamis during great earthquakes.
- The goal of this observatory is to develop an observatory system to monitor interseismic deformation, seismicity, pore pressure and temperature at and above the mega-splay fault by 2011 and to deploy and to start data acquisition since 2011.

EDP07 @ Salt Lake City, July 16-18, 2008

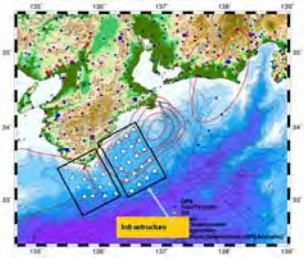
Proposed Borehole Observatory

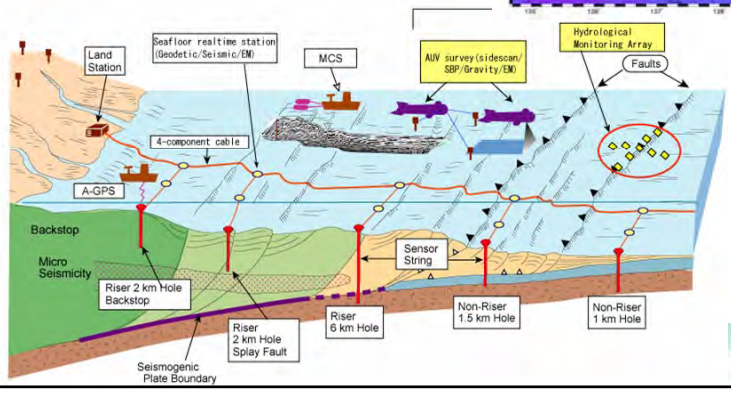


EDP07 @ Salt Lake City, July 16-18, 2008

Integrated Earthquake Monitoring System

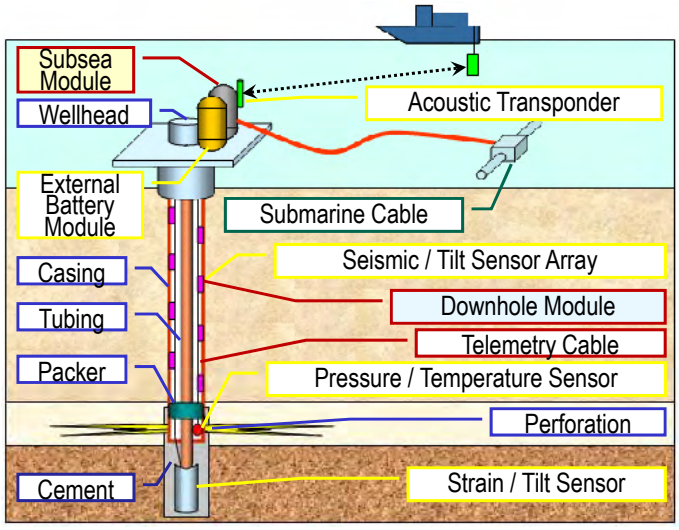
- Sea floor cable network
- Twenty stations
- Seismic, Tsunami
- Development schedule: 2006 - 2009





EDP07 @ Salt Lake City, July 16-18, 2008

LTBMS Conceptual Image



POC
Scientist
JAMSTEC
SOC

Scope of Work

USFY2007

- Define Engineering Requirements
- Define Operational Requirements
- Specify Engineering Specifications

USFY2008

- Design and build EXP (Experimental Prototype)
- Define Field Test Requirements
- Prepare Field Test Plans

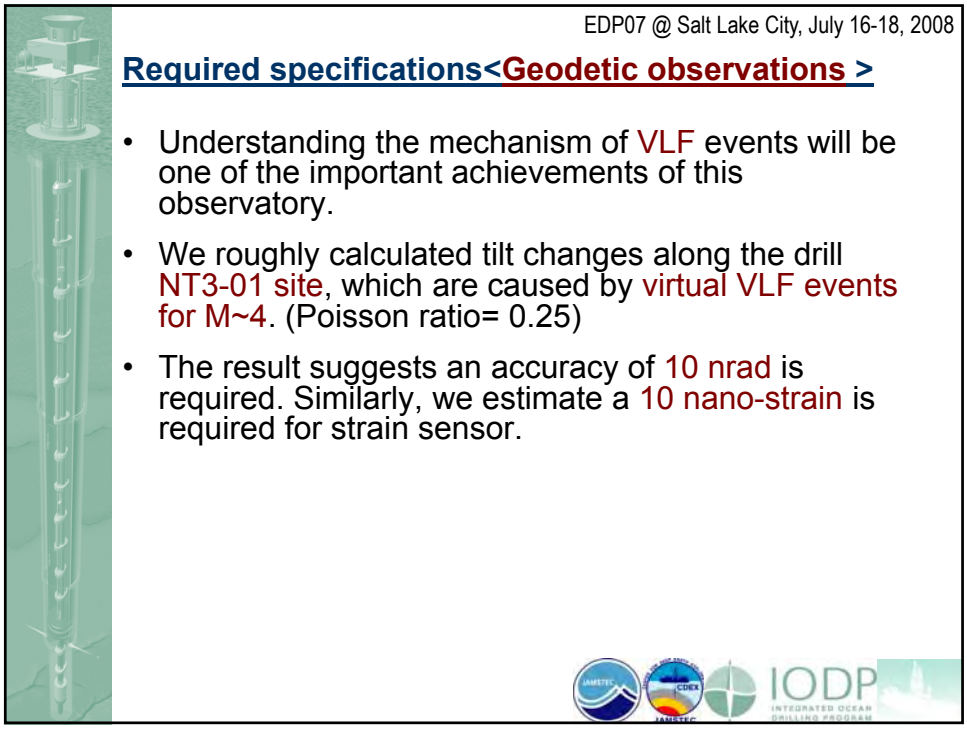
USFY2009

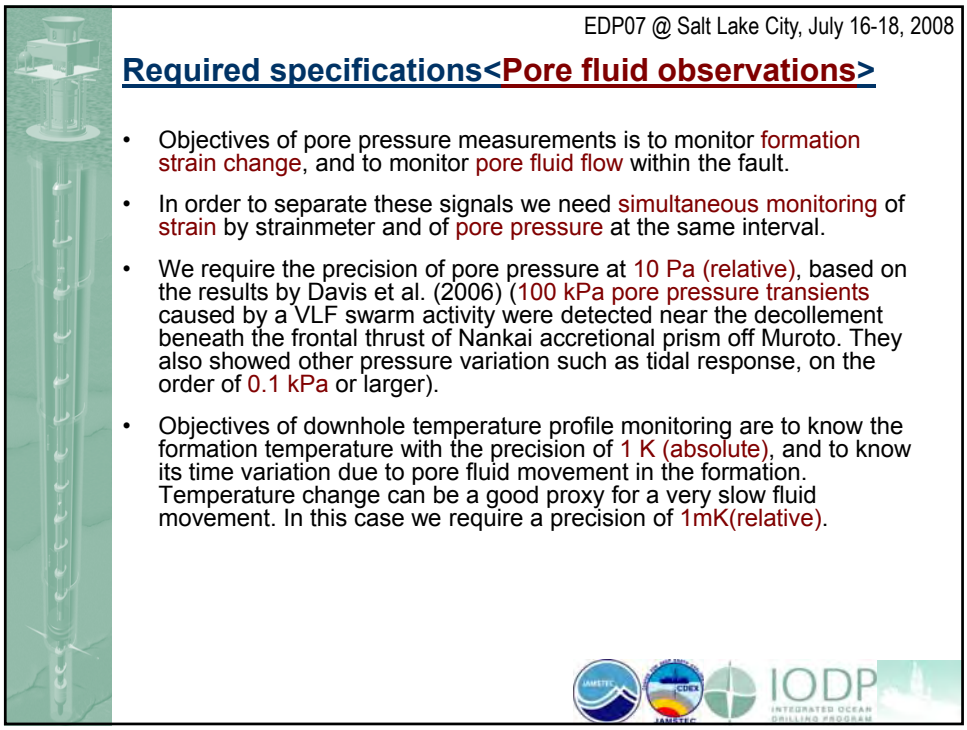
- Integration of EXP
- Field Test in the Land Hole

EDP07 @ Salt Lake City, July 16-18, 2008

Required specifications<Seismic observations>

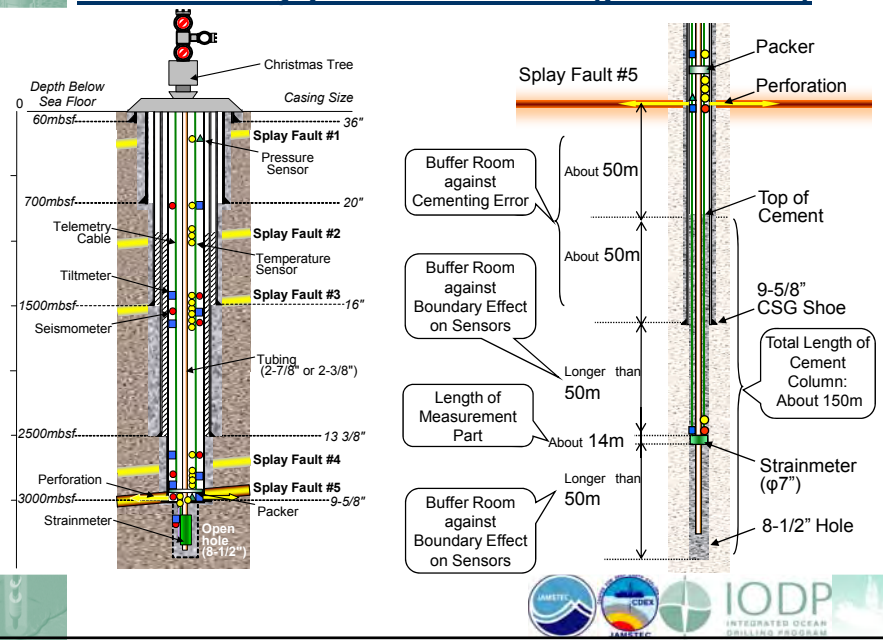
- The system has to cover the potential micro-, small earthquake to M8+ earthquake. Considering the expected noise floor in deep borehole and M8+ earthquake, the dynamic range required exceeds 200dB .
- The strongest motion would be over 2g and the weakest be 10^{-8} m/s^2 at 10Hz and 10^{-10} m/s^2 at 0.05Hz.
- The system frequency range needs to cover from low frequency to high frequency in the range of 0.01~1 kHz.


EDP07 @ Salt Lake City, July 16-18, 2008
Required specifications<Geodetic observations >
• Understanding the mechanism of VLF events will be one of the important achievements of this observatory.
• We roughly calculated tilt changes along the drill NT3-01 site, which are caused by virtual VLF events for M~4. (Poisson ratio= 0.25)
• The result suggests an accuracy of 10 nrad is required. Similarly, we estimate a 10 nano-strain is required for strain sensor.
IODP


EDP07 @ Salt Lake City, July 16-18, 2008
Required specifications<Pore fluid observations>
• Objectives of pore pressure measurements is to monitor formation strain change, and to monitor pore fluid flow within the fault.
• In order to separate these signals we need simultaneous monitoring of strain by strainmeter and of pore pressure at the same interval.
• We require the precision of pore pressure at 10 Pa (relative), based on the results by Davis et al. (2006) (100 kPa pore pressure transients caused by a VLF swarm activity were detected near the decollement beneath the frontal thrust of Nankai accretional prism off Muroto. They also showed other pressure variation such as tidal response, on the order of 0.1 kPa or larger).
• Objectives of downhole temperature profile monitoring are to know the formation temperature with the precision of 1 K (absolute), and to know its time variation due to pore fluid movement in the formation. Temperature change can be a good proxy for a very slow fluid movement. In this case we require a precision of 1mK(relative).
IODP

EDP07 @ Salt Lake City, July 16-18, 2008

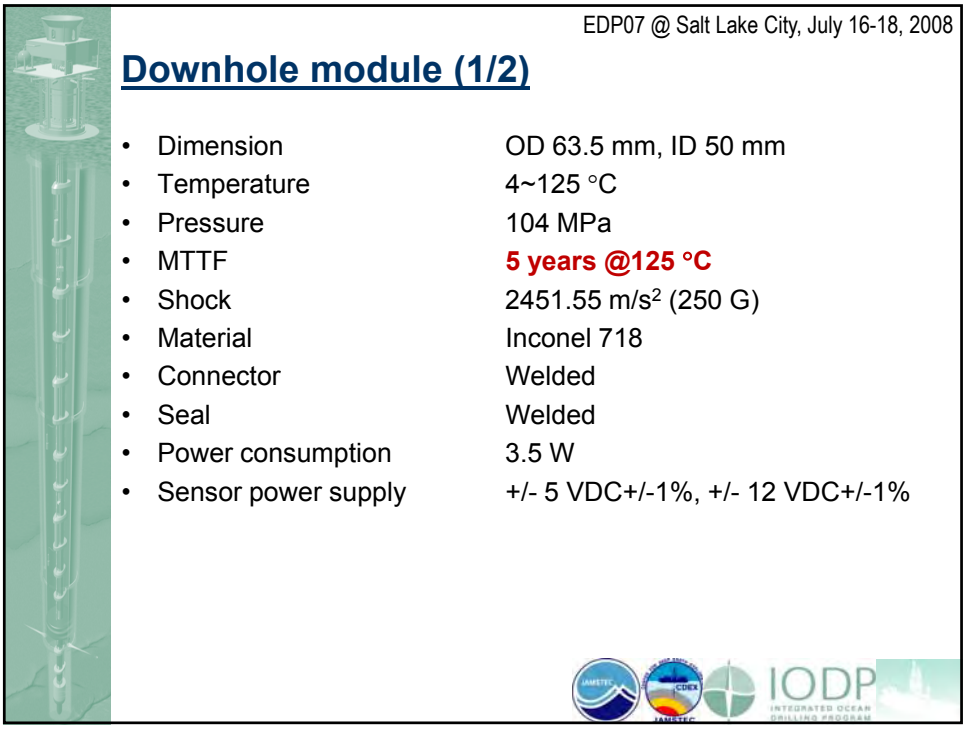
Observatory plan for NT2-03 (perforation)



EDP07 @ Salt Lake City, July 16-18, 2008

Downhole Telemetry System

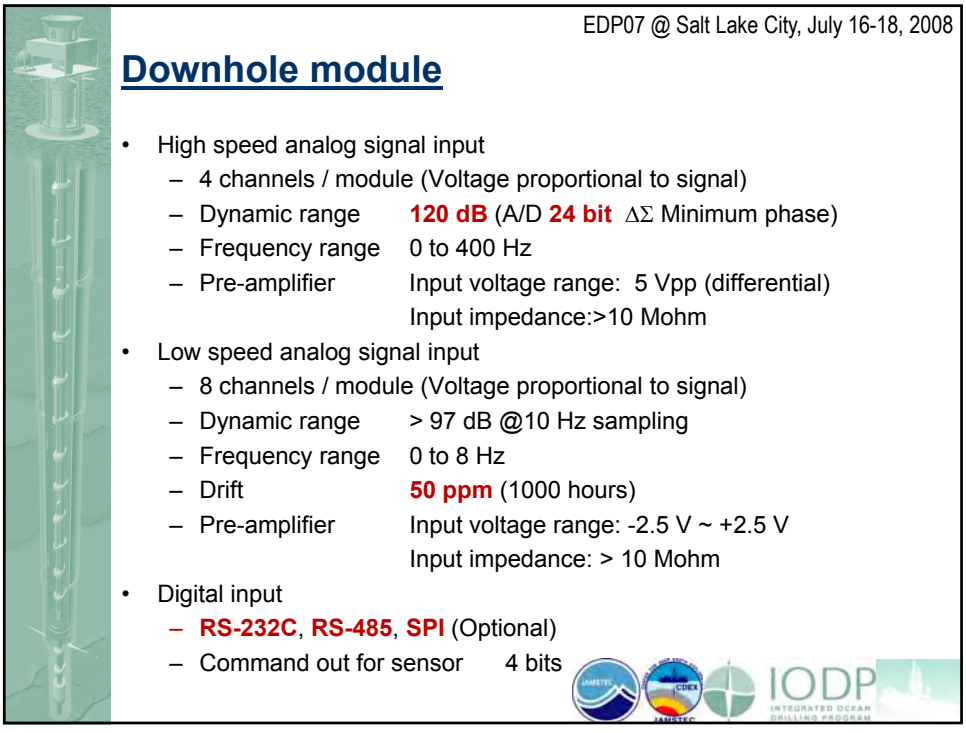
- Synchronization accuracy **< 10 μs** (PLL jitter) @1.024 Mbps
- Number of DHM **8 modules**
- Uplink speed 2048, 1024, 512 kbps (Selectable)
- Uplink bit error rate $< 10^{-9}$
- Downlink command speed 500 bps
- Downlink carrier frequency 2 kHz
- Maximum module distance 1000 m @2.048 Mbps
  1500 m @1.024 Mbps



EDP07 @ Salt Lake City, July 16-18, 2008

Downhole module (1/2)

• Dimension	OD 63.5 mm, ID 50 mm
• Temperature	4~125 °C
• Pressure	104 MPa
• MTTF	**5 years @125 °C**
• Shock	2451.55 m/s^2 (250 G)
• Material	Inconel 718
• Connector	Welded
• Seal	Welded
• Power consumption	3.5 W
• Sensor power supply	+/- 5 VDC+/-1%, +/- 12 VDC+/-1%



EDP07 @ Salt Lake City, July 16-18, 2008

Downhole module

- High speed analog signal input
  - 4 channels / module (Voltage proportional to signal)
  - Dynamic range **120 dB** (A/D **24 bit** ΔΣ Minimum phase)
  - Frequency range 0 to 400 Hz
  - Pre-amplifier Input voltage range: 5 Vpp (differential)
    Input impedance:>10 Mohm
- Low speed analog signal input
  - 8 channels / module (Voltage proportional to signal)
  - Dynamic range > 97 dB @10 Hz sampling
  - Frequency range 0 to 8 Hz
  - Drift **50 ppm** (1000 hours)
  - Pre-amplifier Input voltage range: -2.5 V ~ +2.5 V
    Input impedance: > 10 Mohm
- Digital input
  - **RS-232C**, **RS-485**, **SPI** (Optional)
  - Command out for sensor 4 bits

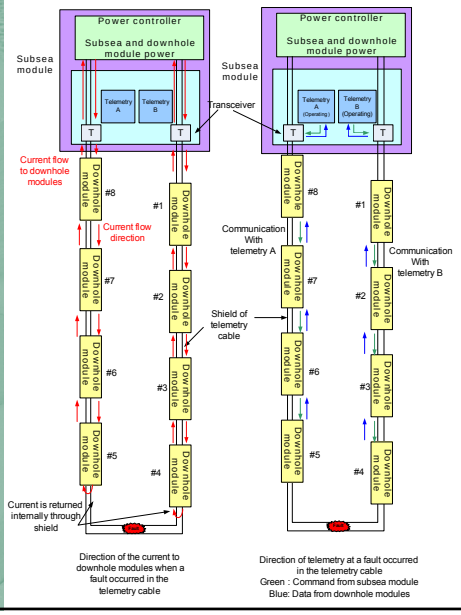
EDP07 @ Salt Lake City, July 16-18, 2008

USFY08 Progress

- Fault tolerant
- System synchronization
- ADC selection
- Cable selection
- Low power design
- Mechanical design
- Destructive test plan
- EXP Land test requirements
- Operation procedure
- Risk assessments

EDP07 @ Salt Lake City, July 16-18, 2008

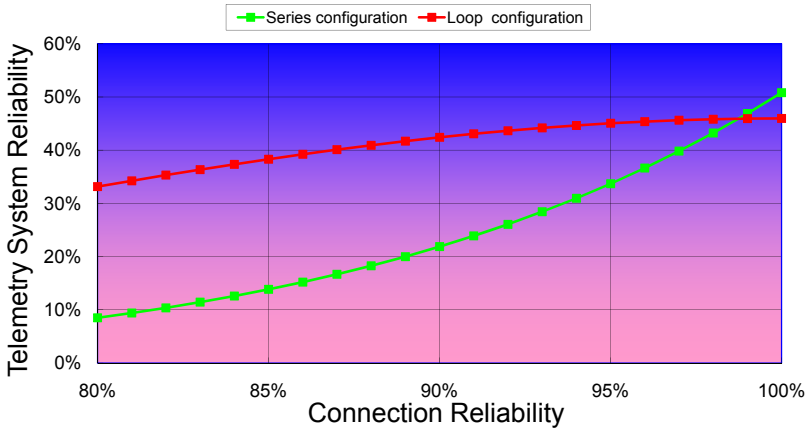
Fault Tolerant System



In the fault tolerant concept, faults are taken as faults occurred in the telemetry cables, the connections and inside the downhole modules themselves. If a fault is detected in the cable, the downhole module closest to the fault will short circuit the center power line with outer shield of the telemetry cable. This is achieved through a built-in relay mechanism inside the downhole module. The switching of the relays in the downhole module adjacent to the fault makes the system operate **two separate telemetry systems on both side of the fault.**

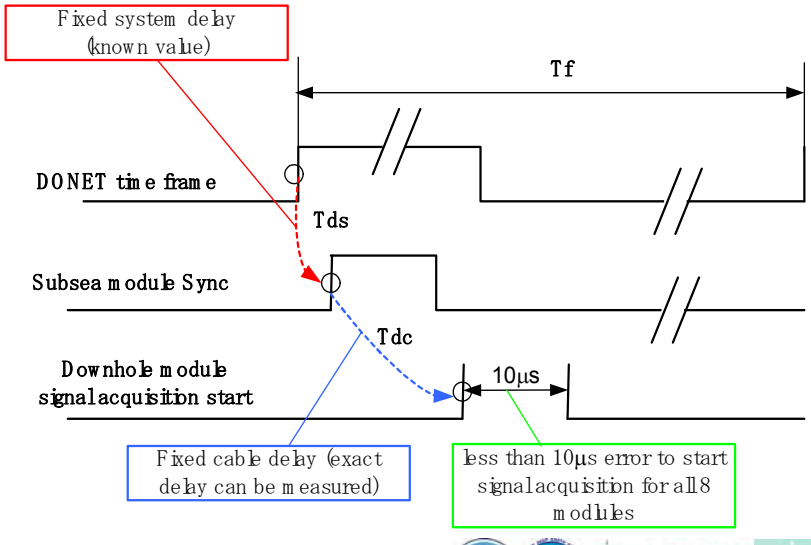
EDP07 @ Salt Lake City, July 16-18, 2008

System Reliability



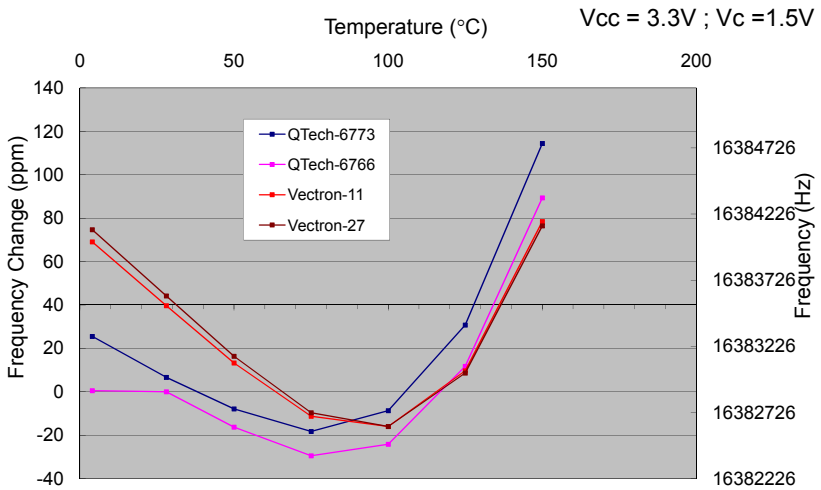
EDP07 @ Salt Lake City, July 16-18, 2008

System Synchronization



EDP07 @ Salt Lake City, July 16-18, 2008

Temperature Dependency of VCOs



EDP07 @ Salt Lake City, July 16-18, 2008

Evaluation Test for fast sampling ADC

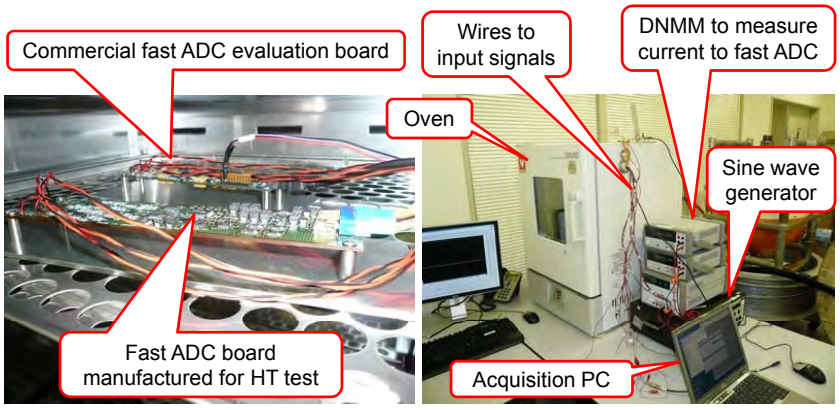
Evaluate fast sampling ADC with respect to the following items in various temperatures up to 150 ℃

Key items

- Signal to Noise Ratio (SNR)
- Total Harmonic Distortion (THD)
- Delay time between input and output
- Current consumption
- Noise drift
- THD drift

EDP07 @ Salt Lake City, July 16-18, 2008

Fast ADC Test Set Up in Oven

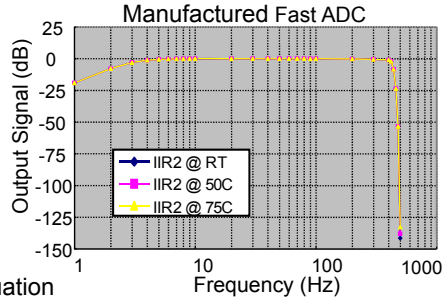


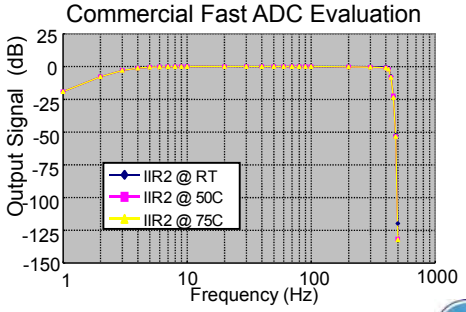
Set up in the HT oven

Test set up

EDP07 @ Salt Lake City, July 16-18, 2008

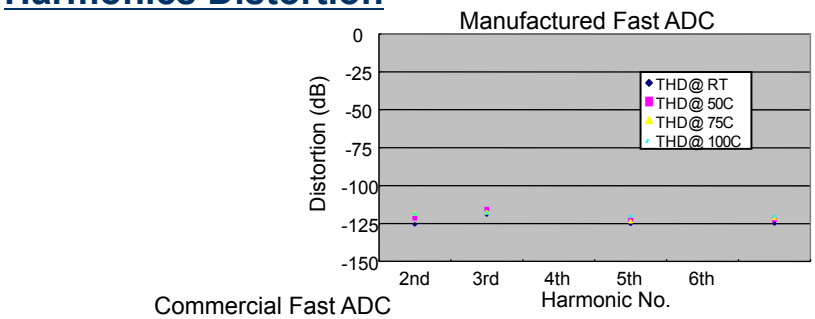
Filter Characteristics

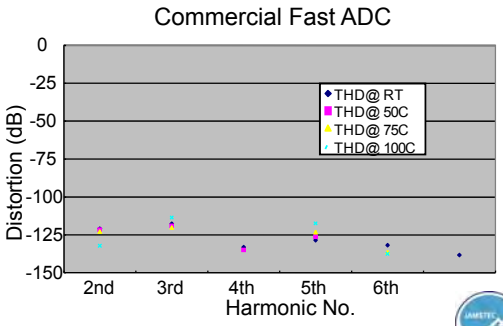




EDP07 @ Salt Lake City, July 16-18, 2008

Harmonics Distortion

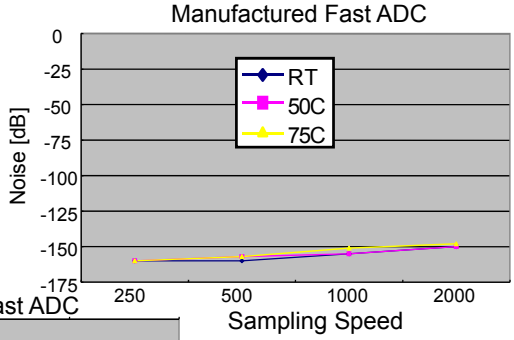


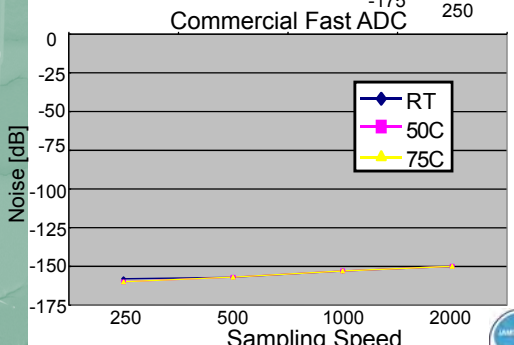


(Input Signal of 31.25 Hz)

EDP07 @ Salt Lake City, July 16-18, 2008

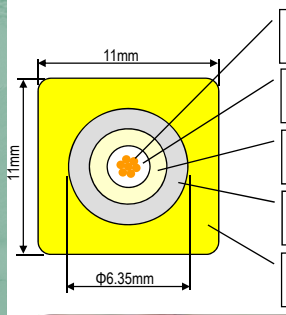
Noise Floor





EDP07 @ Salt Lake City, July 16-18, 2008

Cable Selection (1)



Mechanical Properties

- Collapse pressure: *20,000 psi*
- Burst pressure: *23,000 psi*
- Nominal weight: *217 kg/km*

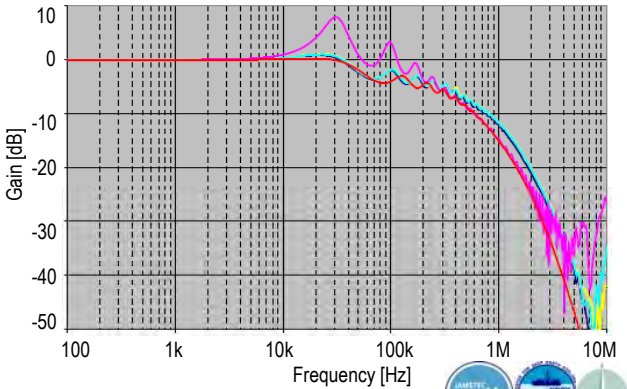
Electrical Properties (@150℃)

- Conductor resistance: *11Ω/1,000ft*
- Tube resistance: *35Ω/1,000ft*
- Capacitance conductor to tube: *28.5 pF/ft*
- Insulation resistance: *15,000MΩ-1,000ft*

EDP07 @ Salt Lake City, July 16-18, 2008

Cable Selection (2)

Cable Type		Mono	T-pair
Cut-Off Frequency (kHz)		60.26	194.98
Attenuation (dB)	2 kHz	0.01	0.04
	512 kHz	-7.48	-9.13
	1000kHz	-11.51	-14.49
	2000kHz	-20.41	-25.79

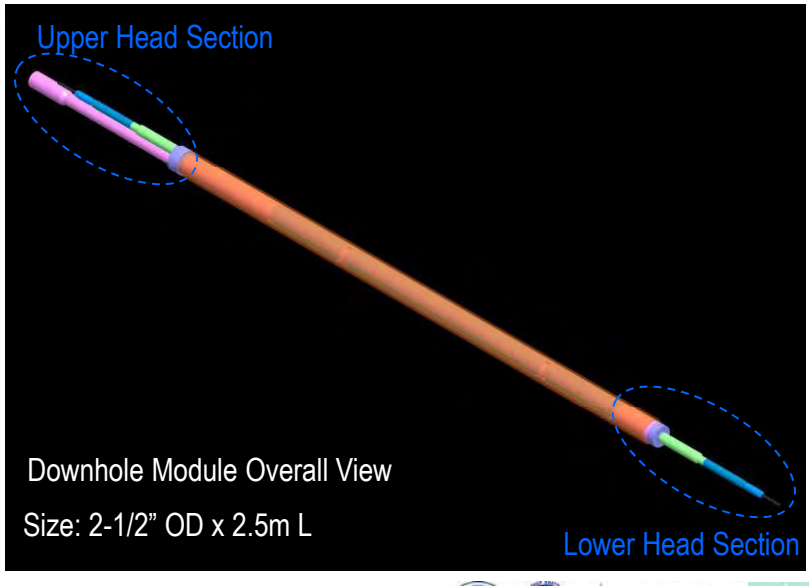


EDP07 @ Salt Lake City, July 16-18, 2008

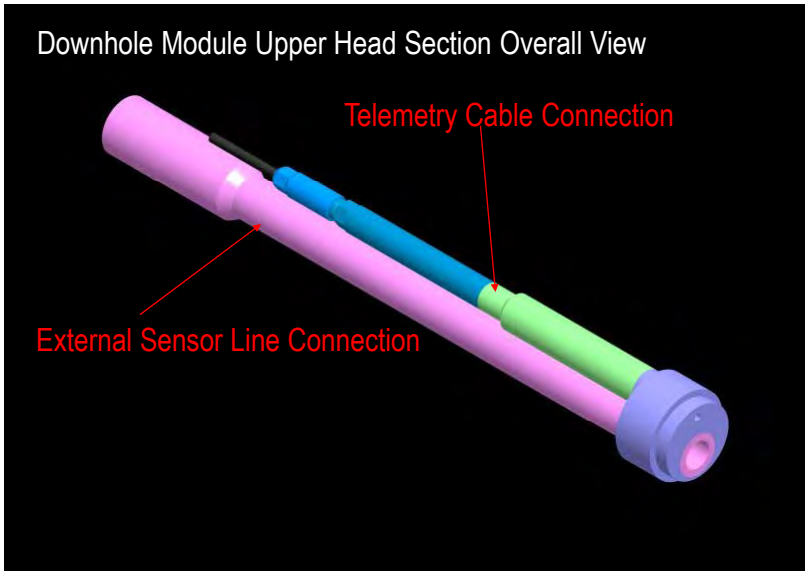
Power Consumption

Element	Current = 100 mA	Current = 200 mA
Subsea	4.32 W	4.32 W
Power for downhole electronics	34.8 W	44.0 W
(Regulator efficiency=85%)	= (27.0+2.59)/0.85	= (27.0+10.36)/0.85
Downhole module	27.0 W (3.37 W x 8)	27.0 W (3.37 W x 8)
Cable	2.59 W	10.36 W
Total	39.1 W	48.3 W

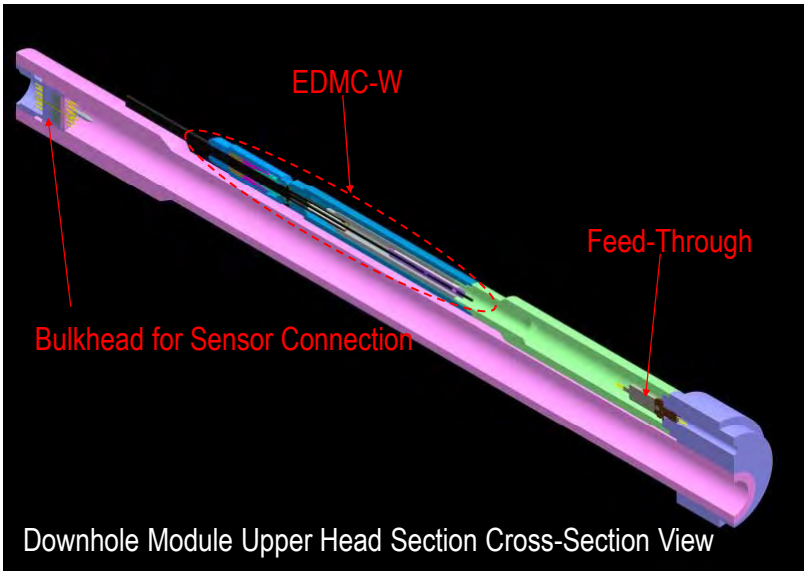
EDP07 @ Salt Lake City, July 16-18, 2008



EDP07 @ Salt Lake City, July 16-18, 2008



EDP07 @ Salt Lake City, July 16-18, 2008



EDP07 @ Salt Lake City, July 16-18, 2008

Destructive Test Plan

Prepare EXP design mockup to apply shock and long-term operational test under high temperature. This is full life evaluation test.

Major test items;

- System reliability under high temperature
  - 150 ℃, 8 months
- System level anti-shock packaging design
  - 250G, 2axis
- Pressure tight housing
  - 16000psi, 135 ℃, 1hr

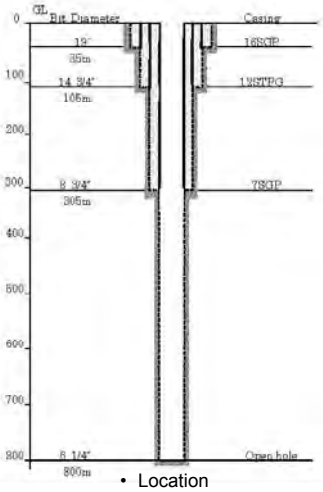
EDP07 @ Salt Lake City, July 16-18, 2008

EXP Field Test Requirements

Deploy downhole equipments in land well to perform field test. Field test plan will describe test procedure, test item and criteria of test. We will finalize this test plan in FY09 before starting the field test. During this test, we will also evaluate deployment handling tools and operation procedure also.

Major test items;

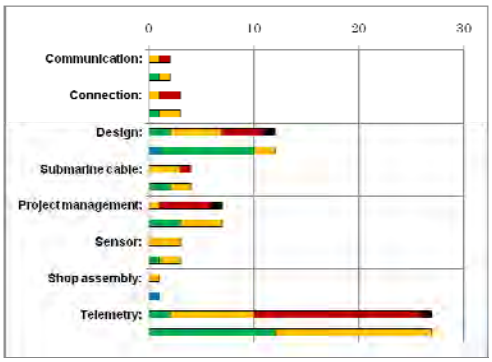
- System reliability in the real well
- Downhole installation
- Deployment handling



- Location
  Tazawa Lake in Akita

EDP07 @ Salt Lake City, July 16-18, 2008

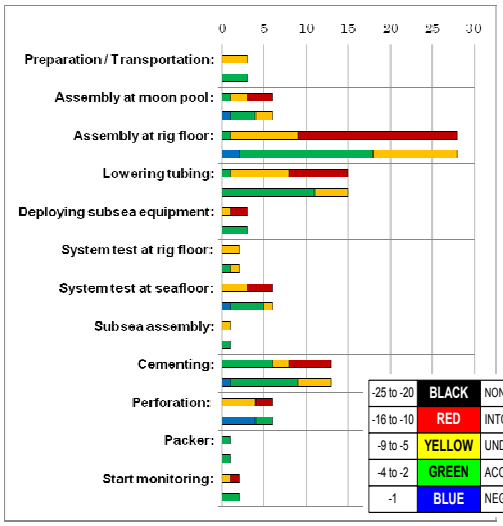
Risk Assessments (telemetry)



-25 to -20	BLACK	NON-OPERABLE: Evacuate the zone and or area/country
-16 to -10	RED	INTOLERABLE: Do not take this risk
-9 to -5	YELLOW	UNDESIRABLE: Demonstrate ALARP before proceeding
-4 to -2	GREEN	ACCEPTABLE: Proceed carefully, with continuous improvement
-1	BLUE	NEGLIGIBLE: Safe to proceed

EDP07 @ Salt Lake City, July 16-18, 2008

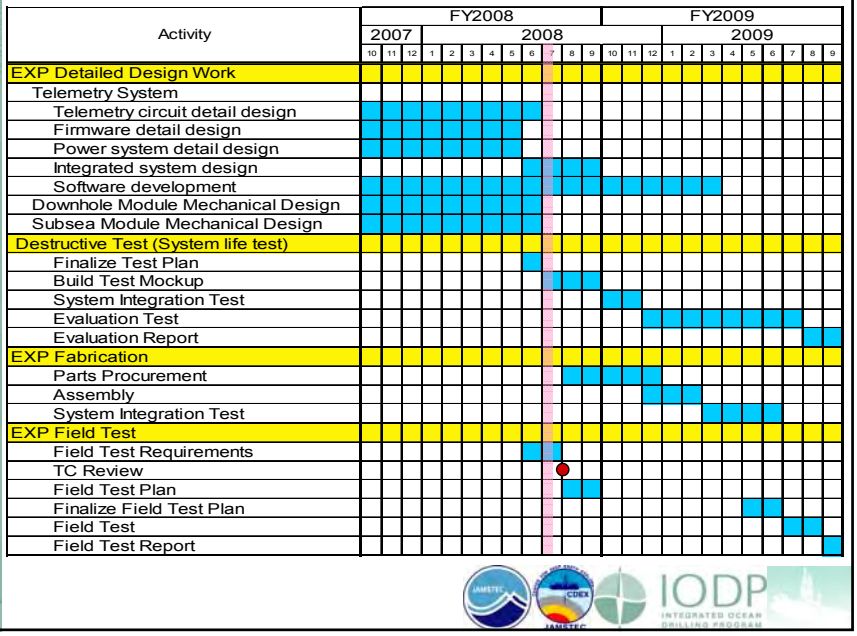
Risk Assessments (operation)



-25 to -20	BLACK	NON-OPERABLE: Evacuate the zone and or area/country
-16 to -10	RED	INTOLERABLE: Do not take this risk
-9 to -5	YELLOW	UNDESIRABLE: Demonstrate ALARP before proceeding
-4 to -2	GREEN	ACCEPTABLE: Proceed carefully, with continuous improvement
-1	BLUE	NEGLIGIBLE: Safe to proceed

EDP07 @ Salt Lake City, July 16-18, 2008

Schedule



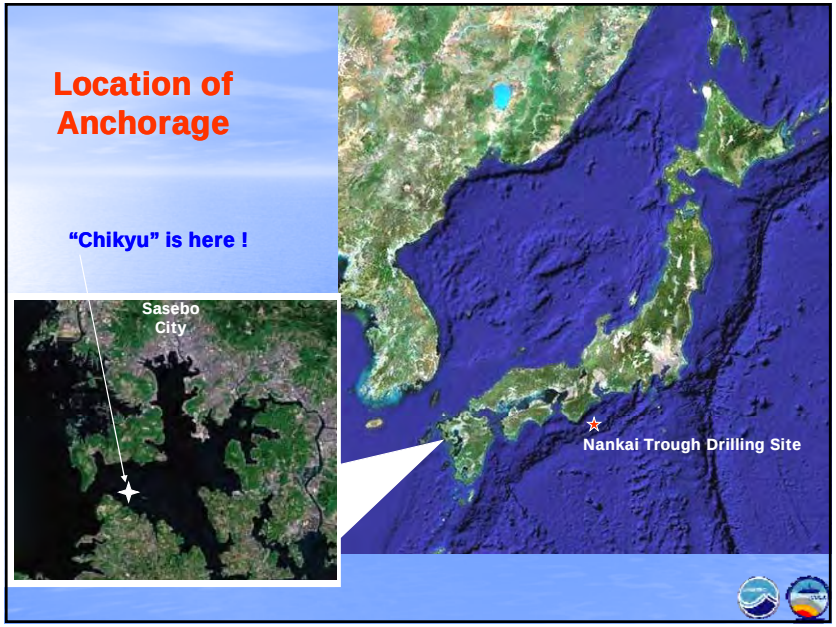
Current Situation of "CHIKYU"

Yoshio Isozaki

Director, Engineering Department
Center for Deep Earth Exploration (CDEX)
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

"Chikyu" at Anchorage

Location of Anchorage

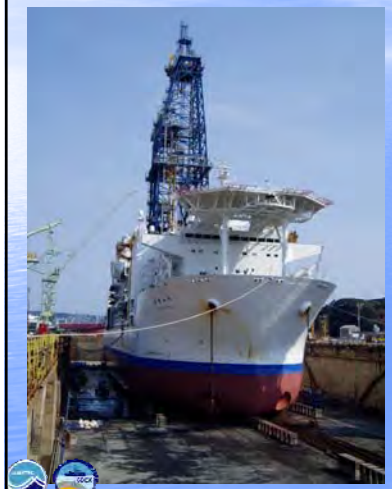


Works onboard "Chikyu"

- Maintenance & Preservation of Machinery & Equipment
- Maturity Training by New Operation Organization
- Preparation of Repair Works of Thrusters
- Preparation on Re-installation of Riser Tensioners
- Research Activities in Laboratory Area

Damage of Azimuth Thruster

Intermediate Survey & Maintenance Works



Duration : Feb. 23, 2008
~ Apr.22, 2008

Location : Sasebo Heavy Industries
Co., Ltd. (Sasebo City)

Azimuth Thruster

Propeller can rotate 360 degrees around the vertical axis to control its propulsive direction.

Motor Power : 4,200 kW

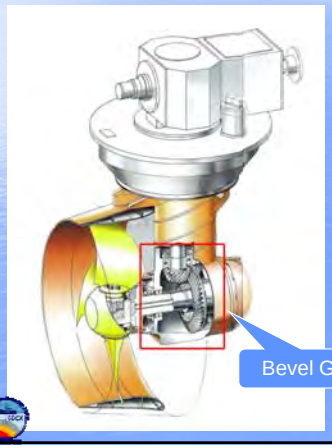
Maximum Propulsion : 72 ton

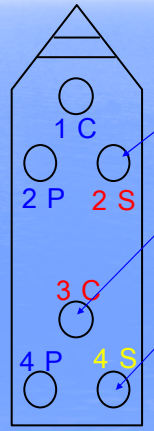
Propeller Speed : 0 to 162 rpm

Rotating Rate : 360 deg / 30 sec

Diameter of Propeller : 3.8m

Damages were found during the planned overhaul inspection in a dry dock after Exp.316.
Several cracks and chip-offs were identified on bevel gears.





Cracks on two teeth

Cracks on one tooth

Chip-off from one tooth and cracks on another tooth (replaced with a spare gear)

Bevel Gear

A set of wheel & pinion to transfer the rotating power toward right angle.

Material of Gear : 17CrNiMo6
(Surface of teeth is hardened.)

Dia. of Wheel : 1,612mm

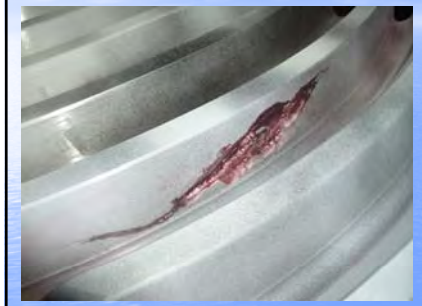
No. of Tooth : 71 on Wheel
16 on Pinion

Design Standard : AGMA
(American Gear Manufacturers Association)

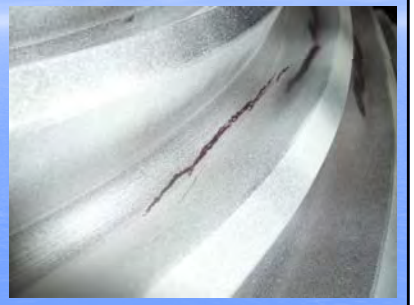
Damage on Wheel of 4S Thruster

Detail of Damage on Wheel of 4S Thruster

Penetrated Cracks on tooth



Pressure side



Non-pressure side

Estimated Cause of Damage :

- Occurrence of Cracks from Surface of Tooth
  - Touch of Pinion Edge with Wheel Tooth Root
- Occurrence of Cracks from Interior of Tooth
  - Insufficient Shear Strength of Wheel Gear
  - Existence of Impurity inside Gear Material

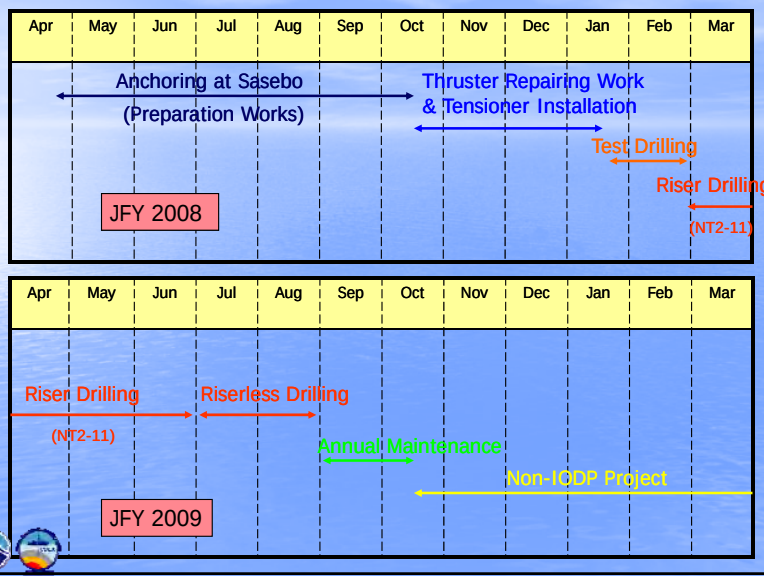
Recovery Measures :

Replacement of all six bevel gears with newly designed and manufactured ones to prevent the recurrence

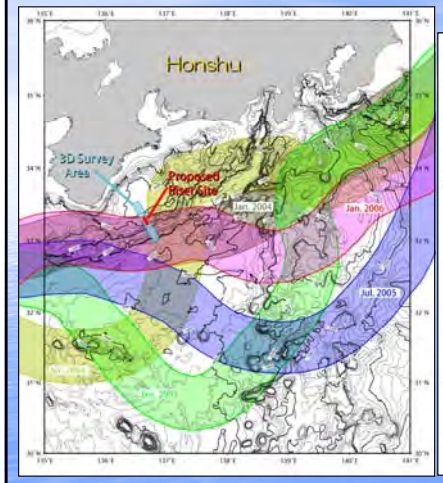
Recovery Schedule :

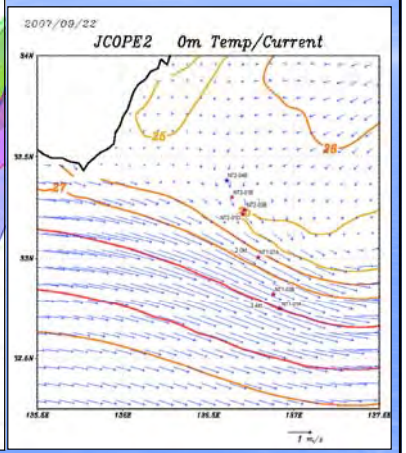
- Manufacturing New Gears ; by the end of Nov. 2008
- Repair Works of Thrusters ; by the middle of Jan. 2009
  - Test will be performed after completion of repair works.
  - Riser tensioners will be re-installed during repair works.

Schedule



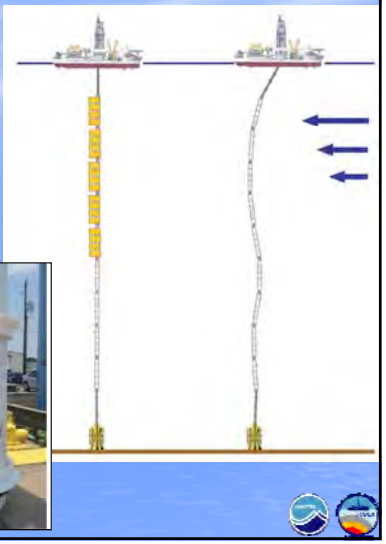
Kroshio Current at Nankai Trough

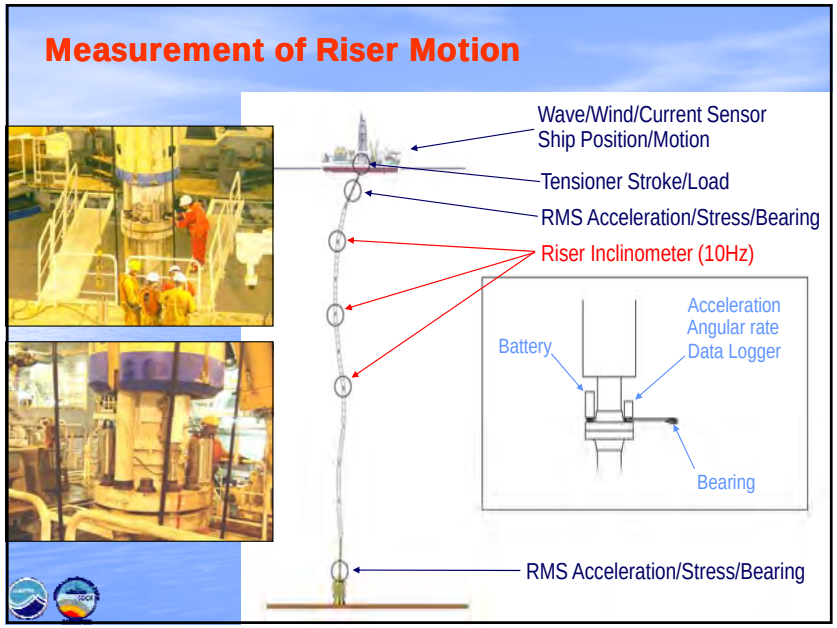




Development of Riser Fairing System

- Reduction of Drag Force
- Suppression of VIV
  (VIV : Vortex Induced Vibration)




Measurement of Riser Motion
Wave/Wind/Current Sensor
Ship Position/Motion
Tensioner Stroke/Load
RMS Acceleration/Stress/Bearing
Riser Inclinometer (10Hz)
Acceleration
Angular rate
Data Logger
Battery
Bearing
RMS Acceleration/Stress/Bearing

IODP
INTEGRATED OCEAN DRILLING PROGRAM

EDP Meeting
Salt Lake City
15th-18th July 2008

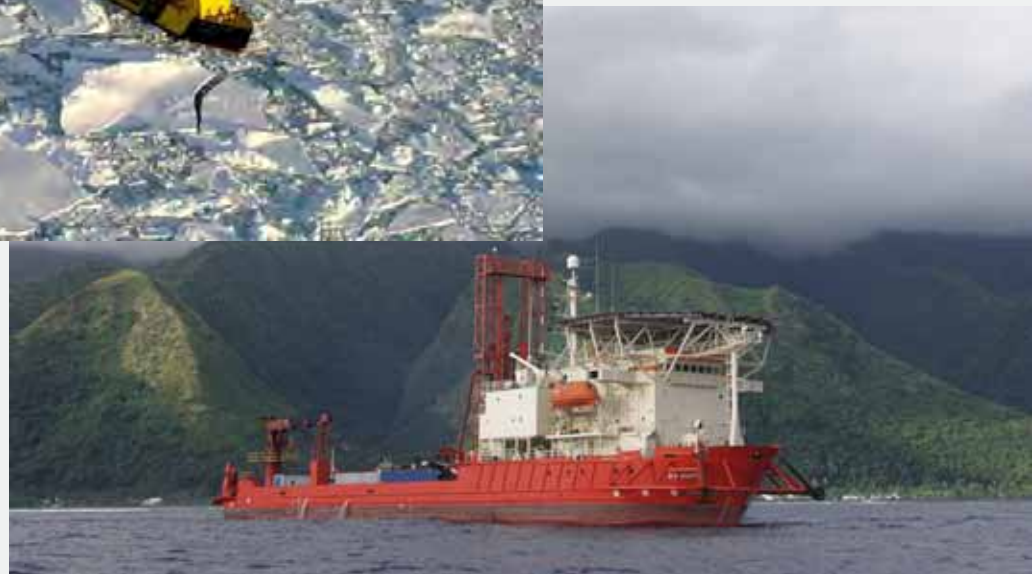
NJ Drilling 2009
GBR Drilling 2009/10
Alternative Drilling Developments

Dave Smith

ECORD Science Operator

IODP Mission Specific Platforms

2004 Lomonosov Ridge
2005 Tahiti Sea-level
2009 New Jersey
2009 Gt Barrier Reef



New Jersey 2009

90 day project
May – August weather window
1 x LWD borehole to 800m
3 x borehole coring to 800m

Platform – Lift Boat
Drilling Rig – Land based coring
Scientific infrastructure – 9 ISO 20ft containers
- 3 offices – including IT/LAN, database, sat comms/email etc.
- 1 Petrophysics
- 1 core laboratory
- 1 core curation
- 2 refrigerated core storage
- 1 general spares/logging

Slimhole wirleine logging and VSP

Current status:
Evaluating tender returns with a hopeful start date of 1st May 2009 on site

Drilling Platform

L/B Kayd

ECORD Science Operator

L/B Kayd Deck

ECORD Science Operator

Accommodation

Accommodation

Drilling Rig

Great Barrier Reef 2009/10

Up to 45 day project
Oct-Dec weather window
Water depth 40-100m
No. of sites: TBD

Similar project to Tahiti sea level change
Platform – DP based vessel
Drilling Rig – Heave compensated
Scientific infrastructure – 9 ISO 20ft containers, depends on vessel facilities
- 3 offices
- 1 Petrophysics
- 1 core laboratory
- 1 core curation
- 2 refrigerated core storage
- 1 general spares/logging

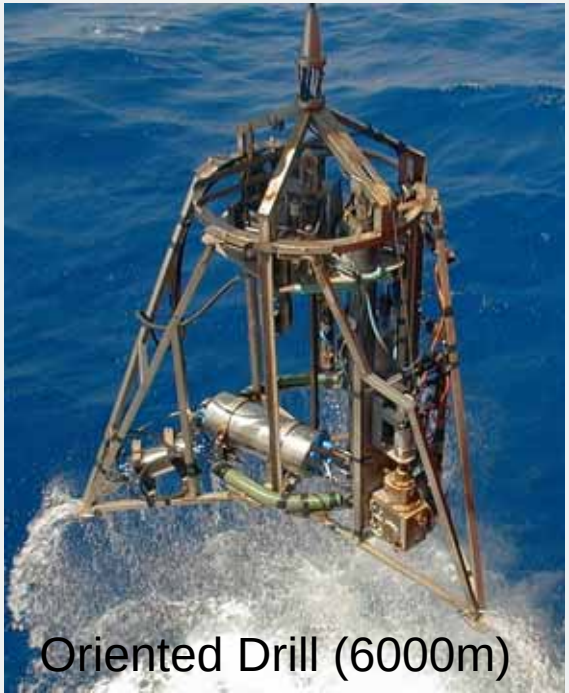
Slimhole wirleine logging

Current status:
Tender returns 8th Aug
Start date – Sept/Oct 2009/10

Alternative Drilling Developments

Why Develop Remotely Operated Coring Tools?

- Up to 4 times cheaper to operate than a Drill Ship
- Operate on vessels with other coring systems or science
- Can go to places that Drill Ships cannot, e.g. Antarctic
- Can collect core samples that cannot be collected by any other means - e.g. Oriented Cores



BGS Remotely Operated Seabed Corers

Clients

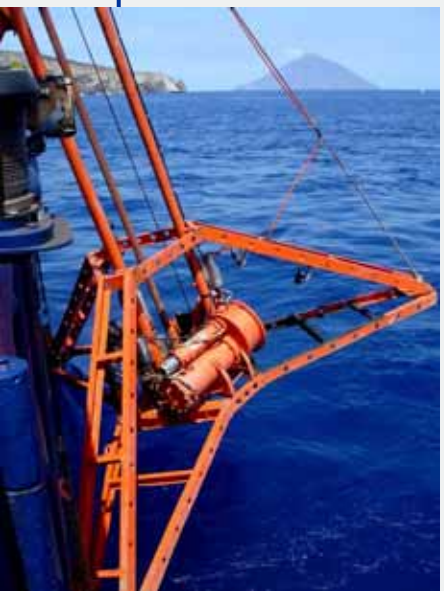
British Geological Survey
British Antarctic Survey
UK & European Universities
Geus
Geomar
DeBeers
Oil Service Companies
Renewable Energy Companies

Projects

Regional Mapping
Diamond Exploration
Gold Exploration
IODP Science
Antarctic science
Arctic science
Marine Habitats
Pipeline Surveys
Law of the sea
Gas hydrates
Volcanic Flows
Tidal Power Generation

Locations Operated

UK, Europe
Arctic
Antarctic
PNG
South Africa
Indian Ocean
West Coast USA
Mid-Atlantic Ridge
Caribbean
Costa Rica
Hess Deep



Deep Water Vibrocorer

Operates to 2000m WD

Scientific and industry requirement for 5000m WD

Under desk study for development proposal

ECORD Science Operator

Deep-Sea Hammer Corer

Developed to operate to 5000m WD & 30m Penetration

Requires to be pulled out of the ground

Currently no umbilical

Longer cable and winch?

Other Ideas?

- Powerless umbilical
  - Acoustic telemetry control
  - Batteries
- Hot stab from ROV

ROV Drill

Advantages

- Pin point position
- Drill on cliff faces
- Can go where other drills cannot
- Add on tool skid
- Has power, communications and sensors (video)

Disadvantages

- Limited power
- Has to overcome neutrally buoyant platform

BGS 15m Seabed Rockdrill

UK's first Multi-barrel sub-sea drill

Increased coring ability

Multi-barrelled

Core depth 15m+ (40m)

Design water depth 4000m

Working water depth to date 3100m

On going development

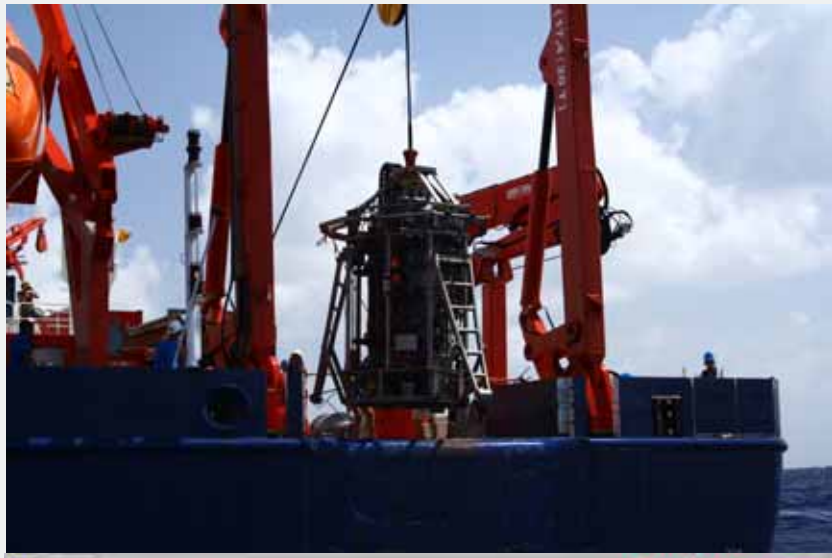
Developments

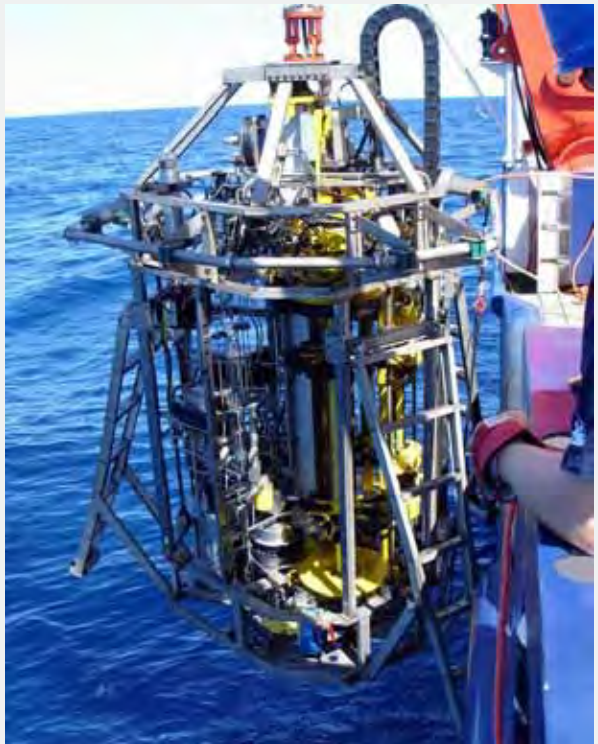
Wireline Implementation

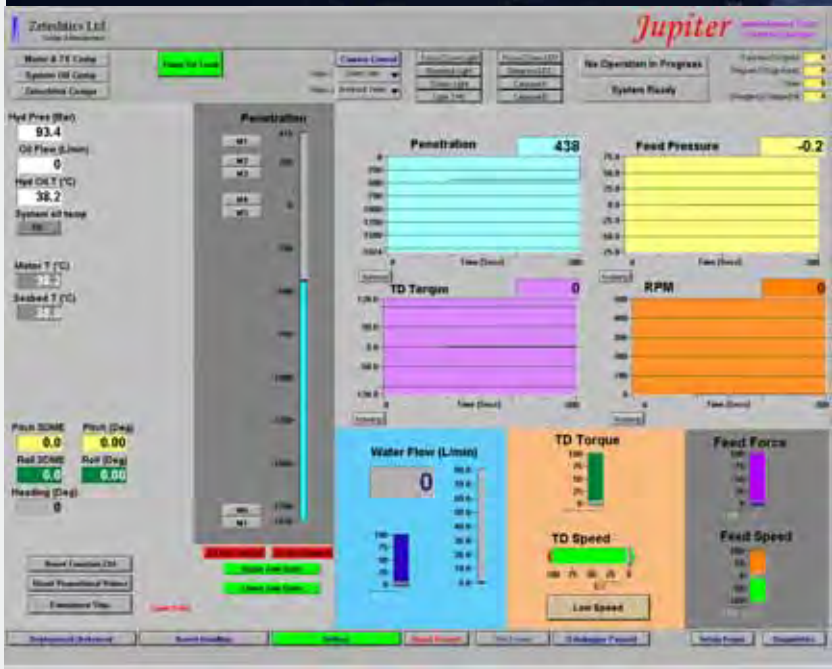
- Increased recovery
- Improved recovery quality
- Improved recover rate
- Protects Borehole
- Reduce Costs

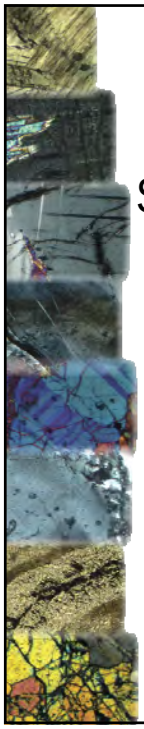
Launch & recovery system

Wireline logging tools









IODP-USIO
Status of FY08 Engineering Activities

EDP Meeting
Salt Lake City, 16-18 July 2008

IODP
Integrated Ocean Drilling Program
United States Implementing Organization

Overview of FY08 Engineering Activities

- SODV Project
  - Vessel conversion
  - Heave compensation
  - 6-5/8" Drill Pipe infrastructure
  - Rig instrumentation
- Drilling Sensor Sub (DSS) and Retrievable Memory Module (RMM)
- Formation Sampling and Measurement Tools Upgrades and Testing
  - APCT3 implementation
  - Common Data Acquisition (CDAQ) system
  - Sediment temperature tool (SET)
  - Metrology Lab
  - Simulated Borehole Test Facility (SBTF)
  - Instrumented Water Sampler (IWS)
- Riserless Mud Recovery (RMR) system (DeepStar)

IODP

SODV Status

Ship to leave Singapore for Darwin: 11 Oct 2008

SODV Status: Heave Compensation

- Active heave compensation
  - After meetings with industry experts, it was decided to removed the Active Heave Compensator (AHC) and resume operations with only the Passive Heave Compensator (PHC).
  - AHC will be stored in College Station. It can be returned to the ship if needed.
- Passive heave compensation (PHC) refurbishment
  - PHC is being optimized for performance
  - Cylinders refurbished by Maritime Hydraulic in Canada
    - Cylinders re-chromed
    - ID increased from 17.000" to 17.050" (.050" over specified diameter) to remove pitting from cylinder ID
    - New seals and seal carriers designed for increased cylinder ID
    - Delivered to Singapore on 4 July
  - Rods delivered 30 June 2008
  - Installation of PHC scheduled to start 18 July
    - Surface finish checked on rods and cylinders
    - PHC rods & cylinders re-chromed and re-installed
    - Accumulator Pressure Vessel (APV) refurbished
    - Pneumatic high pressure piping optimized

SODV Status: 6-5/8 Drill Pipe

- 6-5/8" Drill Pipe Infrastructure
  - All three pipe rackers on the JR were modified to carry 6-5/8" drill pipe
    - Can carry 2800 m of 5-1/2" or 6-5/8" pipe in each pipe racker
  - Acquisition of Elevators for 6-5/8" drill pipe
    - Quotes received from Blohm & Voss and Access Oil Tool
      - Blohm & Voss quoted sleeved elevators that will fit a range of drill pipe
      - Access Oil Tool originally quoted 6-5/8" elevators and is in the process of revising their quote for sleeved elevators
- Drill pipe
  - No 6-5/8" drill pipe ordered at this time
  - In interim, pipe may be rented if expedition requires it
  - Initial drill pipe inventory for leaving Singapore
    - 5-1/2" pipe: 1987 m
    - 5" pipe: 4295 m

SODV: Rig Instrumentation Systems (RIS)

- Epoch Well Services RIGWATCH 8 system installation scheduled for Sept. 2008
  - Ability to collect and monitor over 100 data inputs at 1 Hz
  - Ability to collect and monitor selected data at 10 Hz
  - New rig instrumentation sensors
  - Two-way MWD and LWD transmissions (WITS)
  - IODP measurement systems
  - Data from third party systems
- Depth Tracking system for heave compensation
- Capability to calculate Mechanical Specific Energy will be available
  - Uses subset of RIS data and presents a display for driller to use to improve drilling efficiency
  - Basic principle –improve drilling efficiency by decreasing bit vibration
  - IODP personnel will attend MSE training in September
- Data stream will be transmitted over ODL and IODP networks and stored in IODP data base
  - Data base will be accessible to scientists on first expedition

Drilling Sensor Sub (DSS)

- DSS background
  - An instrumented drill collar sub that is installed just above the outer core barrel (~40 ft behind the bit).
  - Records WOB, TOB, Annulus pressure and annulus temperature at one second intervals.
  - Additional measurements can be added.
  - Data set not available until the DSS is recovered.
- Retrievable Memory Module (RMM) background
  - Instrumented core barrel that receives data from the DSS during coring operations.
  - Collects data on WOB, TOB, Annulus pressure and temperature.
  - Recovered after each coring run and data is downloaded.

Drilling Sensor Sub (DSS)

- Project history:
  - 2001: Project launched
  - 2003: First deployments on ODP Legs 208 and 210 (with RMM on 210)
  - 2005
    - DSS and RMM tested at Schlumberger Test Facility with data successfully transferred between DSS and RMM
  - 2006
    - Tools sent to APS for analysis and repair and recalibration
    - New software installed to correct coefficient errors
    - Bench testing gave accurate readings on both WOB and TOB
  - 2007
    - Both tools returned to TAMU with accurate readings on all sensor output
    - 31 March 2007 Drilling test
    - 17-18 May 2007 Pressure test
    - 21-22 June DSS/RMM Test
    - August 2007 DSS/RMM test cancelled due to communication failure
  - 2008
    - Bench testing at TAMU was successful with DSS/RMM communication
    - 9 May—DSS and RMM tested in drilling environment at Schlumberger
      - DSS failed to initiate data collection
      - Problem found to be faulty wire connection in surface communication cable

Drilling Sensor Sub (DSS)

- Project schedule:
  - 19-20 September 2008
    - Drilling test scheduled
  - November 2008
    - Acceptance of DSS/RMM
    - Closure of DSS/RMM acquisition project
  - Early 2009
    - Sea trial

APC Temperature Tool

- Development history:
  - January 2003: Project launched by Andy Fisher
    - Texas A&M designed mechanical parts tool
    - ANTARES designed internal electronics
  - February 2005: Mechanical parts complete and delivered to UCSC
  - July 2005: Prototype electronics tested at UCSC
  - September-October 2005: Prototype APCT3 deployed on Exp 311
  - August 2007: Tools calibrated at Scripps in San Diego

APC Temperature Tool

- Implementation Project
  - April 2007: project launch
  - July-September 2007
    - Delivery of ANTARES tools (CDEX and USIO)
    - Calibration of all APCT3 tools in USIO Metrology Lab
  - November 2007
    - Deployed successfully 8 times on *Chikyu* during expedition 315
  - December2007
    - Additional APCT3 electronics calibrated and sent to *Chikyu* for deployment on Expedition 316
  - January 2008
    - Two tools operating on *Chikyu* on Expedition 316
  - May 2008
    - Additional cutting shoes sent to CDEX for use on the *Chikyu*
    - APCT3 electronics from Chikyu received in College Station for calibration
    - One calibrated APCT3 electronics sent to *CDEX* for training
    - APCT3 tools accepted and PO with Antares closed out with condition that Antares provide data file formats

Common Data Acquisition (CDAQ) System

- Background
  - Current Data Loggers
    - Support for current data loggers no longer available
    - Current data loggers have come to the end of technological lifespan
    - Technological advances have lead to breakthrough levels of accuracy and flexibility
  - CDAQ
    - Calibration, maintenance and repair done in-house
    - Software and hardware optimized for conditions pertaining to IODP operations
    - Spare stock quantities can be decreased
    - Owning rights to software and hardware allows expansion without being restricted by vendor proprietary rights

Common Data Acquisition (CDAQ) System

- Project history
  - August 2006: Project launched
  - July 2007
    - Prototype boards fully populated for testing
    - Software developed
  - August 2007
    - System integration firmware for DVTP replacement tool, Sediment Temperature Tool (SET)
  - November 2007
    - Final Board Production and user interface complete
    - Hardware for mounting in SET received
  - December 2007
    - Hardware and board assembled for SET
    - Parts shipped to *Chikyu* for initial deployment on Expedition 316
  - January 2008
    - SET tool with CDAQ electronics arrived at *Chikyu* 3 Jan
    - SET run successfully on *Chikyu* 3 times
  - June 2008
    - Project Acceptance by committee (Acceptance team chair: Peter Flemings)
    - Project closure anticipated by end of July 2008

Sediment Temperature Tool (SET)

- Background:
  - Replaces DVTP/P tools for better data acquisition rates, maintainability, software interfaces
- Project history:
  - August 2007
    - System integration firmware completed
  - November 2007
    - Hardware for mounting CDAQ in SET received
  - December 2007
    - Hardware and board assembled for use in prototype SET
    - Parts shipped to *Chikyu* for initial deployment on Expedition 316
  - January 2008
    - SET tool with CDAQ electronics arrived at *Chikyu* 3 Jan
    - SET tool run successfully 3 times on *Chikyu*
  - March 2008
    - SET tool returned to College Station after use on *Chikyu*
  - June 2008
    - Mechanical parts for five (5) SET tools on order

Metrology Lab

- Background
  - IODP determined a need for an in house temperature and pressure calibration and testing facility for down hole temperature and pressure tools
  - A Deadweight tester (DWT) was purchased for pressure transducer calibration
  - Temperature bath and Standard Platinum Resistance Thermometer (SPRT) were purchased for temperature calibration
  - Annealing furnace and additional SPRT
  - Metrology lab facility construction and configuration
  - National Conference of Standards Laboratories membership
  - Calibrations performed to National Institute of Standards and Technology (NIST) traceable standards

Metrology Lab

- Project history:
  - 2006 Project launched
    - Deadweight Tester (DWT), temperature bath, standard platinum resistance thermometer (SPRT) acquired for use in calibrations
  - June 2007
    - Membership in NCSLI and purchase of NCSLI Recommended Practices
    - Purchase of Calibration Standards
  - July 2007
    - APCT Calibration Procedures
    - Thermistor/Pressure transducer calibration procedures
  - August 2007
    - Review of Standards and Procedures Complete
  - October 2007
    - Initial draft of Calibration Program Quality Assurance Manual
  - November 2007
    - Release Calibration Program Quality Assurance Manual
- Project schedule:
  - August 2008
    - Acceptance testing scheduled for week of 8 August by committee
    - Project closure anticipated by end of September 08
  - Future possible expansion of capabilities
    - Capabilities to calibrate temperatures up to 250ºC

Simulated Borehole Test Facility

- Background
  - Sea trials of Davis-Villinger Temperature-Pressure Probe (DVTPP) and Instrumented Water Sampler (IWS) result in the need for a shore based facility for testing of IODP's probe type tools prior to deployment at sea
  - The concept of a Simulated Borehole Test Facility was developed with the following scope:
    - Design for testing probe type penetration tools and piston coring systems in sediment
    - Design to simulate dynamic tool insertion into sediments under lithostatic pressures up to 400 psi (~150 mbsf) and hydrostatic pressures up to 3000 psi (~2000 mbsl)
    - Use a "standard" sediment with a known and controllable density and porosity
    - Sediment tank instrumented with pressure transducers and thermistors for evaluation of temperature and pressure tools

Simulated Borehole Test Facility

- Project history:
  - 2003 Project launched
  - May 2007
    - Second consolidation press acquired
    - Sediment consolidation method automated
    - Sediment sample inserted in SBTF and tested under pressure
  - June 2007
    - Sediment samples produced at 400 psi (~150m overburden)
  - July 2007
    - SBTF pressure and temperature sensors installed
    - SBTF test using DVTP—pressure port failure
  - July 2008
    - Acceptance Testing by committee
      - Linear encoder failed
      - All other criteria passed
    - Purchase/repair of replacement linear encoder
- Project schedule:
  - August 2008
    - Expected acceptance test completion
    - Expected projected closure by end of September 08

Instrumented Water Sampler (IWS)

Background

- IWS developed in 2002 in an effort to provide a more reliable tool with improved sampling capability
  - To replace Water Sampling and Temperature Probe (WSTP)
  - Uses Scripps Institute of Oceanography modifications to the hydraulic and mechanical elements of the Fisseler Water Sampler (FWS) to include motor driven screw to operate syringe piston
- Samples up to 40 ml of fluid in ~20 min
- Collects temperature and pressure measurements during sampling
- Programmatic feedback on sampling control based on load on syringe motor
- A prototype IWS tool was deployed for sea trials on ODP Leg 208
- Data collected on Leg 208 resulted in recommended modifications to the IWS

Instrumented Water Sampler (IWS)

- Project history:
  - 2002: Project launched
  - 2003: prototype tool used on ODP Leg 208
  - May 2008
    - Electronics packaging design completed
    - Mechanical design completed
  - July 2008
    - Motor control board design completed
    - Complete detail drawings and tolerance stack-up
- Project Schedule:
  - August 2008
    - Order mechanical parts and test fixtures
    - Firmware design
  - FY09
    - Receive parts
    - Inspection
    - Assembly and test

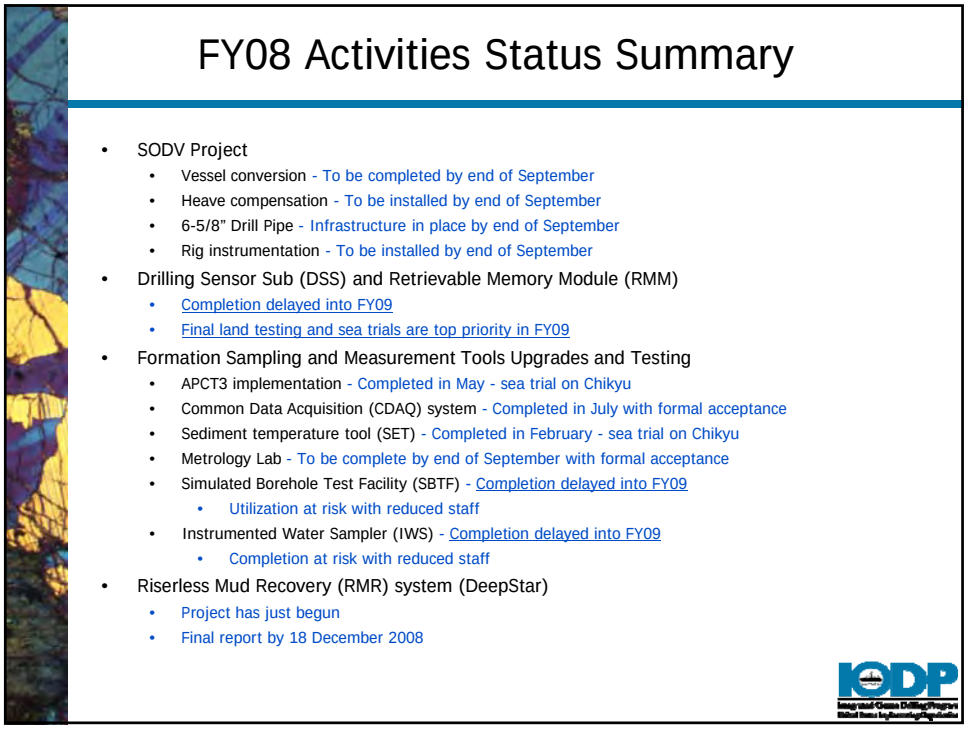
Riserless Mud Recovery System (RMR)

Background

- Feasibility study to determine if AGR's Riserless Mud Return System (RMR) can be used on RV *JOIDES Resolution*.
- IODP-MI contract with DeepStar
- TAMU and AGR subcontracts
  - TAMU Partnership between IODP-TAMU and Harold Vance Department of Petroleum Engineering

Riserless Mud Recovery System (RMR)

- Project schedule
  - May 2008
    - Statement of work for feasibility study approved by TAMU/TAMRF and sent to IODP-MI
  - June 2008
    - Contract between IODP-MI and DeepStar signed
    - Subcontract sent to TAMRF for approval
  - July 2008
    - 1 July—Kick-off meeting held at AGR
  - December
    - TAMU and AGR deliver feasibility study to IODP-MI



FY08 Activities Status Summary

- SODV Project
  - Vessel conversion - To be completed by end of September
  - Heave compensation - To be installed by end of September
  - 6-5/8" Drill Pipe - Infrastructure in place by end of September
  - Rig instrumentation - To be installed by end of September
- Drilling Sensor Sub (DSS) and Retrievable Memory Module (RMM)
  - Completion delayed into FY09
  - Final land testing and sea trials are top priority in FY09
- Formation Sampling and Measurement Tools Upgrades and Testing
  - APCT3 implementation - Completed in May - sea trial on Chikyu
  - Common Data Acquisition (CDAQ) system - Completed in July with formal acceptance
  - Sediment temperature tool (SET) - Completed in February - sea trial on Chikyu
  - Metrology Lab - To be complete by end of September with formal acceptance
  - Simulated Borehole Test Facility (SBTF) - Completion delayed into FY09
    - Utilization at risk with reduced staff
  - Instrumented Water Sampler (IWS) - Completion delayed into FY09
    - Completion at risk with reduced staff
- Riserless Mud Recovery (RMR) system (DeepStar)
  - Project has just begun
  - Final report by 18 December 2008

STP Action Item 0612-29

STP will investigate whether the effects of riser drilling on microbiology and chemistry of cores is significant.

STP Consensus Statement 0802-06: Detection and Control of Contamination Issues During Riser Drilling.

STP proposes that multiple contamination tests using PFT (Perfluorocarbon Tracer), and fortuitous or additional inorganic tracers (e.g., barium, lithium bromide, potassium bromide) be used during riser coring. (Inorganic tracers should not be seen as an alternate to PFT). Sampling of drilling fluids should be scheduled so that microbial communities in this medium can be compared to those in the samples.

Vote: 16 For, 0 Against, 0 Abstentions

Priority: HIGH

STP suggests this be forwarded to IODP-MI, EDP, and SPC

Also, STP asks EDP to investigate drilling fluids and/or techniques that are less likely to adversely impact interstitial water geochemistry, rock geochemistry, and microbiology. The best way to initiate this may be to have an appropriate presentation to EDP by Rick Colwell (STP member).

The SPC accepts STP Consensus Statement 0802-06 related to detection and control of contamination during riser drilling, particularly with respect to microbiology, and forwards it to IODP-MI for discussion and implementation.

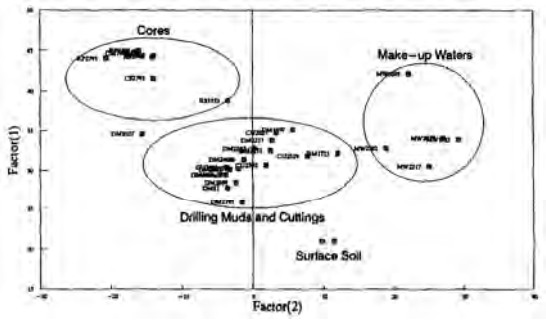
The SPC also endorses the proposal for Rick Colwell to attend EDP as STP liaison to initiate discussion of how EDP can best provide advice on drilling fluids/techniques to minimise adverse impact on interstitial fluids.

Terrestrial coring

Piceance Basin of W Colorado; indurated sandstone 850-2000 mbls; hydro-lift core sampler (Baker-Hughes) used to encase the core in polypropylene glycol gel during retrieval

- Total PLFA in samples was 300 to 10,000-fold lower than in the drilling muds.
- Aerobic, mesophilic heterotrophs at 6 x 10^7 /ml in drilling fluids, none detected in the cores (10^7-fold "protection factor").

Colwell et al. 1997



Taylorsville Triassic Basin; fluvial and lacustrine shales, siltstones, and sandstones 850-2621 and 2804 mbls; sidewall and percussion coring

- Distinctive microbial community profiles (e.g., PLFA) noted in drilling muds, make-up waters, surface soils, and cores

Lehman et al. 1995

Microbiological QA/QC of drilling circulation mud during the riser drilling of Chikyu Shakedown Expedition

M. Masui, Y. Morono, F. Inagaki

Geomicrobiology Group,

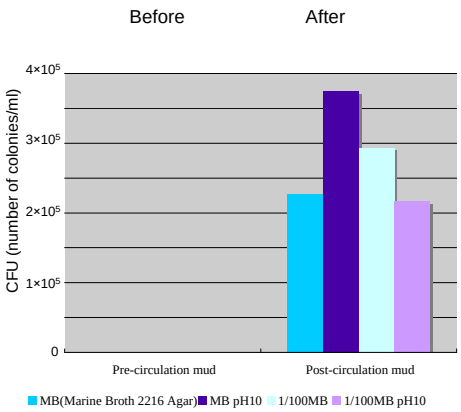
KOCHI, JAMSTEC

N. Masui, Y. Morono, F. Inagaki, in preparation

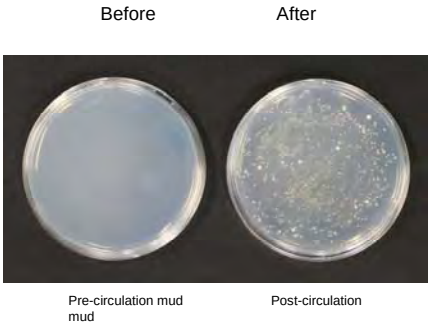
Chemical composition of the riser drilling mud used during the “Chikyu” Shakedown Expedition CK06-06.

PRODUCT NAME	CONCENRATION (wt/vol-Water%)	Å@Å@Å@ÅCÅ@Å@TERISTICS	
		Material	Function
Kunigel-VO	0.87	BentoniteÅiNa-montmorilloniteÅj	Mud base, Viscosifier, Filtration reducer
Barite	1.44	Barium Sulfate	Weighted agent
NaCl	1.91	Sodium Chloride	Gas hydrate inhibitor, Swell and hydrate inhibitor
KCl	6.99	Potassium Chloride	Swell and hydrate inhibitor
NaOH	0.34	Sodium Hydroxide	pH control agent (Adjust to 10.7)
Soda Ash	0.30	Sodium Carbonate	Mugnasium ion treatment
Tel-Polymer(H)	0.20	Polyanionic Cellulose Derivative(High-molecular weight)	Filtration reducer
Tel-Polymer(L)	0.79	Polyanionic Cellulose Derivative(Low-molecular weight)	Filtration reducer
Tel-Polymer(DX)	1.37	Starch Derivative	Mud base, Viscosifier, Filtration reducer
Xan-Vis	0.20	Xanthan GumÅDerivative	Viscosifier
Clean Lube(L)	4.89	Polypropylene Glycol Derivative	Lubricant, Heat resistance agent
Tel-Clean	0.44	Nonionic Surfactant	Lubricant

N. Masui, Y. Morono, F. Inagaki, in preparation



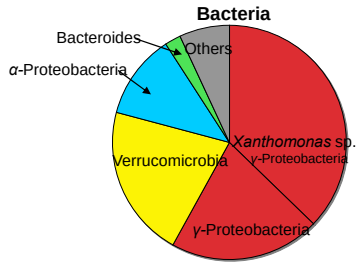
CFU assay of drilling mud samples. Four kinds of medium agar plates were incubated at 25˚C for 2 weeks. No colonies were observed on agar plates of pre-circulation mud. MB pH10,The pH value of Marine Broth solution was adjusted to 10 with Na_2CO_3. 1/100MB, Marine Broth solution was diluted to hundredth in concentration with artificial seawater. 1/100MB pH10, The pH value of diluted medium was adjusted to 10.



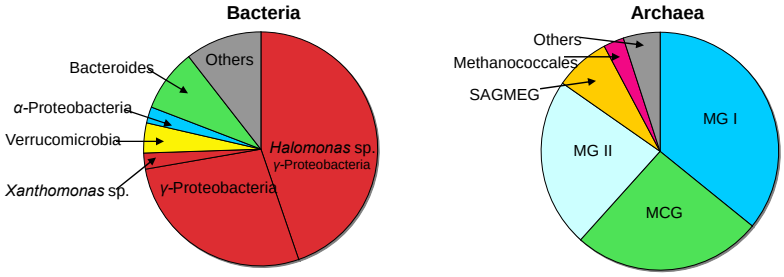
An example for the culture plates which drilling mud samples were spread on agar media.

N. Masui, Y. Morono, F. Inagaki, in preparation

Pre-circulation mud



Post-circulation mud



Summary circle charts of archaeal and bacterial phylotype compositions for 16S rRNA gene clone libraries constructed from drilling mud samples. No clones of the archaeal 16S rRNA gene were obtained from the pre-circulation mud.
MGI, Marine Group I; MGII, Marine Group II; MCG, Miscellaneous Crenarchaeotic Group; SAGMEG, South African Gold Mine Euryarchaeotic Group

Conclusions

- *Xanthomonas* DNA is derived from xanthan-gum, but no microbial growth was observed.
- After the riser drilling, heterotrophic facultatively anaerobic microbes, most likely introduced from the deep subseafloor, actively grow in drilling mud fluids.

Considerations

- IODP should consider **modifying physical and chemical conditions of mud circulation to minimize microbial growth and contamination during the riser drilling**. Sterilization is likely to be impossible or hazardous.
- Consider fresh mud circulation at **pH >12** (near uppermost limit for microbial life).
- High levels of organic matter in the drilling mud causes subsequent growth of microbial contaminants. It is a concern for geochemistry and microbiology of cores. **Switch to inorganic mud constituents when possible.**
- IODP should **perform preliminary contamination surveys** on cores during earliest riser drilling expedition from geochemical and microbiological view points.
- **Maximize the use of hydraulic piston corers**, monitoring bit activity, and redesign of core barrels and drill shoes (D'Hondt et al., 2007)
- Constant use of **fortuitous and purposefully added drilling fluid tracers.**

Ultradeep Drilling

Bill Ussler

July 16, 2008

EDP 3 at the KTB

SPC Consensus 0708-30

The SPC requests that the Engineering Development Panel (EDP) work with IODP-MI and the Implementing Organizations (IOs) to assess the technological needs required to achieve the deep penetrations required for a Mohole.

Two approaches at this meeting

- Invite local drilling industry representatives to educate the panel on state-of-the art drilling technologies
- Review an active drilling proposal with a deep target for technological readiness

Proposal 698-Full2 IBM

- Objective - to obtain a continuous high-recovery sequence of arc volcanic and plutonic rocks to depth of 8km.
- Riser drilling proposed
- Integrated coring, sampling, and logging
- Need representative recovery of lithologies to attain key science goals
- Science goals - document chemical and petrologic evolution of the island arc through time; address origin of continental crust (ISP)

Drilling, Coring, and Logging Plan in Proposal 698Full-2

- 7 nested casings
- 1 year time estimate for hole completion (depends on experience at NT3-01
- Core-log-seismic integration essential to success (depth control)
- VSP and check shots
- Large diameter FMI (need 6 5/8” drillpipe)
- Borehole temperature
- Side-wall coring
- High core recovery expected - lavas, plutonics, metamorphics (fabric)

Deep Drilling Statistics

Site	Water Depth (m)	Borehole Depth (m)	Total Depth (m)	Comments
Proposal 698Full-2	1,798	8,000	9,798	1 year? <250°C
KTB	0	9,101	9,101	4+ years; $338 million; 265°C
Kola SG-3	0	12,262	12,262	24 years; 190°C
Bertha Rogers 1-27	0	9,583 (31,441ft)	9,583	1974 gas well
Nankai NT3-01	~2,000	6,000	8,000	450 days allocated; ~175°C
1256D	3,635	1,507	5,142	~5 months; ~70 °C
JR			**10,290 (SODV)**	Total string length
Deepest hole	3,463	**2,111**	5,574	
Deepest water	**5,980**	560	6,540	
Chikyu (riser)	2,500 (max)	7,000 (max)	**9,500**	<250°C borehole
Deepest hole	1600	**3,400**	5,000	
Deepest water	**2,200**	2,700	4,900	
Chikyu (non-riser)		7,000 (max)	**10,000**	
Deepest hole	1,931	**1,057**	2,988	
Deepest water	**4,081**	494	4,575	

Platform	Hook Load (lb)	Torque (ft-lb)	Passive Heave Load (lb)
KTB	1,800,000		
SODV	1,200,000 - 1,500,000	80,000	800,000
Chikyu	2,755,000 (1250t)		

Other Issues

- Logging wire - KTB 2-cable approach
- Heave
- Time - KTB took 4+ years
- Temperature
- Hole inclination control
- Fishing for lost equipment (time consuming)
- Clear termination point - how to decide to terminate project

Evaluation of Technological Readiness

- Physical oceanography, climate, and weather
  - require as part of site survey package?
- Identify most capable platform
- Drilling plan
- Casing plan
- Coring and sampling plan
- Logging plan
- Seafloor completion plan
- Heave/drillpipe resonance/long-term fatigue issues
- Risk assessment - identify high risk elements of expedition plan
- Identify technology gaps

Drilling proposals at SPC or OTF that would benefit from the ED proposals under review at EDP 7

EDP-2010-01B	EDP-2010-02B	EDP-2010-03B
Deep Rock Stress Tester (DRST)	Anti-Contamination Coring System	Multi-sensor Magnetometer Module (MMM)
537 - CRISP	545 - Juan de Fuca Hydrogeology	612 - Geodynamo
703 - SeisCORK	603 - NanTroSEIZE	626 - Pacific Equatorial Age Transect
	677 - Mid-Atlantic Ridge Microbiology	644 - Gulf of Cadiz
	547 - Oceanic Subsurface Biosphere	654 - Shatsky
	555 - Creten Margin	669 - Walvis Ridge Hotspot
	584 - TAG II Hydrothermal	686 - Southern Alaska Margin 1: Climate-Tectonics
	662 - South Pacific Gyre Microbiology	724 - Gulf of Aden Paleoenvironment

Core Quality & Quantity Assessment Progress Report

Engineering Development Panel
July 17, 2008

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Overall Goals

- To quantify the definition of core quality
- To understand, identify and quantify the full range of issues affecting core quality and quantity
- To provide a series of recommendations as to how IODP might improve core quality by improving existing procedures or by implementing or developing new technology

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Identified Factors

- Core barrel type
- Bit type
- Water Depth
- Borehole depth
- Lithology
- Weather
- Heave
- Weight-on-bit
- Rate of penetration
- Bit rotations per min.
- Torque on bit
- Driller
- Vessel
- And….

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Available Data

- **Core Recovery**
- **Bulk Density**
- Magnetic Susceptibility
- **Natural Gamma Ray**
- **P-Wave Velocity**
- **Moisture Density (porosity)**
- Thermal Conductivity
- Shear Strength
- Color Reflectance
- Point Susceptibility
- Downhole Temperature
- Splicer
- Tensor
- Cryomag
- Paleo Investigation
- Age Profile
- X-Ray Diffraction
- XRD Images
- X-Ray Fluorescence
- Geochemical Measurements
- Smear slides
- Visual Core Descriptions
- Core Photo Images
- **Logging Data: Caliper, lithodensity, Gamma Ray, Porosity**, inclinometry, borehole imagery, etc.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

EDP Consensus 0801-10

The EDP recommends that the core quality and quantity study be separated into two components. **The first component,** which should be completed most promptly**, should provide an assessment of sample quantity based on prior drilling leg experience.** The second component, assessment of sample quality, is equally important but requires more extensive research, is less likely to benefit from legacy leg experience, and may require collection of new data.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Core Quantity

- Examine recovery statistics as a function of:
  - Tool type
  - Water Depth
  - Borehole Depth (mbsf)
  - Lithology

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

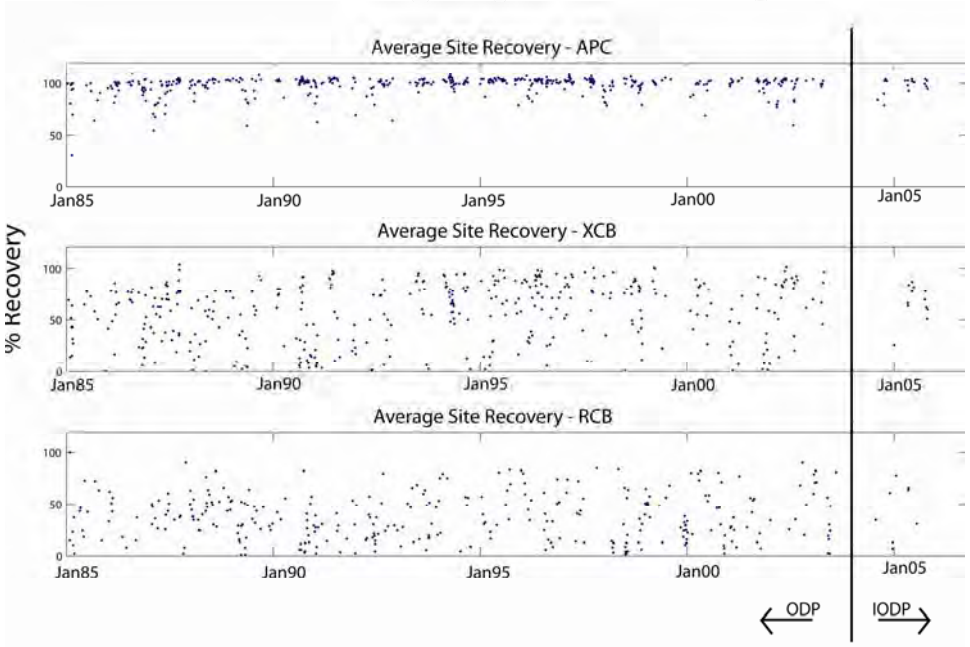
Recovery f (Tool Type)

ODP and IODP JOIDES Resolution Expeditions

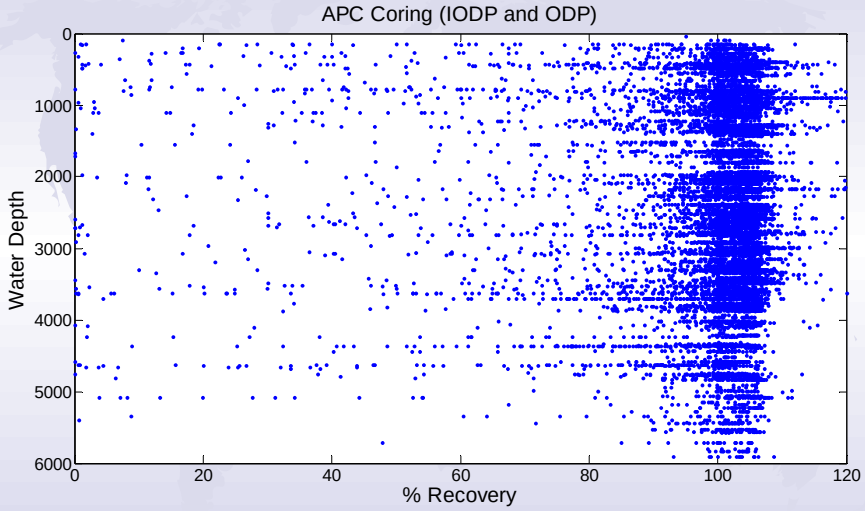
	Total Length Cored (m)	Total Core Recovered (m)	% Recovery	Total Cores (No.)	Over-estimate of Recovery (No.)	% over-estimated
APC	121892	120832	**99.1**	13545	103	0.8
XCB	94816	61799	**65.2**	10406	142	1.4
RCB	110184	47183	**42.8**	12668	46	0.4
MDCB	221	62.55	**28.3**	78	1	1.3
Diamond	514	66	**12.8**	147	5	3.4
PCS	168	86	**51.2**	157	2	1.3

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(Tool, time)

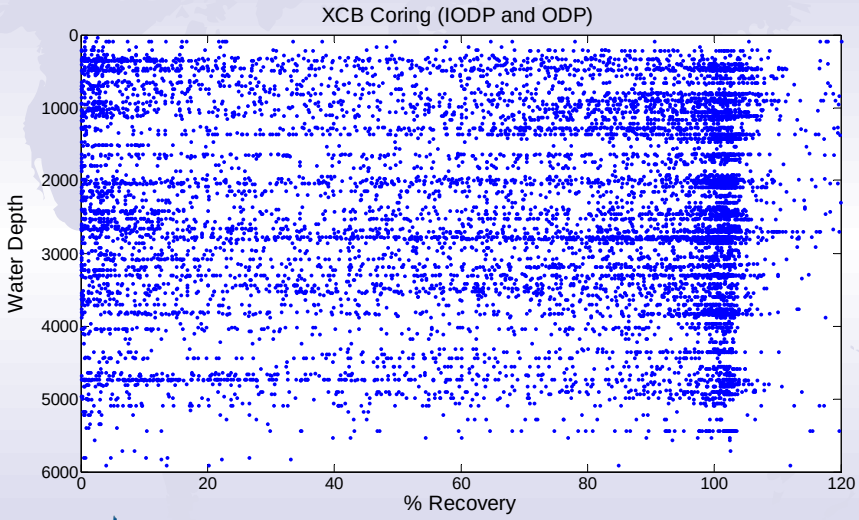


Recovery f(Water Depth) - APC



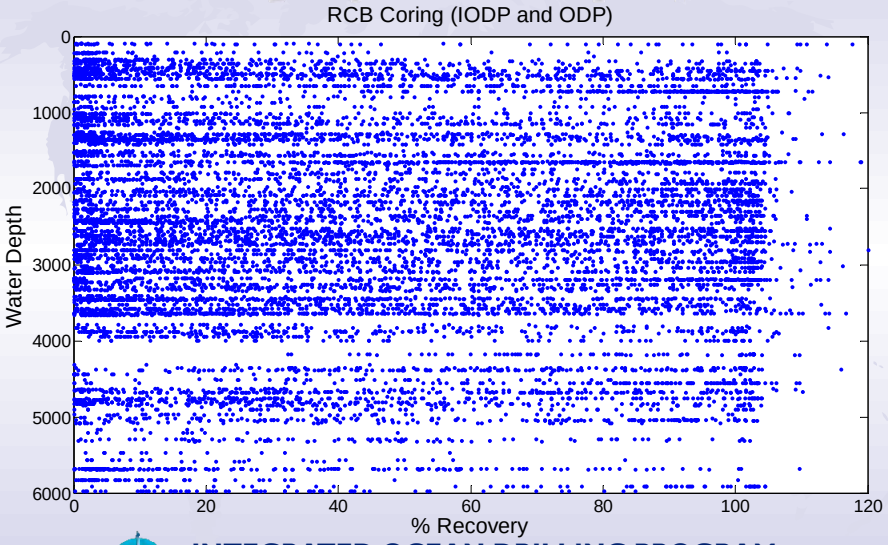
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(Water Depth) – XCB



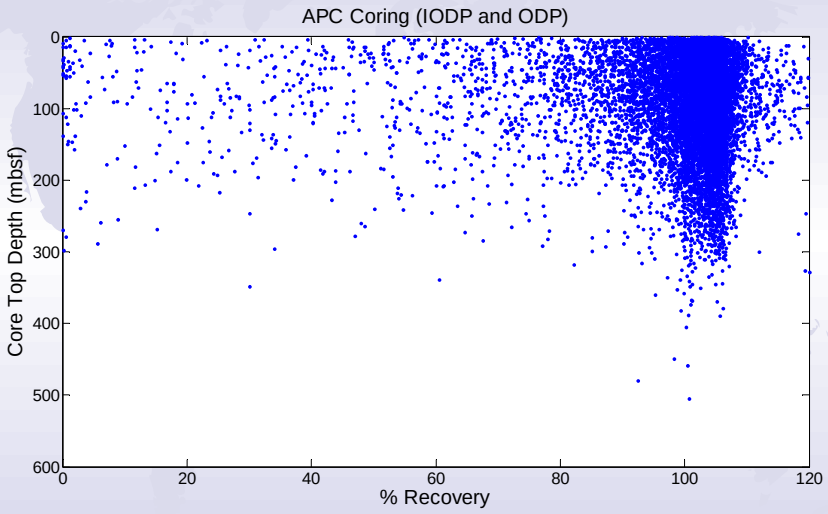
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(Water Depth) - RCB



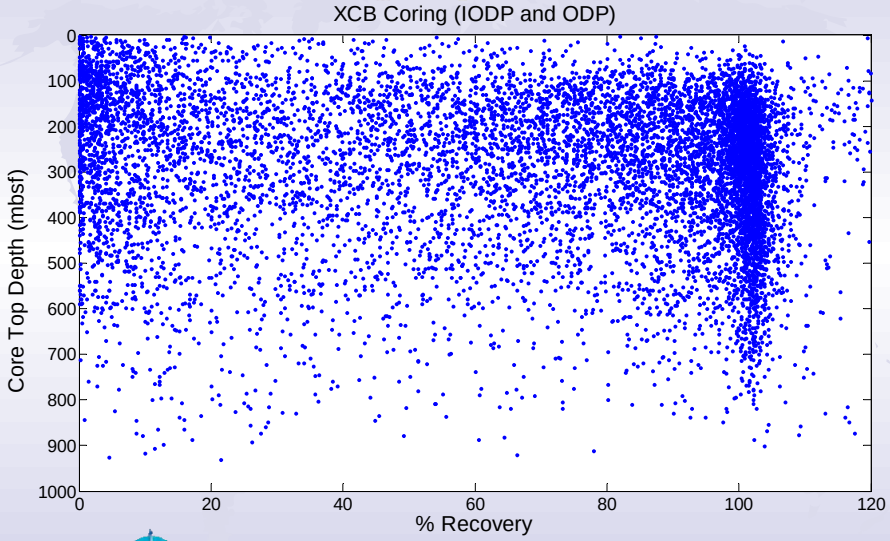
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(mbsf) – APC



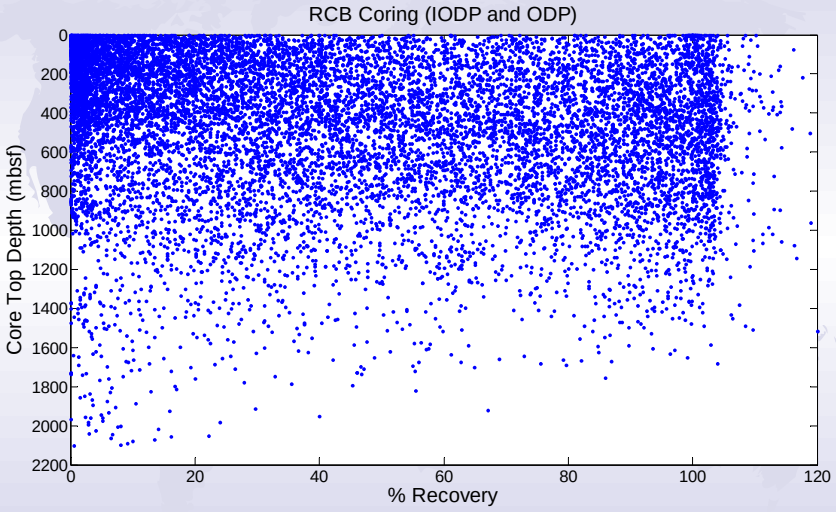
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(mbsf) - XCB



INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(mbsf) - RCB



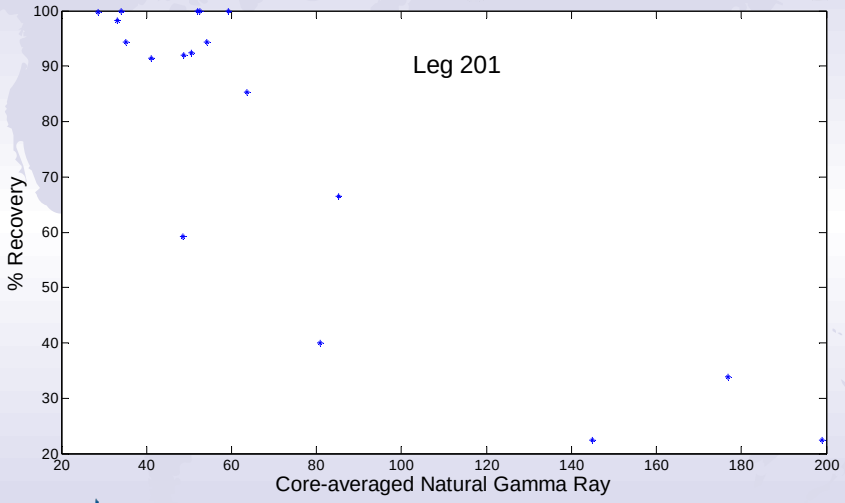
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Recovery f(Lithology)

- 37000 cores examined – lithology is not a variable you can download…yet…what to do?
- General plot of Recovery vs. NGR?
- Ternary chart?
- Any suggestions?

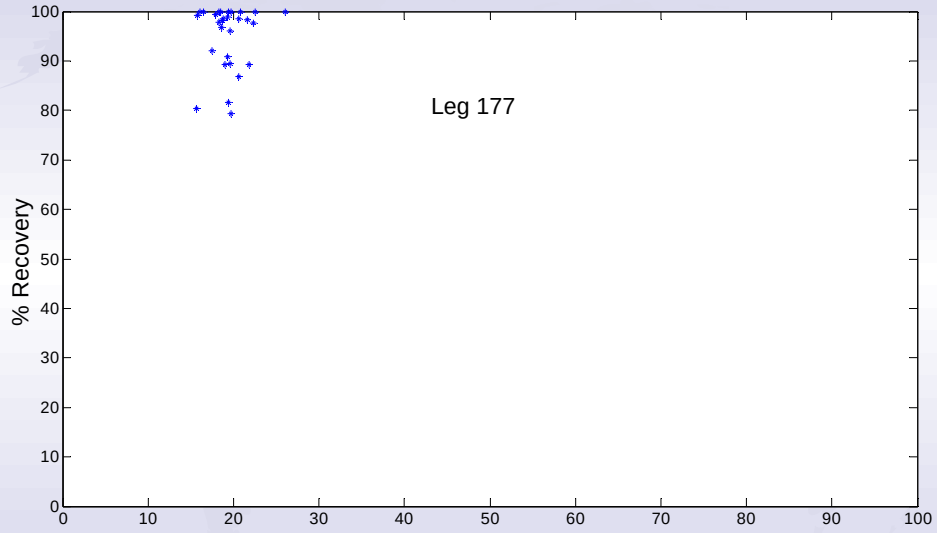
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Natural Gamma Ray vs. Recovery



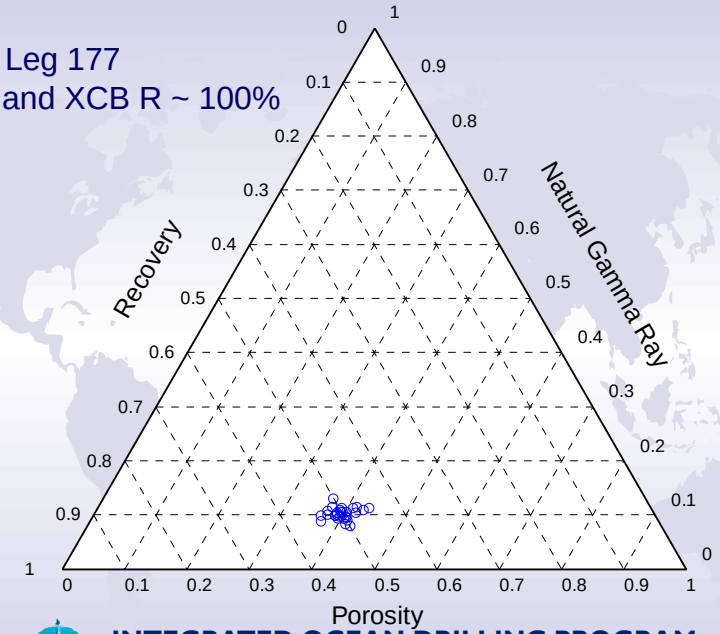
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Natural Gamma Ray vs. Recovery

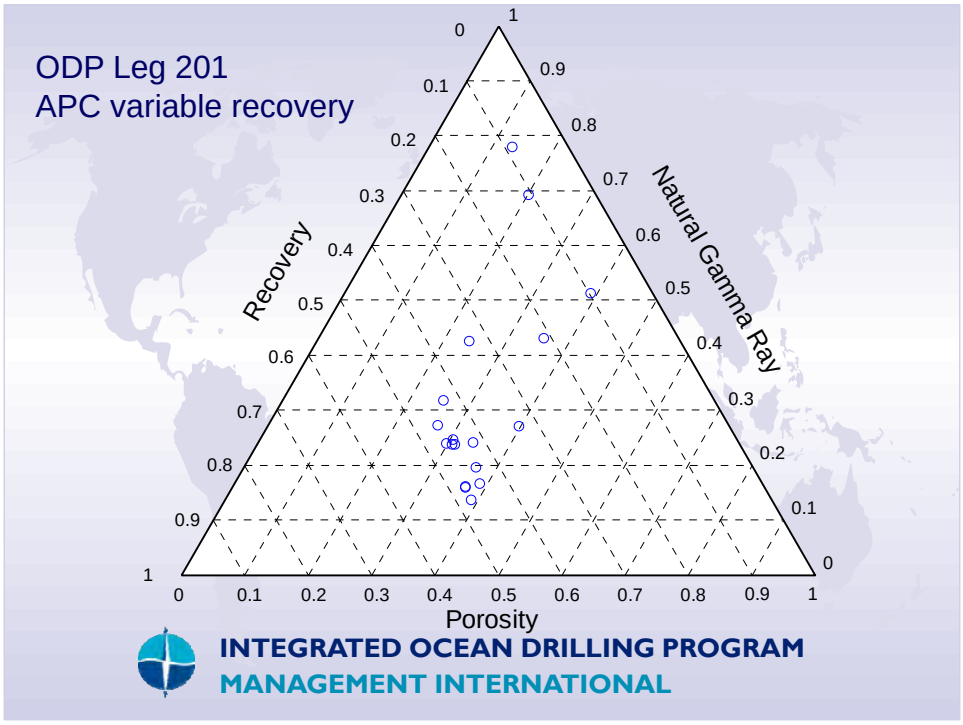


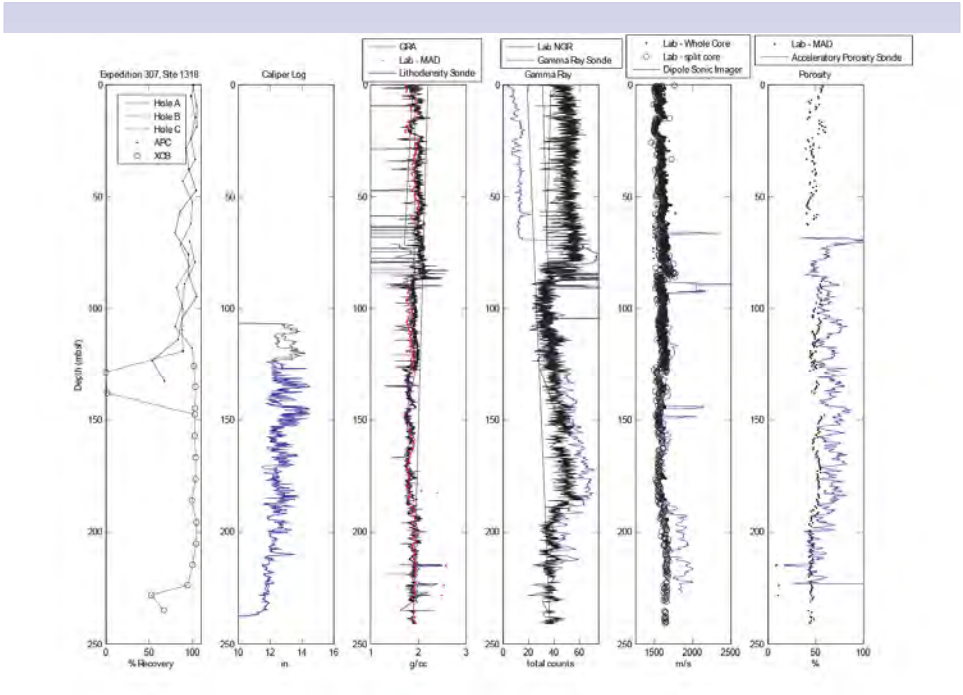
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

ODP Leg 177
APC and XCB R ~ 100%



INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL


ODP Leg 201
APC variable recovery
Recovery
Natural Gamma Ray
Porosity
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL


Expedition 307, Site 1318
Caliper Log
GRA
Lab - MAD
Lithodensity Sonde
Lab NGR
Gamma Ray Sonde
Lab - Whole Core
Lab - split core
Dipole Sonic Imager
Lab - MAD
Accelerator Porosity Sonde
Gamma Ray
Porosity
Hole A
Hole B
Hole C
APC
XCB
Depth (mbsf)
% Recovery
in.
g/cc
total counts
m/s
%

APC Recovery

- Generally excellent
- Lower recoveries due to silt, sand and gravel layers
- In-situ vs. lab porosity and density data could be indicator of Quantity and Quality
- Slightly lower recoveries in nanofossil ooze.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

XCB Recovery

- Core disturbance high and recovery low with changing from APC to XCB. Generally loose first 2-3 cores with transistion
- Less reliable recovery in interlayered material.
- Again, generally very good recovery stats overall.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

RCB Recoveries

- Low recovery in pillow lava – increases with harder inclusions
- Need to use running averages to analyze.
- Consistency of recovery increases as material hardens
- Drilling-induced fracturing hindered recovery
- Poor core recovery in hard, fractured formations
- Coring in the dikes extremely difficult.
- Vertical hole deviation lowered recovery
- RCB provided higher recovery in sand/silt strata than the APC and XCB.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Core Quality

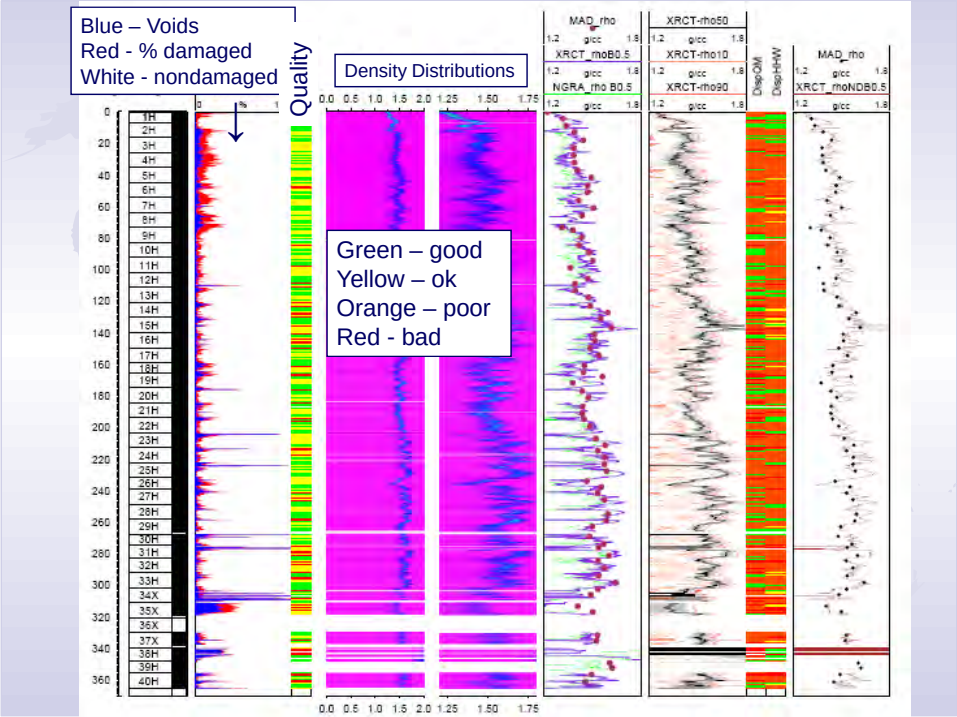
- **Disturbance index** (for marine clays with OCR below 3 - 4):

$\Delta e / e_0$

Overconsolidation Ratio, OCR	$\Delta e / e_0$			
	Very Good to	Good to Fair	Poor	Very Poor
1-2	<0.4	.04-.07	.07-.14	>.14
2-4	<0.3	.03-.05	.05-.10	>.10

- **Tomography**: defining core quality as a function of void ratio and % core damage determined using CT scanner.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL



Next Steps for FY2008

- Additional work with comparing in-situ with laboratory measurements, developing a relationship between physical properties and recovery.
- CDEX core quality report from NanTroSEIZE expeditions – examine findings and methodology
- Knowledge Sharing Seminar
- Synthesis into final report
- Develop detailed case studies for FY2009
  - Look into hiring an intern or contracting this work out

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Preliminary Recommendations

- Improvement in how % recovery is calculated
- Environmental and Drilling dynamics data should be methodically acquisitioned, archived and made accessible.
- Further work should be concentrated on:
  - Transition zones from soft to medium-hard materials.
  - Coring through medium-hard materials
  - Transitioning from medium-hard to hard materials
  - Alternating soft and hard materials

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Drilling proposals at SPC or OTF that would benefit from the ED proposals under review at EDP 7

EDP-2010-01B	EDP-2010-02B	EDP-2010-03B
Deep Rock Stress Tester (DRST)	Anti-Contamination Coring System	Multi-sensor Magnetometer Module (MMM)
537 - CRISP	545 - Juan de Fuca Hydrogeology	612 - Geodynamo
703 - SeisCORK	603 - NanTroSEIZE	626 - Pacific Equatorial Age Transect
	677 - Mid-Atlantic Ridge Microbiology	644 - Gulf of Cadiz
	547 - Oceanic Subsurface Biosphere	654 - Shatsky
	555 - Creten Margin	669 - Walvis Ridge Hotspot
	584 - TAG II Hydrothermal	686 - Southern Alaska Margin 1: Climate-Tectonics
	662 - South Pacific Gyre Microbiology	724 - Gulf of Aden Paleoenvironment

Comments on TR Matrix Exercise

- Interdependence noted - geotechnical tools need seabed frame operated by ROV
- Map ED vs. ED (‘mileage map’) - interdependencies
- Science drivers from STP valuable input
- Add ranking/tier of proposals at OTF/SPC
- Identify sediment/hardrock/combination
- Identify platform dependencies
- Have proponents answer questions about ED needs in proposal
- Change C, I, and S to 3, 2, and 1
- Deep/ultra-deep drilling not a specific ED need

Red = benefit nearly all proposals

Theme 1: Sampling/Logging/Coring Version 2.0 (n=11)	***Version 3.0 Total Instances (n=8)***	***Version 3.0 Total Weighted (C=3; I=2; S=1) (n=10)***
A1) Thin Walled Geotechnical Sampler	A1) Thin Walled Geotechnical Sampler	A1) Thin Walled Geotechnical Sampler
A2) Cone Penetrometer/Remote Vane		
	A3) Upgrade to RCB System	A3) Upgrade to RCB System
A4) Hard rock re-entry system (HRRS)	A4) Hard rock re-entry system (HRRS)	A4) Hard rock re-entry system (HRRS)
	A5) Coring Guidelines/Operations Manuals	*A5) Coring Guidelines/Operations Manuals*
A11) Rotary sidewall coring		A11) Rotary sidewall coring
A12) Provide core orientation on standard coring tools - Structural Orientation of Hard Rock Cores		
A13) Seabed coring devices		
A16) Pressure coring systems (PTCS, PCS, FPC, HRC, etc.)		A16) Pressure coring systems (PTCS, PCS, FPC, HRC, etc.)
A17) Pressurized Sample Transfer (autoclave)		
	A20) Upgrades to XCB System	A20) Upgrades to XCB System
A21) Anti-contamination system (gel core barrel)	A21) Anti-contamination system (gel core barrel)	A21) Anti-contamination system (gel core barrel)
A23) Fluid samplers, temperature, and pressure measurement tools	A23) Fluid samplers, temperature, and pressure measurement tools	A23) Fluid samplers, temperature, and pressure measurement tools
A24) Transition corers	A24) Transition corers	A24) Transition corers
	>=8	>=9

Red = benefit nearly all proposals

Theme 2: Drilling/Vessel Infrastructure Version 2.0 (n=10)	***Version 3.0 Total Instances (n=11)***	***Version 3.0 Total Weighted (C=3; I=2; S=1) (n=14)***
	B1) Large Diameter Pipe	B1) Large Diameter Pipe
B3) Heave Compensation	B3) Heave Compensation	B3) Heave Compensation
B5) Seabed Frame		
	B7) Rig Instrumentation System	B7) Rig Instrumentation System
B8) Improved Automatic Driller		
B9) Drilling Parameter Acquisition while coring		
B10) Real Time Drilling Parameter Acquisition while coring	B10) Real Time Drilling Parameter Acquisition while coring	B10) Real Time Drilling Parameter Acquisition while coring
	B12) RFID Chip Implant in Drillpipe	B12) RFID Chip Implant in Drillpipe
	B13) Intellipipe	B13) Intellipipe
B14) Electric/Optical Wireline		
	B16) Non-magnetic collars	B16) Non-magnetic collars
	B17) Non-magnetic core barrel	B17) Non-magnetic core barrel
B19) Protocol for Proper Mud Design	B19) Protocol for Proper Mud Design	B19) Protocol for Proper Mud Design
		B20a) Borehole Camera – looking downward
B21) 4000 m class riser system		
B22) 4000 m class BOP		
	B24) Improve Dynamic Positioning System	B24) Improve Dynamic Positioning System
	B26) Cementing protocol for deep drilling	B26) Cementing protocol for deep drilling
B27) Drill pipe for ultra deep ocean drilling		
		B29) Mud circulation drilling system over 3,000-m water depth
		B32) Temperature tolerant muds and drilling bits
	>=6	>=9

Red = benefit nearly all proposals

Theme 3: Borehole Infrastructure Version 2.0 (n=10)	***Version 3.0 Total Instances (n=11)***	***Version 3.0 Total Weighted (C=3; I=2; S=1) (n=12)***
C1) High temperature electronics, sensors, and sensor systems		
	C2) Improved cementing techniques (high temperature and hydrologic isolation)	C2) Improved cementing techniques (high temperature and hydrologic isolation)
	C3) Corrosion tolerance	C3) Corrosion tolerance
C4) Hydrologic Isolation	C4) Hydrologic Isolation	C4) Hydrologic Isolation
C5) Reliable wellhead hanger seals	C5) Reliable wellhead hanger seals	C5) Reliable wellhead hanger seals
C6) Electric, optical fiber and fluid feed-throughs		
	C7) Identifying, tracking, and minimizing drilling contamination	C7) Identifying, tracking, and minimizing drilling contamination
		C8) Casing boreholes through active fault zones
C9) Physical coupling of acoustic instruments to formations and decoupling from noise sources		
	C10) Accurate estimates of downhole temperatures	C10) Accurate estimates of downhole temperatures
	C11) Techniques for borehole microbiology incubation systems	C11) Techniques for borehole microbiology incubation systems
C14) Systems reliability for LTMS		
C15) ROV-serviceable wellheads and submarine cable connections		
C17) Design standards for electrical, communications, mechanical, and fluid systems	C17) Design standards for electrical, communications, mechanical, and fluid systems	C17) Design standards for electrical, communications, mechanical, and fluid systems
C18) Deployment procedures/soft-landing for borehole infrastructure and instruments	C18) Deployment procedures/soft-landing for borehole infrastructure and instruments	C18) Deployment procedures/soft-landing for borehole infrastructure and instruments
C19) Managing borehole experiments	C19) Managing borehole experiments	C19) Managing borehole experiments
	C21) Borehole instrument deployment, re-entry and servicing systems	C21) Borehole instrument deployment, re-entry and servicing systems
	>=7	>=14

Jack Germaine
EDP 2005-2008

Massachusettes Institute of Technology
Cambridge, MA

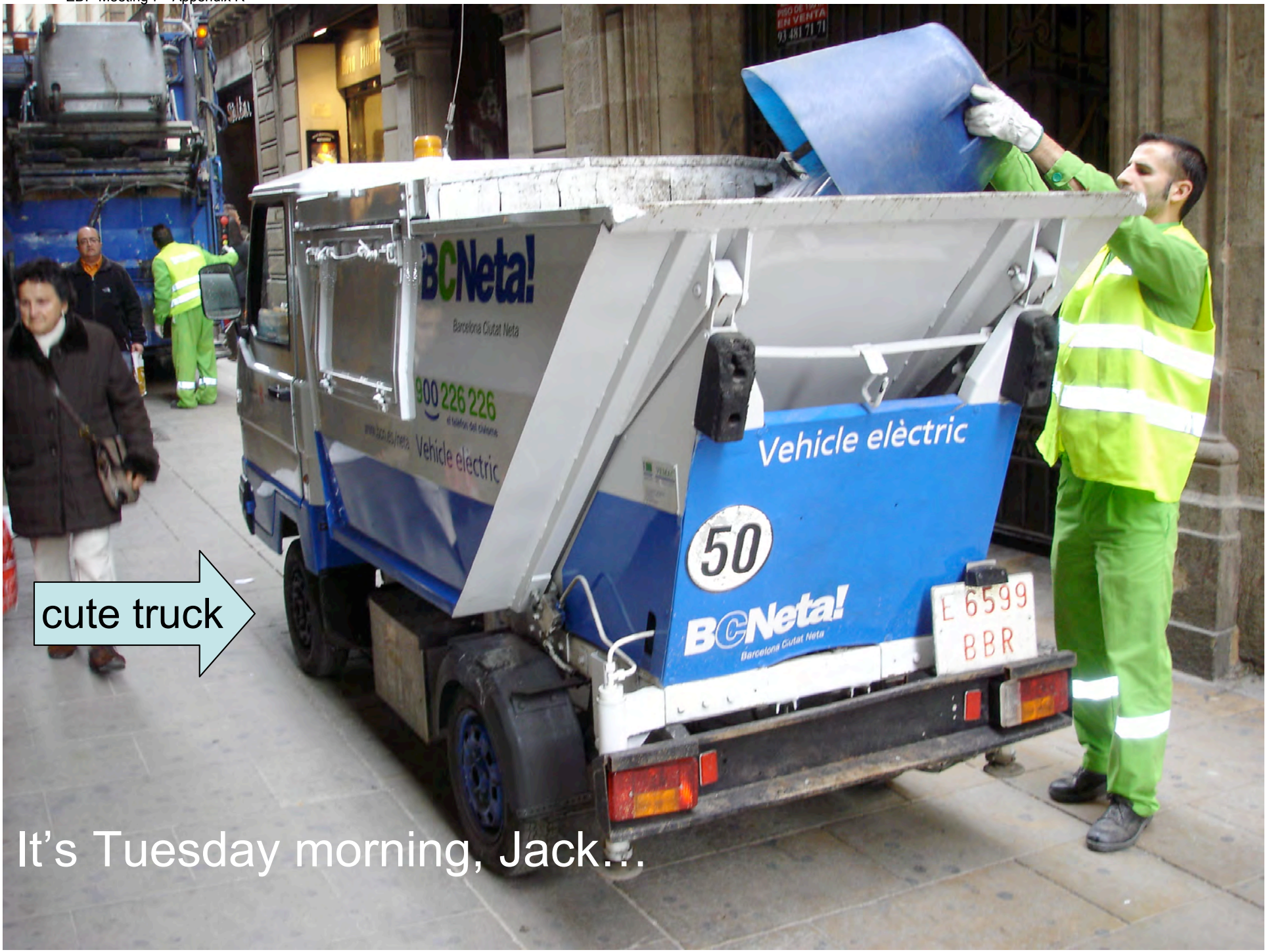
- Department of Civil and Environmental Engineering

Jack is the quintessential Engineer…

Lovely streets of Nice

But, where are the delivery trucks?

So, I did a little research in the back alleys of Nice…


BCNeta!
Barcelona Ciutat Neta
900 226 226
Vehicle elèctric
Vehicle elèctric
50
BCNeta!
Barcelona Ciutat Neta
E 6599
BBR
cute truck
It’s Tuesday morning, Jack…

Thank you for your good humor, insight, and contributions to the IODP-EDP.

Review of Changes to the Technology Roadmap

Bill Ussler

July 16, 2008

Sampling, Logging, and Coring

- A1 & A2 - Geotechnical tools: added “Current tools exist in industry and could be implemented on IODP vessels if a seabed frame were available”.
- A6 - DCS: added “…and is attached to a seabed frame.” “Existing hardware is currently being used in the geotechnical industry.”
- A8 - Retractable Bit: added “Development of such hardware is considered a long range objective and not technology to be presently pursued within the next 5 years of the program.”
- A9 - Vibracore/Percussion Sampler: moved historical narrative on VPC to Note 1.
- A10 - MDCB: moved detailed narrative on MDCB to Note 2.
- A13 - Seabed Coring Devices: deleted reference to PROD.

Drilling/Vessel Infrastructure

- B3 - Heave Compensation: added discussion about modeling heave compensation in incremental steps of technical complexity; and need to acquire data on passive heave compensation system performance to test and validate dynamic models.
- B5 - Seabed Frame: added discussion of hydraulic feed and swivel system to control WOB, with caveat that this is >5 yr technology.
- B16 - Non-magnetic collars: moved detailed narrative to Note 3.
- B21 - 4,000m riser system: noted that carbon fiber should be considered as a material.

Drilling/Vessel Infrastructure

- B28 - High T/High P Directional Drilling… reworded
- B23 - Protocol for proper design to minimize borehole stability problems: new section added

Borehole Infrastructure

- C22 - Stress Measurements: new section added

Tasks at this meeting

- Approve changes to text and formally adopt version 3.0
- Identify ‘high priority’ engineering development items - same 3 categories; ~10 in each; use TR mapping to active drilling proposal matrix (electronic file and large-format paper copy)

TR Matrix codes

C = critical

I = important

S = somewhat important