Meeting Minutes – 16th EPSP Meeting

IODP Conference Room, Texas A&M University

College Station, TX

September 1-2, 2015 – Corrected (page 9) October 9, 2017

The 16th EPSP meeting was called to order by Chairman Barry Katz at 08:30 on September 1, 2015, at Texas A&M University, College Station, TX.

Mitch Malone, meeting host, presented a brief summary of meeting logistics.

Self-introductions were made.

Panel members in attendance were: Bob Bruce (alternate), Earl Doyle, Brandon Dugan, Martin Hovland, Suzanne Hurter (alternate), Jennifer Jencks, Barry Katz (Chair), Philippe Lapointe, David Long, Dieter Strack, Takeshi Tsuji, Bill Winters.

Guests were: James Allan (NSF), Kan Aoike (CDEX), Peter Blum (TAMU), Angelo Camerlenghi (Proposals 857 and 796), George Claypool (TAMU Safety Panel), Brad Clement (TAMU), Cornel de Ronde (Proposal 818), Neil DeSilva (TAMU Safety Panel), Gregor Eboli (Proposal 820), Peters Flemings (Proposal 887), Patricia Fryer (Proposal 505), Kevin Grigar (TAMU), Richard Hobbs (Proposal 760), Susan Humphris (JRFB), Denise Kulhanck (TAMU), Leah LeVay (TAMU), Johanna Lofi (Proposal 857 and ECORD), David Mallinson (SEP), Mitch Malone (TAMU), Kylara Martin (Proposal 888), Tim McHargue (TAMU Safety Panel), Kirk McIntosh (Proposal 878), Joshu Mountjoy (Proposal 841), Katerina Petronotis (TAMU), David Scholl (Proposal 888), Robert Stern (Proposal 888), Karen Stocks (IODP Science Support Office), Zhen Sun (Proposal 878), Debbie Thomas (Proposal 567), Trevor Williams (TAMU), Warren Wood (Proposal 888), and Carlos Alvarez Zarikian (TAMU).

The chair reminded all of the unique conflict of interest rules that EPSP operates under and that Brandon Dugan will not be a voting member on actions associated with Proposal 837. (He is a proponent for the proposal.)

Review Proposal 818 - Gateway to the Sub-Arc Mantle: Volatile Flux, Metal Transport, and Conditions for Early Life (Brothers) – Cornel de Ronde presented an overview of the proposed program. The proposed drilling has four primary objectives: 1-characterize the sub-volcano, magma chamber-derived volatile phase to test model-based predictions; 2-explore the sub-seafloor distribution of base and precious metals and metalloids, and the reactions that have taken place along pathways to the seafloor; 3- quantify the mechanisms and extent of fluid-rock interaction; and 4-assess the diversity, extent and metabolic pathways of microbial life in an extreme, metal-toxic and acidic volcanic environment. It was reported that the drill-bit will be penetrating into an extreme environment of high temperature and low pH. These conditions may limit drilling. A site-by-site review followed.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
NWC-1A	-34.86086	179.054017	405	Recommend approval as requested.
NWC-2A	-34.866529	179.060990	555	Recommend approval as requested.
WC-1A	-34.87527	179.058567	565	Recommend approval as requested.
UC-1A	-34.882137	179.068339	800	Recommend approval as requested. Panel expressed concern that there may be a need for a significant volume of mud when penetrating the potential "2-phase" zone and the operator should be prepared.
UC-2A	-34.887636	179.072414	530	Recommend approval as requested.
LC-1A	-34.879597	179.07031	300	Recommend approval as requested.
SEC-1A	-34.876105	179.081069	300	Recommend approval as requested.

The panel has requested a camera survey prior to drilling at each location to ensure that the site does not include an active vent community. The shipboard party should be aware of the potential for H_2S in the cores when they are recovered and during handling.

Review Proposal 820 - (Expedition 359) - Currents, monsoon and sea level in the Indian Ocean: the Neogene of the Maldives – Gregor Eberli requested the panel's approval of two additional sites and the extension of a third. This request was prompted by the removal of proposed sites KK-03A and KK-03B from the drilling plan and the availability of new seismic data. The expedition's objectives are: 1-deciphering of the Neogene environmental changes in the Maldives; 2-determine the onset of the modern depositional system driven by sea-level changes and strong currents; 3- reconstruct the pre- to post-drowning evolution of a carbonate bank; 4-constrain the timing of the evolution by dating unconformities; and 5-obtain a continuous carbon isotope record to calibrate the platform and platform margin with the pelagic record. A site-by-site review followed.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
MAL-02A	4.93315634	73.02798344	1010	Requested extension recommended for approval.
MAL-09A	4.85025773	73.28367339	714	Recommend approval as requested.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
MAL-08A	4.90693350	73.00819003	1100	Recommend approval as requested.

Review Proposal 837 (Expedition 362) - The Sumatra Subduction Zone – The Role of Input Materials In Shallow Seismogenic Slip And Forearc Plateau Development – Brandon Dugan presented the addendum to the proposal requesting approval for additional sites and the deepening of previously approved sites. The panel was reminded of the scientific background and objectives of the expedition. The primary objectives are: 1-establish initial and evolving properties of the North Sumatran incoming sedimentary section; and 2-constrain potential effects on seismogenesis, tsunamigenesis, and forearc development for comparison with global examples. The secondary objectives of the expedition are: 1-determine how the stress field changes across the incoming oceanic plate approaching the subduction zone, close to the 2012 M>8 earthquake sites within the oceanic plate; and 2-determine Nicobar fan depositional history as part of the wider Bengal fan – Himalayan uplift – monsoonal history being developed in the region. The site-by-site review followed.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
SUMA-11C	3.03408	91.60581	1460	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-14A	3.438672	92.01463	1570	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-15A	3.301788	91.87684	1810	Not recommended for approval.
SUMA-16A	2.816078	91.8549	1620	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-17A	2.918672	92.01283	1700	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-18A	3.002212	92.14206	1710	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-19A	4.089065	92.67162	1600	Approval is recommended to the revised depth of 1600 m.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
SUMA-20A	4.04716	92.62895	1500	Approval is recommended to the revised depth of 1500 m.
SUMA-21A	3.987817	92.56924	1200	Approval is recommended to the revised depth of 1200 m.
SUMA-22A	3.467878	92.86095	1600	Approval is recommended to the revised depth of 1600 m.
SUMA-8B	3.36915112476	91.9445466187	1760	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-11B	3.09553774394	91.6679293852	1610	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-12A	2.754761	91.759619	1610	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.
SUMA-10A	3.522780	92.945966	1600	Depth extension is recommended for approval.
SUMA-15B	3.39497867891	91.9697570391	1810	In order to accommodate uncertainties the panel has recommended approval to basement plus 10 meters.

A final recommendation of approval for SUMA-15B requires the submission of a completed Site Form. The Site Form should be provided to the Panel Chairs of EPSP and SEP, Mitch Malone (TAMU), the IODP Science Support Office and the chair of the JRFB.

Review Proposal 505 (Expedition 366) - Mariana Convergent Margin: Geochemical, Tectonic, and Biological Processes at Intermediate Depths of an Active Subduction Factory - A brief scientific overview was presented by Patricia Fryer. There were five primary objectives for the drilling: 1-examine slab dewatering; 2-study the rheology of forearc and slab materials; 3-characterize the along- and across-strike mantle wedge variability; 4-examine biochemical activity; and 5-study serpentinite mud volcanism. Each of these objectives will examine these processes through time and their linkages. This discussion was followed by a site-by-site review.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
MAF-9B	16.5375	147.2208333	150	Recommend approval as requested.
MAF-10B	16.46	147.1725	250	Recommend approval as

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
				requested.
MAF-11A	18.10666667	147.0983333	150	Recommend approval as requested.
MAF-12B	18.0945	147.1	250	Recommend approval as requested.
MAF-13A	18.0515	147.1	250	Recommend approval as requested.
MAF-14A	17.99216667	147.1	300	Recommend approval to revised depth of 300m
MAF-15A	15.7095	147.1766667	100	Recommend approval as requested. Panel recommends that this site not be drilled first.
MAF-16A	15.78533333	147.1415	250	Recommend approval as requested.

As a result of the depth change for MAF-14A the Safety Forms need to be updated. The revised Safety Forms should be provided to the Panel Chairs of EPSP and SEP, Mitch Malone (TAMU), the IODP Science Support Office and the chair of the JRFB.

Continental Breakup: Drilling at the South China Sea Rifted Margin - Zhen Sun presented an overview of the proposal. The primary objectives are of drilling are: 1-determine the nature of the basement across the Continent-Ocean-Transition (COT) of the South China Sea rifted margin to discriminate between competing models of breakup at non-volcanic rifted margins; 2-examine the scale of time-lag between plate rupture and asthenospheric upwelling; 3-address the kinematics of breakup in terms of rate of extension and vertical crustal movements; and 4-improve the understanding of the Cenozoic regional tectonic and environmental development of the Southeast Asia margin. This was followed by the sit-by-site review. The panel expressed concern with both the position and proposed drilling plan for some locations (i.e., drilling down without coring).

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
SCAII-1B	18.44435	116.13827	1638	The panel prefers location SCAII-1A over SCAII-1B. Suggest that proponents reconsider positions off-structure. Final decision at next panel meeting.
SCSII-1A	18.45472	116.13167	1638	The panel prefers location SCAII-1A over SCAII-1B. Suggest that proponents reconsider positions

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
				off-structure. Final decision at next panel meeting.
SCSII-3B	18.93037	115.85142	1102	Not recommended for approval.
SCSII-3C	18.86948	115.88742	843	Action by the panel was tabled.
SCSII-8A	18.30695	116.21849	1443	Panel has requested that the proponents re-examine the proposed drilling plan. It is doubtful that the panel can approve drilling down to 1123 mbsf prior to coring.
SCSII-9B	18.14383	116.31410	1669	Action by the panel was tabled. Panel recommends that the proponents re-examine the site and optimize its position.
SCSII-11A	18.41089	115.88519	1515	Tabled until next panel meeting. Consider relocation.
SCSII-12A	18.27419	115.96566	1926	Action by the panel was tabled.
SCSII-13A	18.10495	116.06523	1876	Action by the panel was tabled.
SCSII-3D				Prior to determining that this proposal would best be served by tabling the review until the next panel meeting the panel recommend the approval of a limited penetration to a depth equivalent to 4.15 sec TWT at CDP 6000 on line 04EC1555 was approved.

The panel strongly recommends that the proponents re-examine the position of their proposed drilling locations several are located on basement highs, others are located near faults, or potential gas indicators. To simplify the review process and reduce the need for EPSP to attempt to relocate sites the proponents are requested to increase the number of potential drilling alternatives.

The panel requests that the proponents prepare structure maps on key horizons, including basement. The extent of these maps should be sufficient to show that the target sites cannot be charged from off-structure depocenters. In order for the panel to better assess the safety issues EPSP requests that the seismic data presented have undergone relative amplitude processing. The proposed drilling program is very aggressive (especially if the panel is unable to approve drilling down without coring) and there may be a need to consider a modified hydrocarbon monitoring program similar to that used during the MSP phase of drilling along the New Jersey margin. It is requested that the operator review the program and determine if a modified monitoring program is a possibility and report back to the panel at its next meeting.

If the proponents wish to obtain a final approval recommendation for SCSII-3D a completed set of Site Forms will be required.

Review Proposal 760 (Expedition 369) - Tectonic, paleoclimatic and paleoceanographic history of the Mentelle Basin and Naturaliste Plateau at southern high latitudes during the Cretaceous – The scientific justification for the program was presented by Richard Hobbs. The objectives are: 1-examining the rise and collapse of the Cretaceous "hothouse"; 2-examining the relative roles of productivity and oceanic circulation in the development of oceanic anoxic events; 3-characterizing Cretaceous and Cenozoic paleoceanography, including changes associated with the Gondwana break-up and changes in the Tasman passage and the Indonesia gateway; and 4-characterizing the Gondwana break-up. This was followed by a site-by-site review.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
MBAS-3C	-33.91324	113.21206	1500	Recommend approval as requested.
MBAS-9A	-33.26981	114.32278	1200	Recommend approval as requested.
MBAS-4A	-33.79545	112.47463	880	Not recommended for approval.
MBAS-5B	-34.39853	112.81727	750	Recommend approval as requested.
MBAS-6A	-33.88254	114.22490	1200	Recommend approval as requested.
MBAS-8A	-33.08220	113.08074	1060	Not recommended for approval.
MBAS-4B			880	Recommended for approval at SP6065 on line S310-SWM07 pending receipt of the Site Forms.
MBAS-4C			880	Recommended for approval at SP6023 on line S310-SWM07 pending receipt of the Site Forms.
MBAS-8B			1060	Recommended for approval at SP985 on line S310-SWM07 pending receipt of the Site Forms.
MBAS-8C			370	Recommended for approval at SP1165 on line S310-SWM07 pending receipt of the Site Forms.

A final recommendation of approval requires the submission of completed Site Forms for MBAS-4B, MBAS-4C, MBAS-8B, and MBAS-8C. These Site Forms should be provided to the Panel Chairs of EPSP and SEP, Mitch Malone (TAMU), the IODP Science Support Office and the chair of the JRFB.

Review Proposal 841 - Creeping Gas Hydrate Slides: Slow Deformation of Submarine Landslides on the Hikurangi – Joshu Mountjoy presented an overview of the scientific program. The program's objective is to test the hypothesis that creeping in an active landslide is linked to the shallow gas hydrate system. Although this was scheduled as a full review based on the panel discussion the site-by-site review was deferred until the next panel meeting. This was, in part, a result of the planned MEBO coring program planned for April 2106 that will provide information on the nature of the penetrated section. The next safety review should include a review of these drilling results. The panel was particularly interested in the distribution of sand packages and the geotechnical properties of the penetrated section. There was also an interest expressed in seafloor videos of the MEBO drilling to determine if there was any gas release associated with the drilling. It should be noted that both the safety package and safety presentation should present the key seismic lines with the sites marked along with the depth of penetration. Sites should be located away from any apparent indications of gas release. Concerns were also expressed that the proposed IODP drilling plan includes only LWD and limited pressure coring. A discussion will be need to be held as to how monitoring will be conducted. (Prior drilling has shown that even closely spaced holes may have quite different quantities of gas.)

The panel meeting was recessed at 17:00 until 8:30 September 2, 2015.

Day 2 was reconvened at 8:30.

Review Proposal 567 - Paleogene South Pacific APC Transect: Heat Transport and Water Column Structure During an Extreme Warm Climate – A brief scientific overview was presented by Deborah Thomas. There were four primary objectives for drilling: 1-test the current reconstruction of meridional sea surface temperature gradients for the Paleogene; 2-test and refine models of the proto-Ross Gyre and surface water circulation in the South Pacific during the Paleogene; 3-gain an understanding of ice history; 4-test proposed models of deep-water circulation and its potential roles in the evolution of global climate during the Paleogene; and 5-reconstruct the intensity and pattern of Southern Hemisphere winds, as well as regional aridity during the Paleogene. This was followed by a site-by-site review.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
SP-1B	-50.4856666	-163.2795	247	Recommend approval as requested.
SP-2B	-49.9385833	-156.843016	147	Recommend approval as requested.
SP-3B	-49.3873666	-141.989066	85	Recommend approval as requested.
SP-4B	-46.5062	-139.3535	60	Recommend approval as requested.
SP-5B	-42.7545333	-137.155366	32	Recommend approval as requested.
SP-13A	-50.77675	-151.967033	164	Recommend approval as requested.
SP-14A	-47.1005833	-133.998916	181	Recommend approval as

				requested.
SP-15A	-40.0102333	-154.041683	91	Recommend approval as requested.
DSDP277	-52.2238333	166.191333*	480	Recommend approval as requested.

Operational note – the panel has no issue with the TAMU request to "tag" basement prior to coring for all of the proposed "SP" sites

Review Proposal 800 (Expedition 360) - Nature of the Lower Crust and Moho at Slower-spreading Ridges – Peter Blum presented a brief review of the program's scientific objectives: 1-use the tectonic window into the lower crust at Atlantis Bank to recover the full lower section of the ocean crust and the igneous crust–mantle transition; and 2- test the hypothesis that the Moho beneath Atlantis Bank is a serpentinization front. The panel recommended the approval of drilling within an area ring-fenced between longitudes of 57.25° and 57.35° and latitudes between -32.666667° and -32.766667. As a consequence of the nature of the section to be penetrated the panel placed no limits on drilling depths. It was noted that the safety package will need to be completed prior to the ship leaving the dock. This was confirmed by the operator, JRFB, and the NSF.

Site	Latitude	Longitude	Depth of Penetration (m)	Remarks
AtBK-3	57.29166	-32.6716	1000	Recommend approval as requested. (Within the ring-fence)
AtBk-2	57.339166	-32.68333	1003	Recommend approval as requested. (Within the ring-fence)
AtBk-1a	57.28516	-32.7125	6000	Recommend approval as requested. . (Within the ring-fence)

Although approval is recommended for a ring-fenced area a final recommendation of approval requires the submission of completed Site Forms for Sites ATBk-1a, AtBk-2, and AtBK-3. These Site Forms should be provided to the Panel Chairs of EPSP and SEP, Mitch Malone (TAMU), the IODP Science Support Office and the chair of the JRFB.

Preview Proposal 857 - Uncovering a Salt Giant: Umbrella proposal of the multi-phase drilling project (MDP) – Johanna Lofi and Angelo Camerlenghi presented the proposal overview. The primary objectives

* Minutes were corrected in October 2017 by the Chairman (Barry Katz) to account for an erroneous minus sign in the longitude.

of the proposed drilling plan are: 1-defining the causes, timing and emplacement mechanisms of the MSC salt giant; 2-establishing the factors responsible for early salt deformation and fluid flow across and out of the halite layer; 3- establishing whether salt giants promote the development of a diverse and exceptionally active deep biosphere; and 4- determine the mechanisms underlying the vertical motions inside basins and their margins. Because this was a preview and not a formal review a site-by-site review was not undertaken. The panel noted the potential problems with drilling into a pre-salt section without well control. The panel provided guidance on the nature of the material that it will need in order to be able to effectively review the proposed drilling program and to be in a position to potentially recommend the approval of a drilling plan.

The panel suggested that a suite of maps be included in the final safety package including depth maps on key horizons in the pre- and post-salt section. Critical to the evaluation would be structure maps on the base and top of salt and the base of sediment. Thermal maturity maps at the base of the sediment and the base of salt would be helpful. These maturity maps should extend into the possible fetch areas that might feed into the drilling locations. Estimates of pore pressure in the sub-salt section should be provided. Seismic data when provided to the panel should be presented as depth sections, with an estimate of uncertainty. In addition, the panel recommended that multiple (3 or 4) alternative drilling sites for each of the four proposed drilling locations be nominated. The operator will need to provide to EPSP details of the hydrocarbon and pore pressure monitoring program as well as programs to kill the hole if hydrocarbons or excess pressure are encountered.

Preview Proposal 796-ADP – Nice Amphibious Drilling, In situ Monitoring and Risk Analysis - Angelo Camerlenghi presented the proposal overview. The objectives of the proposal are to examine subaquatic landslides in a cost-effective onshore-offshore drilling approach in an area where multiple landslide trigger mechanisms prevail simultaneously, but can be distinguished based on the available data and amphibious drilling and state-of-the-art instrumentation. Because this was a preview there was no site-by-site review. The panel felt that there was a need to consider the risk of shallow water flow and the presence of man-made features.

The depths of penetration, which are 150 meters or less, do not appear to represent any significant hydrocarbon (gas) risk, however, because of the shallow water depths (typically less than 50 meters) there will need to be a discussion with the operator concerning the need for an independent shallow hazards survey.

Preview Proposal 887-CPP – Genesis of Methane Hydrate in Coarse-Grained Systems: Northern Gulf of Mexico – The scientific overview of the proposal was presented by Peter Flemings. The project will study the genesis of methane hydrates in coarse-grained sediments in the Northern Gulf of Mexico by testing three working hypotheses. The program will include conventional cores, pressure cores, in situ pressure testing (MDT) at multiple sites. It was noted that the DOE Project may drill Sigsbee (GC 955) in 2016 or 2017 with a geotechnical vessel and the panel will be available to provide a review if the timing is appropriate. Several technical challenges were noted: 1- the use of gel sweeps from 50-500 mbsf and 10.5 PPG continuous mud beneath 500 mbsf to maintain hole stability; 2-the need for wide diameter

pipe and deployment of MDT tool at several (deep) locations; and 3-the number of pressures cores to be taken. Identified risks are: 1-the avoidance of drilling into a gas leg beneath the hydrate stability zone; and 2-the presence of free gas within the hydrate stability zone at the Sigsbee site that will require weighted mud. A site-by-site preview was not conducted but a discussion was held on how the panel will handle the technical review, when all of the data are proprietary and require the acceptance (signing of a confidentiality agreement). It was agreed that the members of EPSP, the TAMU Safety Panel, TAMU director's staff, a representative from SEP, the NSF, and the JRFB will be presented with the opportunity to sign the agreement and participate in the review. Only those individuals that have signed the agreement will participate.

When preparing the safety package for the final EPSP review the proponents should provide their calculation of the depth to the base of the hydrate stability zone and an estimate of the uncertainty associated with these calculations. TAMU will need to prepare a prosed drilling and monitoring protocols.

Preview Proposal 888- - Drilling to determine the origin of the Aleutian Arc-Basin system and the climate, oceanographic, diagenetic, and deep biosphere record in its sedimentary fill – An overview of the program was presented by Robert Stern and David Scholl. The drilling program had three primary objectives: 1- resolve when and in what tectonic setting the crust of the basin formed, whether by entrapment or rifting; 2-reconstruct the Cenozoic paleoclimatic and paleo-oceanographic history preserved in its sediments; and 3-investigate ongoing processes of diagenesis and methane cycling. Sites should be positioned so that they are as far off the crest of the structure as possible. There will be a need to demonstrate that free gas is not likely to be present. It is unlikely that the panel will approve drilling directly into the VAMP (velocity amplitude anomaly). This suggests that approval of FRNLA-01A as currently positioned is not likely. The panel recommended that the proponents develop a suite of multiple alternate sites for each of the objectives. Furthermore, if the program is placed on the drilling schedule or if there is a request for a pre-scheduling review the panel will require page-size prints of the seismic data in the safety package. The montage as presented makes it very difficult for the panel to review the data to ensure the safety of the drill site. Because this was a preview no detailed site-by-site review was conducted.

The chair announced that the next EPSP meeting will be held in the August/September timeframe depending on operator requirements in College Station.

The meeting was adjourned at 15:35.