

**JOIDES Resolution Facility Board (JRFB) Meeting:
15-16 May 2018 - Alexandria, VA USA**

Summary of Consensus Statements and Action Items

Consensus Statements

Consensus 1

The JRFB approves the Agenda for its 15-16 May 2018 meeting.

Consensus 2

The JRFB approves the May 2017 JRFB Meeting Minutes with no changes.

Consensus 3

The JRFB approves the following updated policies and guidelines:

- 1) IODP Proposal Submission Guidelines (15 May 2018)
- 2) IODP Guidelines for Site Characterization Data (15 May 2018)
- 3) IODP Standard Confidentiality Policy (15 May 2018)
- 4) IODP Limited Non-Disclosure Agreement Policy (15 May 2018)
- 5) IODP Sample, Data and Obligation Policy (15 May 2018)
- 6) IODP Environmental Principles (15 May 2018)
- 7) *JR* Third Party Tool Policy (15 May 2018)
- 8) *JR* Staffing Procedures (15 May 2018)
- 9) SEP-EPSP Terms of Reference (15 May 2018)

Consensus 4

The new **IODP Standard Confidentiality Policy** and the new minimum data requirement for all restricted data files will come into effect immediately for new pre-proposals being submitted at the **1 October 2018** proposal submission deadline. The JRFB encourages proponent teams of proposals already in the IODP Proposal Database (PDB) to work toward all the new guidelines in this policy as much as possible.

Consensus 5

The JRFB recommends the rescheduling of Expedition 384 (Engineering Testing) to FY'20, following Expedition 385 (Guaymas Basin) and a tie-up period. This will be followed by Full Proposal 859 (Amazon Margin), Full Proposal 864 (Equatorial Atlantic Gateway) and a second tie-up period. Furthermore, the JRFB recommends the scheduling of the first expedition for Full Proposal 853 (South Atlantic Transect) in the beginning of FY'21, followed by Full Proposal 890 (Walvis Ridge Hotspot), Full Proposal 834 (Agulhas Plateau) and the second expedition for Full Proposal 853 (South Atlantic Transect). The expectation of the JRFB is that there will be in total 8 months of operations in FY'21.

Consensus 6

The JRFB recommends the following engineering tests to be carried out during Expedition 384 by the JRSO in order of priority:

- 1) New drilling bits for improved advancement, opening and remediation of drill holes in hard rock formations.
- 2) New underreamers for opening up holes in hard rock formations.
- 3) New coring bits for coring in hard rock formations.
- 4) New biodegradable drilling fluid additives for improved hole cleaning.
- 5) New bottom-driven XCB based on current *Chikyu* XCB designs.
- 6) Continued testing of the Turbine Driven Coring System (TDCS) depending on the outcome of first tests during Expedition 376 and discussions with CDEX.
- 7) MDHDS testing in conjunction with the T2P system.

Consensus 7

Based on the long-term regional track of the *JOIDES Resolution* from 2021 until 2023/24, the JRFB is encouraging the IODP science community to submit proposals for drilling projects in the North Atlantic, Arctic Ocean, and the North Pacific.

Consensus 8

The JRFB reaffirms that, based on current and anticipated proposal pressure, the *JOIDES Resolution* will start to operate in the general area of the Equatorial and North Atlantic, Gulf of Mexico, Mediterranean, Caribbean, and the Arctic in FY'21 and through FY'22. Furthermore, the JRFB expects that the *JOIDES Resolution* will complete its global circumnavigation in the Indo-Pacific region in FY'23.

Consensus 9

The JRFB in exceptional circumstances on a case-by-case basis will consider to keep unimplemented sites on the board for potential completion at a later date during the IODP 2013-2023 program. The JRFB has decided to keep Expedition 374 Sites U1524 and RSCR-19A and Expedition 368 Site U1503 on the board.

Consensus 10

The US Coast Guard has informed the JRSO and ship owner ODL/SIEM that the *JOIDES Resolution* needs to fulfill all requirements of the Mobile Offshore Drilling Unit (MODU) 1989 Standard in order to receive permitting for Expedition 386 in the US EEZ of the Gulf of Mexico. Given the high costs and insufficient available time for the large number of upgrades required, the JRFB cancels Expedition 386 and removes it from the *JOIDES Resolution* schedule. However, the JRFB will forward proposal 887-CPP2 and 887-ADD2 to the ECORD Facility Board (EFB) for consideration of the potential implementation of this drilling project as a Mission Specific Platform (MSP). The JRFB highlights the fact that the implementation of this drilling proposal addresses Challenge 13 in the IODP 2013-2023 Science Plan.

Consensus 11

The JRFB is very pleased with the results and recommendations presented in the FY'17 Co-chief Scientists Report and the FY'17 JRSO NSF Panel Facility Review Report

(February 2018). Both reports point out the outstanding, safe, and efficient operation of the *JOIDES Resolution* through capable management and critical engineering improvements by the JRSO. In addition, the JRFB supports the recommendations by the NSF in their response to the FY'17 reports, emphasizing that effective operation of this facility requires enhancement of operations risk management methods and safety evaluations, and improved retention of overall drilling knowledge.

Consensus 12

The JRFB requests from the SEP/EPSP, and in consultation with the JRSO representation at their meetings, to ensure that the proponents provide sufficient alternate sites and strategies in IODP proposals, including alternate sites that would require differing operational approaches (such as different water depths, sediment thicknesses and/or types) in order to increase operational flexibility and decrease risk during implementation of the project at sea.

Consensus 13

The *JR* Consortium Partners all intend to provide continued support to the *JOIDES Resolution* in the second IODP phase from 2019-2024.

Consensus 14

Marine seismic data are critical to IODP, as every site drilled, cored and logged with the *JOIDES Resolution* requires high quality seismic data. If drilling targets cannot be imaged properly or if sites cannot be occupied safely, the proposals will not be approved by SEP/EPSP and will not be implemented by the JRFB. Over the last 15 years, 47% of the seismic data in support of 81 IODP expeditions have been collected with US seismic-enabled research vessels. The JRFB underscores the deep concern expressed in the 2018 NSF Panel Review of JRSO, which states that a decrease in availability of sufficient high-quality seismic data continues to impact our ability to submit competitive IODP proposals, a trend that ultimately impacts the viability of *JOIDES Resolution* operations. Having the capability to carry out deep-ocean crustal imaging in the US and worldwide is key for the safe operation of the *JOIDES Resolution* and to support IODP in fulfilling its 2013-2023 Science Plan, which requires operation in challenging drilling environments, including seismogenic subduction zones, continental shelves, deep ocean crustal formations, methane hydrates, hydrothermally active regions, and more.

Consensus 15

The *JOIDES Resolution* Science Operator (JRSO) Annual Program Plan FY'19 is recommended for approval in principle. The final plan, including the addition for the annual support of the Rutgers Core Repository, will be considered for approval by the JRFB at a later date, but before July 2018.

Consensus 16

The Science Support Office Annual Program Plan FY'19 is recommended for approval.

Consensus 17

IODP is at the mid-point of the current science plan “Illuminating Earth’s Past, Present, and Future,” which continues until 2023. The JRFB will foster the development of the next IODP science plan that will be required for a new program beyond 2023. This effort will instruct the nature of future drilling platforms as well as define the science strategy for the next stage of scientific ocean drilling. The JRFB Chair will coordinate with the IODP Forum and other IODP members and consortia, so that the renewal effort will be international in scope and represents the consensus of the overall scientific ocean drilling community.

Consensus 18

The JRFB sincerely thanks Paul Wilson and Mike Coffin for their great enthusiasm for everything *JR* and their contributions on the JRFB. Over the past years the JRFB has gained tremendously from Paul’s and Mike’s extensive knowledge.

Consensus 19

Ken Miller has been the SEP Science Co-chair for the last three years and has done so with the strongest sense of commitment toward IODP science and with great energy! He has done an exceptional job in nurturing a large number of proposals, in particular numerous fast-track proposals, which allowed the JRFB to put together many strong expedition schedules for the *JR*. Ken, your contributions to IODP have been enormous and your work leaves a great legacy in Scientific Ocean Drilling. We hope to see you again on “groundhog day” at Scripps!

Consensus 20

After a versatile career in Scientific Ocean Drilling, Tom Janecek will retire from his program director position at the National Science Foundation. The JRFB and all in IODP are thanking Tom for his many contributions to the program, starting with his work as Expedition Project Manager during the days of ODP, as vice president in the IODP-MI DC office, and his time at the NSF during the two phases of IODP. His leadership has been instrumental in developing the new International Ocean Discovery Program and *JR* business model. Tom, we will miss your straightforward decision making and dry humor from the back of the room!

Consensus 21

Outgoing JRFB chair Anthony Koppers has exhibited insightful and effective leadership over the last 3 years. During his tenure, the development of the regional ship track has allowed more efficient planning and cost-effective implementation of challenging expeditions, while executing the IODP Science Plan and allowing efficient operation of the *JOIDES Resolution*. His knowledge and attention to detail have created a legacy that forms an excellent foundation to not only successfully complete this phase of the scientific ocean drilling program, but to prepare for the renewal of the program beyond 2023. Anthony, the JRFB and the broader international ocean drilling community sincerely thank you for your dedicated service and leadership.

Action Items

Action Item 1

The JRFB Subcommittee on Policies and Guidelines will continue to update and reformat all remaining policies and guidelines for the general IODP, for the *JOIDES Resolution*, and for the JRFB Advisory Panels.

Action Item 2

The JRFB is asked to provide annual reports to the JRFB, including risk analyses, development of risk management methods, and approaches to retain insight/experience in the current JRFB staff and engineering.

Action Item 3

The JRFB is asked, before the next JRFB meeting in 2019, to provide how their science planning for *JR* operations has been improved based on recommendations in the FY'17 JRFB NSF Site Review Report. This includes a cost-benefit analysis and plan toward the potential installation of a whole-core XRF core scanner onboard the *JOIDES Resolution*.

Action Item 4

The JRFB Chair, in collaboration with the SEP Co-Chairs, will continue monitoring and deactivating inactive (>5 years) IODP proposals under SEP review as necessary.

Action Item 5

The JRFB Chair will continue monitoring proposals at the JRFB that have been inactive for 5 years or more and request proponent teams to provide the JRFB with an update via an Addendum and/or PRL.

Action Item 6

The JRFB Chair will work together with the EFB and CIB Chairs and the three IODP Curators for nominations to replace CAB members Elisabetta Erba (ECORD) and Hideyoshi Yoshioka (Japan).

Action Item 7

The JRFB Chair will request that the US Science Support Program (USSSP) solicit applications for the replacement of JRFB non-US science member Paul Wilson and US science member Anthony Koppers. Recommendations from this process will be circulated to the JRFB for approval.

JOIDES Resolution Facility Board Meeting 2018 Roster

Members

James Allan	National Science Foundation (NSF), USA
Wolfgang Bach	University of Bremen, Germany
Brijesh Bansal	Ministry of Earth Science, India
Gilbert Camoin	ECORD Management Agency, CEREGE, France
Brad Clement	JR Science Operator (JRSO), Texas A&M University, USA
Mike Coffin	University of Tasmania, Australia
Barbara John	University of Wyoming, USA
Gil Young Kim	Korea Inst. of Geoscience and Mineral Res. (KIGAM), Republic of Korea
Anthony Koppers, Chair	Oregon State University, USA
Alice Maior ¹	Coordenação de Aperfeiçoamento de Pessoal de Nivel (CAPES), Brazil
Clive Neal, Chair-Elect	University of Notre Dame, USA
Geraldo Nunes Sobrinho	Coordenação de Aperfeiçoamento de Pessoal de Nivel (CAPES), Brazil
Yan Sun	Ministry of Science and Technology (MOST), China
Paul Wilson	University of Southampton, UK
Liping Zhou	Peking University, China

Liaisons

Jamie Austin	IODP Forum Chair, University of Texas at Austin, USA
Holly Given	IODP Science Support Office, Scripps Institution of Oceanography, USA
Sean Gulick	SEP Co-Chair, University of Texas at Austin, USA
Barry Katz	EPSP Chair, Chevron Corporation, Houston, TX, USA
Shin'ichi Kuramoto	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Gilles Lericolais	ECORD Facility Board Chair, IFREMER, France
Ken Miller	SEP Co-Chair, Rutgers, The State University of New Jersey, USA
Sally Morgan	European Science Operator (ESO), British Geological Survey, UK
Yoshiyuki Tatsumi	CIB Chair, University of Tokyo, Japan

Observers

Leanne Armand	Australia-New Zealand IODP Consortium (ANZIC) lead, ANU
Carl Brenner	USSSP, Lamont-Doherty Earth Observatory, Columbia University, USA
Cristiano Chiessi	University of São Paulo, Brazil
Nobu Eguchi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Matthew Erickson	National Science Foundation (NSF) - IPS Science Assistant, USA
Helen Feng	IODP Science Support Office, Scripps Institution of Oceanography, USA
Dave Goldberg	Lamont-Doherty Earth Observatory, Columbia University, USA
Nadine Hallman	ECORD Management Agency, CEREGE, France
Claire Hemingway	NSF Office of International Science and Engineering (OISE)
Bob Houtman	National Science Foundation (NSF), USA
Thomas Janecek	National Science Foundation (NSF), USA
Mitch Malone	JRSO, Texas A&M University, USA
Harue Masuda	J-DESC, Osaka City University, Japan
Bettina Schuffert	ECORD, German Research Foundation-DFG
Angela Slagle	USSSP, Lamont-Doherty Earth Observatory, Columbia University, USA
Shouting Tuo	IODP-China, Assistant Director (Tongji University)
Tatsuya Watanabe	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
James Wright	USAC Chair, Rutgers, The State University of New Jersey, USA
Michiko Yamamoto	IODP Science Support Office, Scripps Institution of Oceanography, USA

Not in Attendance

¹ Alternate for Geraldo Nunes Sobrinho

**JOIDES Resolution Facility Board Meeting Notes:
15-16 May 2018 Alexandria, VA USA**

Tuesday	15 May 2018	09:00-18:00
----------------	--------------------	--------------------

1. Welcome and Introductions

JOIDES Resolution Facility Board (JRFB) Chair, Dr. Anthony Koppers, welcomed the group and provided an overview of the most significant meeting topics, including:

- Major International Ocean Discovery Program (IODP) achievements since 2012, noting how IODP is doing 20% more with 10% less
- Regional track of the *JR* scheduled out to 2023, noting current proposals at the facility board and proposals at SEP looking towards North Atlantic
- Discussion of the *JR* Assessment Workshop and effectiveness of the *JR* in implementing the program's science plan

Dr. Koppers then:

- Introduced new JRFB member Dr. Barbara John
- Noted the absence of JRFB members Dr. Wolfgang Bach, Dr. Geraldo Nunes (with Ms. Alice Maior standing in), and Dr. Yan Sun
- Moderated self-introductions for all present

National Science Foundation (NSF) Program Director, Dr. Tom Janecek, provided the group with additional logistics, including basic safety and comfort information.

Dr. Koppers reviewed the rules of engagement, confidentiality policy, and conflict of interest (COI) management for this meeting. He also noted that all JRFB decisions are made by consensus.

2. Approval of Agenda

Dr. Koppers requested and received consensus to approve the agenda.

Consensus 1

The JRFB approves the Agenda for its 15-16 May 2018 meeting.

3. Approval of May 2016 JRFB Meeting Minutes

Dr. Koppers requested and received consensus to approve the 2017 Meeting Minutes.

Consensus 2

The JRFB approves the May 2017 JRFB Meeting Minutes with no changes.

4. National Science Foundation (NSF) Report

4A. Update from the OCE Division at NSF

NSF IODP Program Director, Dr. Jamie Allan, gave the NSF report, detailing the budget (see 4B), JRSO renewal (see 4C), and internal staff updates. Dr. Allan introduced Dr. Bill Easterling as the new Geosciences Assistant Director at NSF and Mr. Bob Houtman as the acting Ocean Sciences (OCE) Division Director as Dr. Rick Murray finished his tenure in April 2018. He said that the new Alexandria location of the NSF building comes with some challenges in scheduling large meetings, as a several-week window is needed to set the meeting date, which cannot be confirmed until January (6 months before the meeting is held). It needs to be considered whether the JRFB meeting should continue to be held in Washington, DC or another location.

4B. NSF Budget and Forecast

Dr. Allan gave a brief presentation highlighting IODP financial, operational, and administrative progress, including:

- FY2019 Budget
 - The President's FY2019 proposed budget for the NSF is \$7.5B, the same as the FY2017 actual budget, with the actual appropriation set by Congress, not the presidential budget. There is still no budget figure for FY2018 but it is expected to be flat.
 - The FY2019 fiscal guidance to the *JR* Science Operator (JRSO) is \$65M, which covers 8 months of operations. It was noted that fuel prices were higher than planned (e.g., special fuel for the Antarctic, Chilean fuel tax) and had to be taken into account. The difficulty in forecasting future budgets, combined with more complex operations, means that 10 months of operations cannot be done in FY2018 and 8 months is more likely going forward.
 - Additionally, there will be \$14.7M in base contributions from the *JR* partners. Dr. Allan stated that the China memoranda covers through 2018, which NSF hopes to extend. The IODP-China representative, Dr. Shouting Tuo, said that \$3M in contributions from China should not be a problem.
 - Dr. Allan noted the long-term issue of rising drillship costs with flat funding from NSF and its partners and emphasized the need for greater international *JR* partner contributions.

- *JR* Staffing
 - The number of US Science Party members on *JR* Expeditions has been increased to 10 (including onboard outreach members).
 - All *JR* berths, including co-chief scientists and outreach specialists, are treated equally.
 - Expedition 385 (Guaymas Basin) will be the last expedition staffed under the old *JR* staffing policy.

4C. Renewal Process for JRSO Cooperative Agreement in 2019

Dr. Allan then discussed the *JR* Facility Renewal:

- NSF/OCE has received a renewal proposal from the JRSO for 8 months of operation a year. The proposal is a 5-year standard renewal (instead of 4 years).
- An NSF panel will review the proposal and provide recommendations the second week of July 2018.
- The National Science Board (NSB) does not approve the IODP program, but rather the expenditure of funds for facility renewal. The IODP Forum Chair, Dr. Jamie Austin, asked if the approval would occur in September, and Dr. Allan responded that authorization is more likely to occur at the January meeting.
- NSF is not in a position to state its intentions post-2024 regarding international ocean drilling. However, they are aware that China is interested in taking on a larger role in the IODP community, have heard ideas from Japanese and European colleagues, and are excited for potential opportunities for platforms and programs.
- The renewal timeline for the *JR* requires that NSF give the ship owner notice for extending the contract by 1 April 2019 (6 months before the beginning of the next fiscal year).

Dr. Allan briefly discussed the divestment of the *R/V Langseth* after its mid-2020 field commitments. The Dear Colleague Letter to the community indicates that OCE intends to support the community by other means, working with the Marine Seismic Research Oversight Committee (MSROC) and holding a workshop in Fall 2018.

JRFB Science Member, Dr. Clive Neal, asked about renewing the *JR* for 5 years considering that it's an aging facility and when talks might start for replacing the *JR*. Dr. Allan replied that he was impressed by the ship's good condition at a recent port call in Auckland, New Zealand and believes the owner is making investments in the ship (e.g., new dynamic positioning system, replacing the shaft seals). He noted that the Environmental Impact Report (EIR) is good through FY2028, and it will be difficult to get a new EIR approved after that. The community will need to define a new science plan before NSF can determine whether the *JR* is an appropriate platform. NSF may continue to use the *JR* or they may need another ship, but it is unlikely that NSF would do a new build, as it would rather lease a facility.

5. Report of the *JR* Science Operator

5A. Update on JRSO Performance in FY'17, Issues and Accomplishments

Dr. Brad Clement, Director of the JRSO, presented the highlights, operational overviews, and key science outcomes from last year's expeditions. Since the previous JRFB meeting, the JRSO has implemented five expeditions – a 25% increase in operational time over previous years. Based on cruise evaluations completed by the shipboard scientific parties, each of the expeditions achieved successfully the majority of the expeditions' objectives. A few of the notable challenges are listed below.

- Expeditions 367-368 (South China Sea Rifted Margin) to determine the nature and timing of rifting in the SCS. One of the deep objective holes was successfully cased to ~900 mbsf before the failure of a clutch forced the *JR* to abandon deep-

water efforts during this expedition. This hole was left in good condition. The JRFB received a letter from the South China Sea proponents addressing unfinished objectives (to be discussed later).

- Expedition 371 (Tasman Frontier Subduction Initiation and Paleogene Climate) to investigate subduction initiation with secondary paleoceanographic objectives. Issues included a medical evacuation and weather delays that shortened the operation.
- Expedition 369 (Australia Cretaceous Climate and Tectonics) to study the rise and collapse of the Cretaceous hothouse climate. Balancing the somewhat competing tectonic and paleoclimate objectives of the expedition proved to be a challenge during the expedition, although, in the end, both sets of objectives were addressed.
- Expedition 372 (Creeping Gas Hydrates and Hikurangi LWD) combined the Creeping Gas Hydrates objectives (as proposed in an APL) with Hikurangi Subduction Margin objectives because EPSP required logging while drilling (LWD) as a safety mechanism to monitor pressure at the proposed drill sites. Two days of operations were lost to New Zealand's hull cleaning regulations and 3 days to weather.
- Expedition 374 (Ross Sea West Antarctic Ice Sheet History) to look at the variability and response of the West Antarctic Ice Sheet to climatic pressures. NSF provided an icebreaker (additional expenditure) although there was not much sea ice. A major mechanical issue caused by a failed heating element in the oil tank that lubricates the port stern shaft tube resulted in a failed seal. As a result, the vessel took in seawater through the shaft tube and eventually leaked 40 gallons of oil into the environment. This mechanical failure (which was environmentally unsound but operationally safe) led to 16 days lost of operations. The JRFB received a proponent response letter (PRL) from the Expedition 374 co-chiefs proposing to return to complete the expedition's objectives (to be discussed later).
- Expedition 375 successfully installed 2 sub-seafloor observatories designed to monitor slow slip processes in the Hikurangi subduction margin. The successful implementation of these complex observatories was only possible because of the long lead-time the JRFB provided by scheduling this expedition well in advance. This allowed sufficient time for the JRFB to interact with the proponent group and collectively iterate on a set of designs and contingency plans that resulted in successful installations.

5B. Category 1, 2, and 3 Expeditions over Last 5 Years and on the Schedule

Dr. Clement talked about facility costs and how they've received extra income for a few years from Complementary Project Proposals (CPPs), but are now challenged by rising fuel costs. The fixed costs to keep the facility available, not including IODP science operations, make up 80-84% of the total budget. Only ~16% of the budget can be worked with for expeditions, so there only is limited flexibility in hardware, shipping, and fuel costs.

Dr. Clement explained how *JR* expeditions are assigned into 3 cost categories, with the costs referring to only additional costs on top of any nominal expedition:

- Category 1: Little to no expensive hardware (APC, XCB, RCB, some reentry/casing), \$300K - \$800K extra;
- Category 2: Significant casing and/or reentry systems, or cold-water fuel, \$800K - \$1.5M extra;
- Category 3: Complex and expensive (CORKs and/or LWD), \$1.5M - \$2.5M extra.

He noted that the *JR* has done far more Category 2 and 3 expeditions than they estimated they would be able to in their original proposal.

5C. Cost Analyses for Logging While Drilling (LWD) and Fuel Pricing

Dr. Clement went over FY'19 budget challenges, noting the Chilean fuel costs (19% VAT for fuel), special New Zealand taxes, and cold-water fuel will cost an additional \$1.2M, an engineering test expedition (hardware, materials, supplies) will cost an additional \$1.4M, for the scheduled expeditions (Guaymas Basin) beginning in FY'19.

Dr. Clement requested the JRFB to defer the engineering expedition due to costs. Dr. Neal chaired the Deep Crustal Drilling Engineering Working Group last year, but the short lead time to implement the group's guidance makes it wiser for JRSO to take more time to fully scope the engineering tests for an expedition in the eastern Pacific with reasonable water depths and known sediment thickness.

LWD costs were discussed next, as EPSP required LWD for Creeping Gas Hydrate Slide and Hikurangi Subduction Margin objectives. The increased cost of LWD activity was due largely to delays in shipping tools from New Zealand to Perth and an unanticipated New Zealand GST. The de-mobilization of the Schlumberger tools alone cost 40% of the LWD base costs. This was budgeted for, but accounts for a significant portion of LWD costs. JRSO is disputing the \$370K New Zealand GST.

US regulations put in place after the *Deepwater Horizon* disaster now affect operations in the Gulf of Mexico. The *JR* cannot meet the standards required by the Coast Guard for conducting oil and gas exploratory work in the Gulf of Mexico, and it is likely a ~\$5M investment to bring the *JR* into regulatory compliance. Therefore, scheduled Expedition 386 in the Gulf of Mexico has to be postponed or canceled. The possibility of reclassifying it as a Mission Specific Platform (MSP) expedition with an appropriate drilling platform will be discussed with ECORD.

Dr. Mike Coffin, JRFB Member, asked if there are alternative ports outside of Chile to avoid the hefty taxes. Dr. Clement said there are no alternative ports, but there is a possibility that some of the VAT might be waived if the JRSO is able to demonstrate the value of the expedition to Chile.

Dr. Koppers applauded the accomplishments of the program in completing a large number of Category 2 and 3 expeditions, going beyond expectations and what was originally proposed by the JRSO to NSF. Dr. Clement asks the SEP Co-Chairs for more Category 1 proposals for the future, as much of the extra science and the higher number of Category 2 and 3 expeditions accomplished was only possible due to the CPP contributions from China and India. Dr. Austin said the community is encouraged

by the program's progress and that it can adjust to tighter budgets, but also noted that the program will take a few years to respond to the latest budget challenges.

6. Report of the Science Support Office

Dr. Holly Given, SSO Executive Director, outlined the major tasks defined for the SSO, including programmatic services (JRFB and SEP meeting support, managing proposal submissions and reviews) and IODP-specific software systems (PDB, SSDB, iodp.org).

6A. Update on SSO Performance in FY'17, Issues and Accomplishments

Dr. Given noted that the most significant activity from the last year was the office's renewal proposal, which received 7 reviews and did very well. The proposal contains the same task work and approach, with a new PI team (Dr. Given, Dr. Karen Stocks, and Dr. Donna Blackman). Dr. Blackman's recent retirement announcement will require further discussion with Scripps administration on a new plan forward.

Dr. Given then summarized the statistics of proposal and data progress since the JRFB last met. Over the past 2 SEP meetings, 37 proposals were reviewed (23 new). There were fewer data file submissions, which is helpful for reviewers and may indicate improved communication. SEP deactivated 7 proposals, forwarded 6 proposals to JRFB, and fast-tracked 4 proposals. 96 proposals remain active in the system. She then showed a success histogram of proposals' progress from new proposal submission to scheduled/drilled expedition, demonstrating that a number of proposals have made it through from first proposal to completion since the new program began on 1 October 2013. She presented additional histograms and pie charts delineating proposals by science plan theme, target ocean, science plan challenge, review stage, lead proponent's member affiliation, active proponent distribution, drilling platform, and proposal category, noting that the graphs are all available on the IODP website.

6B. Proposal Packaging and Versioning in the Site Survey Data Bank (SSDB)

Dr. Given presented major SSDB improvements from the last year and features currently in development.

- Restricted data access control: newly implemented flag in SSDB for data under non-disclosure agreements (NDA) referred to as 'restricted' data, allows SSO to easily identify specific files that are under NDA and control access to specific individuals. This tool was needed to facilitate the submission of a few proposals that required NDAs.
- Data package submissions: new functionality in SSDB for proponents to submit data files grouped in a dated package, allows reviewers to more easily navigate files in SSDB. Proponents used this tool for the November 2017 data submission round without any major issues.
- EPSP review: to upload Safety Review Report (SRR) and EPSP recommendations directly into PDB and minimize errors when editing site coordinates, will allow SSO to manage documents better and make documents more accessible. EPSP minutes and "recommendations for approval" will be captured in PDB.

- Master Site Table: to provide a list of relevant sites for each proposal throughout its submission history, will eventually include all documents as they come into PDB, including SRR and EPSP results.
- SSDB revamp: discussion between SSO IT staff and select SEP panelists at the January 2018 SEP meeting provided detailed guidance on improving SSDB for proponents, reviewers, and the general public. These results will be prioritized and implemented as future developments.

Dr. Given noted that the JRFB meeting was supposed to be held at the new NSF building in Alexandria. The short time frame for moving the meeting to a new location was difficult, and she asked NSF to consider future meeting host functions or other options such as the Scripps Seaside Forum.

6C. SEP Satisfaction Survey and SEP/EPSP Membership Statistics

Dr. Given did not report on these topics.

7. Report of the IODP Forum

Dr. Austin reported on the IODP Forum, noting its role in examining IODP in a programmatic way and providing advice to the Facility Board. He described the Forum as a political and philosophical group that operates by consensus.

Dr. Austin discussed several consensus items from the 2017 Shanghai Forum meeting:

- Biosphere Frontiers has a consistent but smaller role in the IODP Science Plan that should be nurtured, as the field is growing and has many young scientists.
- The *JR* Assessment Workshop (JRAW) report supports JRSO, and it will be difficult to go down to 4 expeditions per year after many years of 5 expeditions.
- The fiftieth year of scientific ocean drilling (that is, 50 years since DSDP Leg 1) will be commemorated at the December 2018 AGU meeting with a retrospective on the program and support from the Forum.
- The Forum is concerned about the quality of seismic imaging in support of IODP proposals, as the US will not provide organized imaging capabilities beyond 2020 (see Agenda Item 25).
- Education and outreach efforts may be made more effective by decoupling and focusing on one effort or the other.
- The next Forum meeting will be held in Goa, India in late September; incoming Forum Chair Dr. Dick Kroon, who will replace Dr. Austin on 1 October 2018, is expected to participate.

Dr. Coffin asked about China's intentions to build a new drillship, and Dr. Austin replied that there is enthusiasm and China will hold a workshop in Qingdao 5-7 July 2018. Before getting a new drillship, there first needs to be a post-2023 science plan. Dr. Coffin asked if the Forum is the custodian of the new science plan, and Dr. Austin responded that the Forum is behind the long-range planning for a new science plan, but the science plan may require more than a group of volunteers from the Forum.

Dr. Allan brought up past IODP workshops from the 1990s that led to the foundation for the original IODP plan and served as the basis for the current Science Plan. Dr.

Koppers agreed that it would take a huge effort and said that the incoming Forum Chair was chosen with these concerns in mind, as the Forum is expected to have an important role.

Dr. Leanne Armand, ANZIC IODP lead, announced that ANZIC will have a workshop next year to specifically facilitate building the next science plan. Things are in motion to meet next year to get the community's input. She agreed with Dr. Neal that the facility boards need to give an indication on how they want this to go forward. Dr. Nobu Eguchi, CDEX Operator, said Japan will also hold a workshop.

Consensus 17

IODP is at the mid-point of the current Science Plan "Illuminating Earth's Past, Present, and Future," which continues until 2023. The JRFB will foster the development of the next IODP science plan that will be required for a new program beyond 2023. This effort will guide the nature of future drilling platforms as well as define the science strategy for the next stage of scientific ocean drilling. The JRFB Chair will coordinate with the IODP Forum and other IODP members and consortia, so that the renewal effort will be international in scope and represents the consensus of the overall scientific ocean drilling community.

8. Report of the ECORD Facility Board

Dr. Gilbert Camoin, Director of the ECORD Managing Agency, presented on ECORD's post-2018 renewal plans, MSP expeditions following the last ECORD Facility Board meeting in March, and how the MagellanPlus workshop program brings proposals into the system.

8A. Update on ECORD Renewal Process

Dr. Camoin described ECORD's structure and changes that will be made for the second phase of the program. There will be 2 task forces: Outreach (splitting the education and outreach programs and reducing efforts on education) and Vision (preparing for a potential post-2023 program). Dr. Camoin listed new personnel changes within EFB, and then went over ECORD's renewal process:

- ECORD evaluation (last year)
- ECORD Memoranda of Understanding (MoU) revisited
- IODP partnerships (no changes with JAMSTEC)
- ECORD renewal (at the national level within each country)

8B. Update on MSP Expedition Schedule 2017-2023

Dr. Camoin briefly presented 4 completed MSP expeditions from 2014-2017: Expeditions 347 (Baltic Sea), 357 (Atlantis Massif), 364 (Chicxulub), and 381 (Corinth Rift). He highlighted the success of Expedition 364 and that they expect many more impactful results. Expedition 381, the most recent, used new techniques and tools to drill 3 sites, recovering more than 1,600 m of core and 12,000 samples.

The expected ECORD budget for 2019-23 is flat, with a \$16M balance for the end of 2018 and \$45M until the end of the second phase of the program. The 2018-20 operational plan has 2 scheduled expeditions (no expedition in 2018):

- 2019: Expedition 373 (Antarctic Cenozoic Paleoclimate)
- 2020: Proposal 816 (Hawaiian Drowned Reefs)

A low-cost expedition could be implemented in 2021. The canceled Expedition 377 (Arctic Ocean Paleoceanography) remains a high priority for the EFB that it would like to implement before the end of the program, but it cannot expect more in-kind contributions from Russia concerning ice breakers.

Dr. Camoin noted that there are not many MSP proposals at EFB and SEP. There are potentially 7 proposals, but 3 have been inactive over the past few years and could be deactivated. Other proposals are immature. Proposal pressure is lacking beyond 2023.

The MagellanPlus program provides monetary support to hold drilling workshops with the goal of submitting proposals after the workshop. Since 2014, more than 21 workshops were implemented, and more than 12 proposals were submitted for all platforms. Dr. Camoin listed the upcoming workshops in 2018 and 2019.

Two special workshops were added this year alongside the MagellanPlus workshops, one for early career scientists to write proposals (resulting in one proposal), and another calling for proposals regarding the future of IODP beyond 2023 (surprisingly no results).

Dr. Camoin announced the next 2 ECORD meetings:

- 7-8 November 2018: ECORD Outreach, ECORD Council, ESSAC in The Hague, Netherlands
- 21-22 March 2019: EFB in Bremen, Germany

There was concern regarding the lack of MSP proposal submissions, and Dr. Camoin said this would be a major discussion item for the next two council meetings. The high cost of expeditions and expectation of resources available may affect the supply of proposals.

9. Report of the *Chikyu* IODP Board

Chikyu IODP Board (CIB) Chair, Dr. Yoshiyuki Tatsumi, presented a report highlighting a few major consensus items from the CIB meeting in March. The CIB is looking for new riser-based projects. There are three riser proposals (CRISP, IBM, and Hikurangi) at the CIB, and they have asked proponents to submit updates by October. One proposal forwarded from SEP (925-Pre Blanco Fracture Zone) was an innovative and interesting experiment, but contains politically and environmentally sensitive concerns. The CIB deactivated the proposal and encouraged the proponent to submit a riserless pre-proposal first that focuses on long-term monitoring to characterize the fault zone.

Dr. Tatsumi brought up the Lord Howe Rise proposal addendum, which has been reviewed and approved but postponed due to budget issues. Dr. Armand explained that the Australian government budgeted \$500M for research on the Great Barrier Reef, which left LHR with little expectation of funding. Geoscience Australia is still trying to find support, but election results may impact funding. Dr. Shin'ichi Kuramoto, JRFB

Liaison from CDEX, mentioned that 2 site surveys were done using the JAMSTEC fleet funded by Geoscience Australia.

9A. Update on Chikyu Renewal Process

9B. Update on Chikyu Expedition Schedule 2017-2023

Dr. Eguchi presented recent and upcoming expeditions:

- Expedition 380: NanTroSEIZE Frontal Thrust. There have been several drilling campaigns in recent years. The expedition finished in 27 days and completed 3 LTBMS transects. Education and outreach efforts for the core-log-seismic integration investigation at sea (CLSI@Sea) program utilized cores and seismic data from previous expeditions with international participation. The workshop report is being prepared and will be submitted to *EOS* and *Scientific Drilling*.
- Expedition 358: NanTroSEIZE (the final expedition). There have been 12 expeditions since 2007. Expedition 358 will expand the riser hole and collect samples using new technology (expandable casing). The staffing plan is complicated, and it will be a long expedition.

10. JRAW Report

Carl Brenner, Director of the US Science Support Program (USSSP), gave the *JR* Assessment Workshop (JRAW) Report. In late 2015 NSF approached USSSP to organize community guidance as part of the approach to the NSB for renewal of the *JR* Facility. USSSP held a workshop in early 2016 with Drs. Beth Christensen and John Jaeger as workshop Co-Chairs. They looked at 4 things:

- Specific merits of the *JR*
- *JR* modifications that would be needed to accomplish the Science Plan
- Regional model of the *JR*
- Overall science accomplished by the *JR*

Mr. Brenner described the survey results soliciting views of the *JR* community, workshop timeline, workshop attendees, and steering committee members.

The survey was open until April 2017. Almost 1000 survey responses were collected, and 876 were analyzed after removing incomplete or duplicate responses. With 37 countries represented, half of the responses came from the US. There were varied experience levels, with half of respondents being >10 years removed from receiving their PhD. Half had sailed on the *JR* 1-2 times, while 34% had never sailed on the *JR*. More than 50% were working under the science plan theme Climate and Ocean Change, and many had secondary interests in another theme. There were overwhelmingly positive responses for the suitability of *JR* capabilities.

The workshop was held on 26-27 September 2017.

- Day 1: Participants analyzed and integrated results from the community survey in breakout sessions by science theme.
- Day 2: Participants synthesized preliminary assessments of the *JR* and evaluation of regional operations.
- Day 3: Steering committee members and a few other participants prepared the preliminary draft of the report.

Mr. Brenner provided highlights of suggestions organized by the 4 science themes. Overall, the community felt that IODP addressed all the challenge questions and recovered samples and data that led to unanticipated developments using analytic advancements in tools.

Recommendations from the report included:

- Periodic reviews of analytical capabilities to keep up with science objectives and approaches
- Additional core storage options for vulnerable material sampled
- Continued efforts on core recovery and quality of traditionally difficult-to-core sediments
- Dedicated biosphere expedition freezer (-80°C)
- Stratigraphic correlation key for continuous recovery of critical intervals

11. Policies and Guidelines Updates

Dr. Koppers led the Policies and Guidelines discussion, noting the members of the JRFB Subcommittee on Policies and Guidelines, including himself, Dr. Given, Dr. Coffin, and Dr. Christina Ravelo who was recently replaced by new JRFB member Dr. Barbara John.

Dr. Koppers stated that major changes have been highlighted in the documents provided, and it is assumed that all JRFB members have read the changed documents available in the Agenda Book. Any concerns should be raised, otherwise the changes will be accepted as presented. The goal is to provide a common format for all the guidelines, with the latest versions made available on the IODP website, using updated terminology. There is one more document to be updated next year.

Action Item 1

The JRFB Subcommittee on Policies and Guidelines will continue to update and reformat all remaining policies and guidelines for the general IODP program, for the *JOIDES Resolution*, and for the JRFB Advisory Panels.

11A. Updates on IODP Confidentiality Policies

Dr. Koppers noted that the proposed changes were provisionally approved in 2017, and that there was further discussion with the panel chairs at the SEP Small Group Meeting in January 2018 as well as input from the Co-Chief scientist reviews that were woven into the new confidentiality policy. The handling of proprietary industry data in the SSDB is addressed in the new policy on the Use of Limited Non-Disclosure Agreements.

11A-1. Combining Previous Policies into one Standard IODP Confidentiality Policy

There is now a single confidentiality policy for all IODP proposals in the Proposal Database (PDB) and data in the Site Survey Data Bank (SSDB). Previously there had been two separate policies.

11A-2. Listing of the Eight Principles Governing Confidentiality in IODP

Dr. Koppers summarized the major points of the new Standard IODP Confidentiality Policy, noting a major change to make all IODP proposal documents, including site forms and site characterization data files, publicly available when JRFB or another Facility Board schedules a successful proposal.

11A-3. Introducing “Restricted” Data Category in Site Survey Data Bank (SSDB)

There is a new feature in the SSDB to identify “restricted” data, i.e., data under a limited non-disclosure agreement (LNDA). Proponents need to coordinate with the SSO to upload restricted data in the SSDB, and can only do so if they agree to also upload a set of “minimum data” derived from the restricted data set. The minimum data will be made publicly available once the proposal is scheduled, and the Science Party will have access to this subset of data. There must be an exceptional basis for proponents to upload restricted data, as restricted data are never made available except for the derived minimum subset. The new restricted flag in the SSDB is an addition to the ‘release’ and ‘hold’ flags already in place.

11A-4. Adding Definition for “Minimum Data” Requirement for “Restricted” Data

The minimum data requirement applies to all primary and alternate sites proposed. The main goal is to make sure these data provide sufficient coverage and context for the scientific research expedition. Dr. Koppers described the requirements for different data types (seismic reflection profiles by depth and profile, and bathymetric maps) in detail, and noted that Dr. Sean Gulick, the SEP Site Co-Chair, corroborated the parameters. The providers of the restricted data implicitly agree that the minimum data derived from the restricted data will be provided at the highest resolution possible. Exemptions may be provided by contacting the JRFB Chair.

In the event of a platform emergency while at sea, the policy states that all site characterization data from the review and scheduling processes will be made available immediately to those addressing the issue. Dr. Allan reiterated that IODP is an open data program, so actions should be transparent and data used for the drilling platform should be available to the Science Party. There was further discussion on the policy going forward, and it was noted that any new LNDA must reference Section 8 of the IODP confidentiality policy for data accessibility in platform emergencies. Dr. Koppers said he will work on addressing the issue of ‘held’ data in current proposals as well.

Dr. Given brought up specific text in the document describing how violators of the confidentiality policy will be excluded from the program, and she did not approve of using the policy documents to describe punishment for infractions. Dr. Koppers agreed to remove the text according to Dr. Given’s suggestions.

11B. Updates on IODP Proposal Submission Guidelines

11C. Updates on IODP Site Characterization Data Guidelines

Dr. Koppers pointed out small changes in the document, calling out the new standard IODP confidentiality policy and emphasizing the access control options for data files: release, hold, restrict.

11D. Updates on JR Staffing Procedures

Dr. Koppers reminded everyone that NSF indicated that there would be new staffing procedures in place after the Guaymas Basin expedition, and these would be incorporated into the new MoUs that NSF is negotiating with the *JR* Consortium members.

11D-1. Selection of Outreach Officers as part of the Science Party

The Outreach Officers are part of the Science Party, and they count against the MoU quotas. JRSO collaborates with PMOs to call for applications for scientists, and JRSO/USSSP will collaborate with PMOs to staff outreach officers. Outreach officers work to forward the primary science objectives of the expedition, and regional PMO interests will be taken into account in the selection process. Dr. Neal noted that the regional aspect of outreach will have a greater impact on the community.

11D-2. Requirement of Increased Number of PMO Nominees per JR Berth

Dr. Koppers emphasized that PMOs should be more aware of the need for flexibility and need to provide more nominations than the number of allocated berths so the JRSO has the flexibility to achieve a well-balanced and well-equipped Science Party. Dr. Allan said that the Co-Chief scientist comments indicated the need to integrate outreach officers to the Science Party early on, and having several nominees for the outreach specialty as well gives USSSP and JRSO and the Co-Chiefs much more flexibility in dealing with the challenge.

There was discussion on how to define the position of an outreach officer and their duties or background. Dr. Austin suggested journalists and professional blog artists rather than teachers, and Dr. Koppers said that the call for applications will specify an expedition's needs. The PMO meeting this summer can address the role of the outreach officer more clearly. If there are no applications for outreach officers, the new staffing procedures allow the PMO to fill the berth with a scientist instead under normal science staffing procedures.

11E. Updates on JR Third Party Tool Policy

Dr. Koppers noted that the following 4 documents were upgraded to the new format with small changes. No objections or further discussion came from the group.

11F. Updates on SEP-EPSP Terms of Reference

11G. Updates on IODP Sample, Data and Obligation Policy

11H. Updates on IODP Environmental Principles

Consensus 3

The JRFB approves the following updated policies and guidelines:

- 1) IODP Proposal Submission Guidelines (15 May 2018)
- 2) IODP Guidelines for Site Characterization Data (15 May 2018)
- 3) IODP Standard Confidentiality Policy (15 May 2018)
- 4) IODP Limited Non-Disclosure Agreement Policy (15 May 2018)
- 5) IODP Sample, Data and Obligation Policy (15 May 2018)
- 6) IODP Environmental Principles (15 May 2018)
- 7) *JR* Third Party Tool Policy (15 May 2018)
- 8) *JR* Staffing Procedures (15 May 2018)
- 9) SEP-EPSP Terms of Reference (15 May 2018)

Consensus 4

The new **IODP Standard Confidentiality Policy** and the new minimum data requirement for all restricted data files will come into effect immediately for new PRE proposals being submitted at the **1 October 2018** proposal submission deadline. The JRFB encourages proponent teams of proposals already in the IODP Proposal Database (PDB) to work toward all the new guidelines in this policy as much as possible.

12. SEP Overview of Proposals for FY'20-21 Expedition Scheduling

12A. Statistics of JR Proposals at JRFB, in SEP Holding Bin, and with SEP

Dr. Michiko Yamamoto, the SSO Proposal Manager, summarized the status and distribution of proposals available for JRFB review.

12B. Science Evaluation Overview of Proposals Ready for Scheduling and Relevant Proposals in the SEP Holding Bin

SEP Co-Chairs Dr. Ken Miller and Dr. Gulick reviewed SEP summaries for the proposals to be considered by the JRFB.

13. EPSP Preview of Proposals at JRFB

EPSP Chair, Dr. Barry Katz, provided a summary of the February 2017 meeting to preview Proposals 864 (Equatorial Atlantic Gateway, Dunkley-Jones) and 859 (Amazon Margin, Baker). He noted the key requests for each proposal, mainly improved seismic displays for interpreted and uninterpreted sections, more detailed geology/morphology, and some site relocations.

The next EPSP meeting will be a 3-day meeting in September. Dr. Koppers approved of the preview meeting results and looked forward to getting the green light for a viable drilling program for Proposals 864 and 859 in September.

14. Options for FY'20-21 Expedition Scheduling

Dr. Koppers introduced the discussion of expedition scheduling by reminding everyone of the COI policy and then providing several updates. Drs. Austin and Gulick had institutional conflicts with the Gulf of Mexico expedition (P887) and were asked not to participate in that discussion. It was decided that JRFB Member Dr. Paul Wilson, who described himself as a “sleeper” (not named) proponent on the Amazon Margin proposal (P859), would be able to join in the discussion objectively.

Dr. Koppers noted the strategy for selecting the best possible schedule would follow the regional *JR* track as advertised as much as possible, schedule at least one proposal on the Brazilian margin (based on JRFB 1705 consensus statement 6), and aim for 4 expeditions scheduled in FY2020. They would need to take into account the Category 1/2/3 drilling complexities and costs, as well as scheduling in the Southern Ocean in the austral summer 2021. It was also noted that the cost of Engineering Expedition 384 is on the high side of a Category 2 expedition.

14A. Mission Antarctica: PRL in Support of Proposal 732: Antarctic Peninsula (Channel)

Dr. Koppers received a PRL from the proponents requesting that IODP and the Facility Board complete the third in three related Antarctic drilling projects.

14B. Expedition 374: PRL to Return to the Ross Sea

Dr. Koppers reminded everyone of the mechanical issues that led to 16 days lost for Expedition 374. The proponents asked JRFB to keep 2 sites in consideration for the future in order to complete their primary objectives, and they also plan to add additional sites and science objectives for a new “mini-proposal.” Dr. Given asked everyone to consider how the board’s response would set a precedent, to avoid inadvertently opening doors with future implications. Dr. Neal thought the case was clear cut, as a major mechanical failure was responsible for preventing the expedition from achieving its objectives. Dr. Allan notes that the extensive transit time (>1 month) precludes a “mini-expedition” in the future.

14C. Expedition 349/367/368: PRL to Return to IODP Site U1503

Similarly, Dr. Koppers received a letter from 6 Co-Chiefs from Expeditions 349, 367, and 368 regarding a mechanical issue that limited their ability to reach their primary objective. They requested for U1503 to remain at the Facility Board for future implementation (along the 2023-24 *JR* track). Dr. Miller pointed out that the South China Seas expeditions were CPPs and asked if additional funding could come from China. Dr. Allan said that NSF was on record telling China they would not need additional funds, so there will not be additional CPP funds required from China if the Facility Board reschedules. Dr. Coffin added that there are many reasons why expeditions don’t fulfill their objectives, and everyone needed to consider all the reasons (mechanical, weather, political, medical, etc.) with regard to how to handle the situation in the future.

14D. Expedition 386: Gulf of Mexico Methane Hydrate Permitting

Dr. Koppers discussed the permitting issues with the Gulf of Mexico expedition, since regulations have been strengthened following the *Deepwater Horizon* disaster. Although the *JR* has operated successfully in the Gulf of Mexico before, the US Coast Guard will now require the *JR* to meet the Mobile Offshore Drilling Unit (MODU) 1989 Standard before being cleared to operate there. A long list of upgrades would need to be put in place before the *JR* can meet this standard.

Discussions between JRSO and the ship owner came to the conclusion that the expedition cannot be implemented under the current regulatory environment. The expedition has been taken off the schedule, as there is not enough time to carry out the upgrades and their cost is excessive (>\$5M).

Alternatives were considered for implementing Expedition 386. Postponing the expedition to 2022-24 would not be possible, as funding from the Department of Energy (DOE) would not be available that far in the future. The second option, using a MSP, could be looked into with ECORD representatives. The expedition could be forwarded to the ECORD Facility Board as a MSP with the advantages that a platform may be selected that meets the MODU Standard and is implemented with CPP funds. There will be challenges with fitting a new MSP expedition into their schedule, but preliminary discussions with the EFB, ECORD Managing Agency, and ESO have been positive. Dr. Camoin noted that if the expedition is forwarded, all the budget implications must be evaluated with input from the EFB and ESO to receive endorsement from the ECORD Council. Dr. Given said that if the EFB is successful, it would reflect very well on the international and cooperative strengths of the program. Dr. Koppers agreed to forward the expedition to the EFB.

14E. Recommendations from the Hard Rock Engineering Workshop

Dr. Neal presented a brief summary from the meeting of the Deep Crustal Drilling Engineering Working Group, which he chaired, held at Texas A&M University (TAMU) 16-18 October 2017. The full report is available on the IODP website. There were 27 participants in the meeting, and they came up with 8 recommendations to define strategies for hard rock drilling:

- 1) JRSO is understaffed and needs an additional 1-2 FTEs to efficiently maximize the return on money put into complex drilling.
- 2) JRSO should establish a Project Coordination Team (PCT) for proposals with challenges to start planning drilling operations. The PCT should be established early, when the proposal is forwarded from SEP to the JRFB.
- 3) A Technical Advisory Team (TAT) should be established by JRSO on an as-needed basis to review operations for challenging expeditions. They would not hold regular meetings.
- 4) The full capabilities of the rig instrumentation system should be utilized, which is difficult to implement post-expedition. The TAT would create plans for future expeditions.
- 5) The engineering expedition scheduled for 2019 should be conducted in the shallowest water possible. Technologies to be tested include sensor subs at drill bits and different bits for drilling and coring.
- 6) Future engineering testing for 3 technologies to enhance drilling into hard rock, including a mud return system for riserless drilling.
- 7) Establish a Superfast-dedicated PCT to deepen Hole 1256D based on past experience with broader expertise and knowledge base than currently available. The PCT should develop a coring plan.
- 8) SloMo Phase 1 Atlantis Bank deep drill hole should be moved closer to successful hole 735B where drilling to 3 km can be accomplished.

Dr. Neal talked about future developments for improving coring and drilling, ship operation efficiency, and long-term suggestions for consideration. He noted that complex proposals should be kept at the JRFB to allow flexibility and protect them from falling off the table over time (if they were kept at SEP).

14F. Various Options for Expedition 384: Engineering Testing

At the request of Dr. Koppers, JRSO Manager of Science Operations, Dr. Mitch Malone, presented a prioritized list of engineering tests for Expedition 384 based on recommendations from the Deep Crustal Drilling Workshop:

- Advancing, opening, or remediating a hole: New drill bits, expandable casing
- Improving hole cleaning: Biodegradable fiber additive (difficult to find, may need to contact workshop participants)
- Improving core recovery: New coring bits (challenging due to volume of orders), lined core barrels (too expensive to use for testing)
- What is going on downhole? Sensor subs (expensive, long-term development project)

It was determined that new drilling bits and underreamers should be prioritized, followed by coring bits and drilling fluid additives at medium priority. Tests that were not recommended: expandable casing, lined core barrels, and sensor subs.

Dr. Malone mentioned other tests they would like to perform, including the MDHDS delivery system that was tested on Expeditions 362 and 372 and a bottom-driven XCB that is based on the current *Chikyu* XCB. The Engineering Expedition is planned for 30 days of operation, joined with APL-769 to Hole 504B.

14G. Various Options for Expedition Schedules

Dr. Malone presented the details and rationale for several possible FY'20-21 schedules.

15. Discussion of the FY'20-21 Expedition Scheduling Options

Dr. Malone provided answers to JRFB member questions regarding the scheduling options provided. Dr. Koppers asked the JRFB members to think about these overnight and be prepared for a discussion on the pros and cons in the morning on Day 2.

Wednesday

16 May 2018

9:00 – 17:30

16. Development of the FY'20-21 JR Schedule

Dr. Koppers recapped the possible FY'20-21 schedules provided by Dr. Malone, along with a few updates to the options presented previously. He then led the Board in a discussion of potential schedules, their scientific importance and impact, as well as transit and cost implications. He asked the JRFB members to state which schedule they would like to implement in FY'20-21 to achieve the best science in a cost-effective way. The following list received the strongest consensus:

Guaymas Basin Activity (P833 / Exp 385)

JR Tie-Up

Engineering Testing (Exp 384) / APL (P769)

Amazon Margin (P859)

Equatorial Atlantic Gateway (P864)

JR Tie-Up

South Atlantic Transect, Expedition 1 (P853)

Walvis Ridge Hotspot (P890)

Agulhas Plateau (P834)
South Atlantic Transect, Expedition 2 (P853)

Consensus 5

The JRFB recommends the rescheduling of Expedition 384 (Engineering Testing) to FY'20, following Expedition 385 (Guaymas Basin) and a tie-up period. This will be followed by Full Proposal 859 (Amazon Margin), Full Proposal 864 (Equatorial Atlantic Gateway) and a second tie-up period. Furthermore, the JRFB recommends the scheduling of the first expedition for Full Proposal 853 (South Atlantic Transect) in the beginning of FY'21, followed by Full Proposal 890 (Walvis Ridge Hotspot), Full Proposal 834 (Agulhas Plateau) and the second expedition for Full Proposal 853 (South Atlantic Transect). The expectation of the JRFB is that there will be in total 8 months of operations in FY'21.

Consensus 6

The JRFB recommends the following engineering tests to be carried out during Expedition 384 by the JRSO in order of priority:

- 1) New drilling bits for improved advancement, opening and remediation of drill holes in hard rock formations.
- 2) New underreamers for opening up holes in hard rock formations.
- 3) New coring bits for coring in hard rock formations.
- 4) New biodegradable drilling fluid additives for improved hole cleaning.
- 5) New bottom-driven XCB based on current *Chikyu* XCB designs.
- 6) Continued testing of the Turbine Driven Coring System (TDCS) depending on the outcome of first tests during Expedition 376 and discussions with CDEX.
- 7) MDHDS testing in conjunction with the T2P system.

17. Long-Term Cruise Track of the *JOIDES Resolution*

17A. Proposal Pressure in the South, Equatorial, and North Atlantic

Dr. Koppers projected the map of proposals at SEP and JRFB and the schedule for those proposals still at SEP. He noted that there are many pre-proposals in the North Atlantic, which fits with the path of the *JR* going north after picking up the second expedition for the South Atlantic Transect.

17B. Alternative Long-Term Cruise Tracks (if necessary)

Dr. Koppers determined that no alternative long-term cruise tracks were necessary this JRFB meeting.

17C. Call for Proposals in the North Atlantic, Arctic, and North Pacific

Dr. Koppers reiterated his hope for the science community to hold workshops resulting in proposals in the North Atlantic, Arctic, and North Pacific. The USSSP and MagellanPlus programs are working in the right direction to build proposal pressure in those regions. The Board approved the following proposal call text as drafted by Dr. Koppers.

Consensus 7

Based on the long-term regional track of the *JOIDES Resolution* from 2021 until 2023/24, the JRFB is encouraging the IODP science community to submit proposals for drilling projects in the North Atlantic, Arctic Ocean, and the North Pacific.

Consensus 8

The JRFB reaffirms that, based on current and anticipated proposal pressure, the *JOIDES Resolution* will start to operate in the general area of the Equatorial and North Atlantic, Gulf of Mexico, Mediterranean, Caribbean, and the Arctic in FY'21 and through FY'22. Furthermore, the JRFB expects that the *JOIDES Resolution* will complete its global circumnavigation in the Indo-Pacific region in FY'23.

Dr. Coffin noted that guidelines should be developed for advising proponents who encounter mechanical failures, medical evacuations, or other circumstances beyond their control. The group discussed and decided on specific text to allow undrilled sites to remain at the Facility Board for future scheduling.

Consensus 9

The JRFB in exceptional circumstances on a case-by-case basis will consider to keep unimplemented sites on the board for potential completion at a later date during the IODP 2013-2023 program. The JRFB has decided to keep Expedition 374 Sites U1524 and RSCR-19A and Expedition 368 Site U1503 on the board.

Dr. Malone asked if APL-921 would still be implemented with the engineering expedition, and Dr. Koppers was in favor of doing the APL if it did not jeopardize the engineering test objectives from being met. Dr. Malone said he would work out a more detailed plan for the engineering tests and then return to the Board to determine if the APL can be added.

Further discussion on the canceled Gulf of Mexico expedition ensued, with Dr. Koppers agreeing to write a letter describing the situation to the community to be made available on the IODP website.

Consensus 10

The US Coast Guard has informed the JRFB and ship owner ODL/SIEM that the *JOIDES Resolution* needs to fulfill all requirements of the Mobile Offshore Drilling Unit (MODU) 1989 Standard in order to receive permitting for Expedition 386 in the US EEZ of the Gulf of Mexico. Given the high costs and insufficient available time for the large number of upgrades required, the JRFB cancels Expedition 386 and removes it from the *JOIDES Resolution* schedule. However, the JRFB will forward proposal 887-CPP2 and 887-ADD2 to the ECORD Facility Board (EFB) for consideration of the potential implementation of this drilling project as a Mission Specific Platform (MSP). The JRFB highlights the fact that the implementation of this drilling proposal addresses Challenge 13 in the IODP 2013-2023 Science Plan.

18. Executive Session to Discuss FY'17 JRSO Site Review and Co-Chief Scientists' Evaluation Reports

Closed session – no notes taken.

19. Discussion of NSF's Response to FY'17 JRSO Site Review

Dr. Allan gave a brief review of the process and results of the FY'17 JRSO Site Review. The JRSO's five-year cooperative agreement requires annual reviews, and this was the mid-award (3rd year) review. The reviews help NSF OCE determine whether to renew, re-compete the award to operate the *JR*, or terminate the cooperative agreement. OCE decided to encourage the operator to submit another proposal for an additional 5 years of operations. The NSF panel report is confidential, but the NSF response is public and will be posted on the JRSO website.

NSF determined that the JRSO did very well in their review, and the broader management infrastructure (SSO, SEP, EPSP, Forum, JRFB) are all running very well. Dr. Allan noted that Dr. Koppers's exceptional leadership played a large role in this.

The panel report identified several challenges and made 10 recommendations. Challenges included tight funding, an aging vessel, and the availability of sufficient high-quality seismic data, but no significant shortcomings were identified.

Consensus 11

The JRFB is very pleased with the results and recommendations presented in the FY'17 Co-chief Scientists Report and the FY'17 JRSO NSF Panel Facility Review Report (February 2018). Both reports point out the outstanding, safe, and efficient operation of the *JOIDES Resolution* through capable management and critical engineering improvements by the JRSO. In addition, the JRFB supports the recommendations by the NSF in their response to the FY'17 reports, emphasizing that effective operation of this facility requires enhancement of operations risk management methods and safety evaluations, and improved retention of overall drilling knowledge.

19A. Planning for Future Scientific Ocean Drilling Facilities

19B. How to Efficiently Operate the >33-Years Old JR during the 2019-2024 Phase

19C. Availability of Sufficient High-quality Seismic Data in Support of IODP (see Agenda #25)

19D. Facility Operations Risk Management Recommendations

19D-1. Application of Risk Analyses Methods and Evaluations

19D-2. Addition of Sufficient Alternate Sites Requiring Differing Operational Approaches

Dr. Koppers emphasized the need for sufficient alternate sites with differing operational approaches to be included in proposals. He asked SEP to guide proponents to comply with this request in their reports to the proponents. Dr. Malone noted that this request stems from the South China Sea expeditions, where sites

given clearance by the TAMU safety panel and EPSP were not scientifically sound according to the Co-chiefs. The sites should have been considered earlier in the review process rather than at sea. Dr. Miller said that there are never enough alternate sites, but it is difficult to review proposals with 50 sites. There was further discussion weighing the merits and challenges of alternate sites and contingency plans, with agreement that not all proposals will require alternate sites and drilling strategies, but they may be identified as the proposal goes through the review process.

Consensus 12

The JRFB requests from the SEP/EPSP, and in consultation with the JRSO representation at their meetings, to ensure that the proponents provide sufficient alternate sites and strategies in IODP proposals, including alternate sites that would require differing operational approaches (such as different water depths, sediment thicknesses and/or types) in order to increase operational flexibility and decrease risk during implementation of the project at sea.

Action Item 2

The JRSO is asked to provide annual reports to the JRFB, including risk analyses, development of risk management methods, and approaches to retain insight/experience in the current JRSO staff and engineering.

Action Item 3

The JRSO is asked, before the next JRFB meeting in 2019, to provide how their science planning for *JR* operations has been improved based on recommendations in the FY'17 JRSO NSF Site Review Report. This includes a cost-benefit analysis and plan toward the potential installation of a whole-core XRF core scanner onboard the *JOIDES Resolution*.

19D-3. Enhanced Data Mining and Publication of Previous Drilling Operations

19D-4. Ensuring Appropriate Site Survey Data are Available to Science Parties on the JR

19D-5. Encouraging Enhanced Reporting and New Safety Initiatives for JR Operations

19E. Enhancement of Science Party Support Recommendations

19E-1. Addition of Enhanced PowerPoint and Video Guides

19E-2. Improving Guidelines for Co-chief Scientists and Expedition Program Managers

19E-3. Explore Installation Options for the Whole-core XRF Core Scanner on the JR

19E-4. Continue Improving Support for Effective Onboard Outreach Activities

19F. Archival Publications Recommendation

19F-1. Improve and Update Website Interface for Report Submittal and Publication

20. Future Updates to the Gulf Coast Repository and Core Storage

Dr. Clement gave the group updates on the Gulf Coast Repository (GCR), which currently stores 140 km of cores and has space for 30 km more. He noted that the GCR will stop taking in cores in 2020 since they don't archive cores from the Atlantic. The scientific community underscored the need to maintain storage conditions and continue refrigerating the samples. There continues to be a high amount of interest in the DSDP cores, as the GCR receives a large number of sample requests for these cores. TAMU intends to support the repository with the installation of new equipment (such as a new refrigeration system).

21. The JRSO Draft FY'19 Annual Program Plan

Dr. Clement then presented the JRSO tasks and implementing plan for their FY'19 Annual Program Plan (APP) draft, noting that discussion of the draft would help determine which long lead items to include in the APP. Fluctuating fuel prices should be taken into account as well. The APP will be sent back to the Facility Board for approval and reviewed by NSF.

Six expeditions were scheduled for FY'19 at the May 2017 JRFB meeting:

- Expedition 378: South Pacific Paleogene Climate
- Expedition 379: Amundsen Sea
- Expedition 382: Iceberg Alley & South Falkland Slope
- Expedition 383: Dynamics of the Pacific ACC
- Expedition 384: Engineering Test + APLs
- Expedition 385: Guaymas Basin

The FY'19 guidance from NSF was \$65M, but the FY'18 actual budget was \$66.7M. Through discussions with NSF and the Facility Board Chair, it was decided that the Engineering Test would be deferred to reduce costs for FY'19 and get closer to the budget.

Dr. Clement pointed out that the scheduled expeditions will include operations around so-called Point Nemo, the most remote location on the planet (where NASA targets their spacecraft crashes). He reminded everyone that it will be extremely difficult to get medical help in such remote waters, so the PMOs need to take medical clearance very seriously to prevent incidents.

Dr. Clement then went into the details of the FY'19 APP budget, which has little room for flexibility at \$65.8M. There are some uncertainties for fuel costs based on temperature-dependent fuel blends. Personnel changes at the JRSO were also noted.

The Rutgers Core Repository, a satellite repository for the GCR included in the JRSO APP, was discussed next. Dr. Miller and Dr. James Wright, Chair of the US Advisory

Committee for Scientific Ocean Drilling, left the room due to institutional COIs. Dr. Allan provided some background on the facility, noting their longstanding support for the storage of both IODP and ICDP cores and sampling requests, and Dr. Koppers agreed that the proposal was a logical and worthwhile legacy of scientific ocean drilling that should be maintained. Dr. Neal asked if the \$80K cost was in addition the JRSO APP, which Dr. Clement confirmed. There was general agreement that the repository proposal should be approved.

Cores from the Iceberg Alley Expedition 382 will be stored at the Bremen Core Repository (BCR), but the programmatic XRF scanning cannot be done for free there. Dr. Clement proposed shipping the archives to College Station to get the measurements and then shipping them to Bremen for storage, but the \$20K shipping costs should be taken into consideration. Dr. Koppers was in favor of making XRF scanning a standard measurement and having the BCR provide this as part of the core curation services, and Dr. Miller suggested that this be reflected in the NSF MoU with ECORD. Dr. Allan said if the JRFB endorses the principle, it can be worked out. Dr. Sally Morgan, ECORD Science Operator, said there is no policy on minimum measurements, and Dr. Koppers replied that indeed a policy for the JR Facility does exist. Dr. Allan reiterated that having US cores archived at the BCR for free is good for NSF, and Dr. Austin noted that the cores are the ultimate legacy of the program and demonstrate great cooperation.

Consensus 15

The *JOIDES Resolution* Science Operator (JRSO) Annual Program Plan FY'19 is recommended for approval in principle. The final plan, including the addition for the annual support of the Rutgers Core Repository, will be considered for approval by the JRFB at a later date, but before July 2018.

22. The SSO Draft FY'19 Annual Program Plan

Dr. Given presented the SSO APP to the JRFB for approval. She reviewed the planned budget and reminded everyone of the SSO's role in facilitating the proposal review process for the benefit of both proponents and reviewers. Dr. Allan noted that the SSO's renewal reward should have gone through already but there were some administrative issues. Staff updates were given, noting the departures of Project Coordinator Ms. Rita Bauer and IT Developer Mr. Brian Manning, retirement of Scientific Advisor Dr. Blackman, and hiring of IT Developer Mr. Alan Yang. Dr. Allan said that the SSO has proved crucial in making sure that IODP functioned in an integrated way as much as possible, with consistent policies and procedures across all boards. He also praised the leadership and unspecified tasks taken on by the SSO.

Dr. Given reviewed the primary task work of the SSO:

- Task 1: Logistical and programmatic support for advisory panel meetings
- Task 2: Proposal and data management for 2 submission deadlines every year, including the normal workflow of evaluating proposals and maintaining an archive of all documents and data
- Task 3: Websites for IODP, which will include IODP legacy documents organized on the current website this year
- Task 4: IT platform, which entails backups, security, maintenance, etc.

Dr. Neal was concerned about the planned FTE drop-off in future years given the level of support and extra tasks taken on by the SSO, and Dr. Given responded that she will look at changing the FTEs or other arrangements. Dr. Allan said that NSF will follow the current award, and changes may be made with further discussion. Dr. Koppers added that the SSO has been as vigilant as a sixth watchdog during SEP meetings.

Consensus 16

The Science Support Office Annual Program Plan FY'19 is recommended for approval.

23. Planned Partner Contributions and Commitments 2018-2024

Dr. Koppers led the discussion on planned partner contributions for the second phase of IODP. The NSB will be reviewing international contributions to the operation and management of the *JR*. Some MoUs are being negotiated and will need to be put in place by 2018. There are currently no new CPPs in the system to provide additional funds, and more expensive drilling operations are scheduled for this fiscal year. The increased costs due to LWD and fuel prices are significant. *JR* operations have been scaled down to 8 months from 10-11 months per year. Increased investment in the *JR* by the international partners will be a key argument for renewal. Therefore, Dr. Koppers asked the partners to each present their planned contributions and collectively demonstrate the strong commitment by the international community in support of the *JR*, which will be presented to the NSB.

ECORD: Dr. Camoin said they can contribute \$7M per year starting 1 October 2019. Their flat contribution will reduce their berth count by 1, down to 7 sailing scientists per expedition. Unlike the *JR* policy, MSPs will not count co-chief scientists and outreach officers against participation levels.

ANZIC: The current MoU goes through September 2019 with participation as a half member. Dr. Armand said ANZIC will not be able to increase the fee they pay from their funding agencies, so they will drop to 0.37 of a full membership in order to continue participating until 2020, when ANZIC ends. Staying at 0.5 of a full membership would likely have ANZIC finishing early, and they would prefer to finish through 2020. The funding request would go in early 2019, with outcomes available late 2019 or early 2020. ANZIC would like to become a full member, but it depends upon the political environment. Things look positive at the moment to continue on with the program. Dr. Allan asked if they will sign a memorandum for \$1M/year until 2020 with the goal of \$4M/year for 2020 and beyond. Dr. Armand confirmed their intent and noted that they are in discussion with New Zealand colleagues to find ways to increase their contributions.

Korea: Dr. Gil-Young Kim, JRFB Member from K-IODP, described their funding sources from the Ministry of Oceans and Fisheries (MOF) and the Korea Institute of Geoscience and Mineral Resources (KIGAM) in previous K-IODP phases. The current MoU between NSF and KIGAM ends in 2019 and is under negotiation with MOF for 2020 and onward. Dr. Neal asked if Dr. Kim is requesting a letter from JRFB. Dr. Kim said that he has to convey the importance of IODP to MOF and will seek support letters from IODP member countries. Dr. Koppers suggested using the JRAW report, since it lays out the

science results and provides an excellent view of the impact of the IODP program and the *JR* in particular. Dr. Kim said he was considering involving other Korean agencies and bringing in more universities to explain IODP's importance to the Korean government. Dr. Given suggested getting impactful statements from Korean scientists who have sailed on IODP expeditions and gained valuable research and career experience. Dr. Koppers and Dr. Neal agreed to write a letter of support and advised Dr. Kim to bring the issue to the Forum Meeting for additional support. Dr. Kim noted that the Korean government is not particularly interested in geoscience.

India: Dr. Brijesh Bansal, JRFB Member from IODP-India, indicated that their current memorandum is in place through 2019, and there will be an internal review to determine their intent to commit beyond that. They want to assess the benefits that have been brought to Indian scientists who have sailed on the *JR* and take that into account for the future activity of India in their decision. Dr. Bansal said their intent is to renew at the same level. Dr. Austin noted that the results from the monsoon expeditions probably benefited India more than any other country and provide a strong scientific argument for what the program has done beyond any scientist's individual contribution. Dr. Allan said that the total IODP investment in the geographic regions around India are on the order of \$90M. Dr. Bansal said he is on board but needs to convince the administrative officials.

Brazil: Ms. Maior stated that their current MoU with NSF is for 6 years, ending in September 2019. Their contributions were \$3M/year for the first 2 years and \$1M/year for the remaining 4 years. The intended financial contribution for their new MoU is \$1M/year. Major concerns for the Brazilian program involve the lack of success in leveraging expedition candidates, a limited deep ocean science community, and an uncertain political climate. CAPES is run by the scientific community and is largely stable, so there should be some balance and continuity to the program even if the political environment changes drastically. Dr. Austin noted that at least 2 Amazon expeditions have been added to the schedule and asked how to help increase awareness of the program. Ms. Maior replied that they are re-evaluating the program internally, then within the scientific community, and finally from an external perspective. They want to set up an external PMO operational arm for outreach and train people for expeditions to be better prepared onboard, something that is not done by CAPES. She said Dr. Sidney Mello plans to host. However, there are no grants for post-expedition science, which is a major issue for their scientists. Dr. Wilson asked if there were funds for early career researcher exchanges to help mitigate the problem of not having post-cruise funding and provide the long-term benefit of growing the IODP community. Ms. Maior replied that Brazil became a member of the consortium and selected 9 research projects to finance but it is not ideal to force new scientists into defined projects.

China: Dr. Tuo said China contributed \$33M for *JR* operations for 2014-2018, and they hope to continue participating at such a level for the next 4 years. The \$3M membership fee is likely to be approved because their program was initially approved for 10 years. An increased membership fee will be more difficult, as it will require higher level approval and is not an easy task. CPP expeditions are case-by-case. China wants to increase its contributions to IODP beyond membership. They plan to collaborate with ECORD over the next 5 years to gain experience, and there are plans to build a new drilling vessel that will be ready post-2023 so China may be a platform provider then.

International partners would need to help negotiate with MOST to obtain increased membership fees.

To get possible new members to join IODP, Dr. Armand suggested that ambassadors and other science representatives be invited to the 50th anniversary session at the AGU Fall Meeting in Washington DC. Drs. Koppers and Austin agreed and said the incoming Forum chair could raise support at the IODP Forum meeting.

Consensus 13

The *JR* Consortium Partners all intend to provide continued support to the *JOIDES Resolution* in the second IODP phase from 2019-2024.

24. Astrobiology at NASA and IODP

No discussion. Dr. Koppers noted that this agenda item may be worth revisiting at next year's meeting.

25. Future of US Seismic Imaging and Site Surveying for IODP

Dr. Koppers emphasized the importance of high-quality seismic data to IODP, as drilling targets must be imaged to modern capabilities and drilled safely. The FY2017 NSF Panel Review had 3 main concerns, the third of which was the impact of seismic data availability on the JRSO facility. NSF's response acknowledged the concerns and remains committed to supporting the research needs of the US science community.

NSF has decided to divest from the R/V *Langseth*, resulting in concern from IODP and the larger seismic community. They released a Dear Colleague Letter indicating that no more proposals for the *Langseth* would be accepted. Funding will continue through 2020, but no replacement facility has been determined or made known. This means that PIs will need to secure seismic vessels through industry or international partners. Dr. Koppers talked to NSF program directors about potential options such as the international research vessel barter system, writing proposals with direct payment to an industry/international seismic vessel based on day rates, or submitting proposals with bilateral agreements between NSF and other countries (e.g., German DFG). He asked the group how to instruct the community going forward.

Dr. Koppers then presented statistics gathered by Dr. Gulick on seismic data supporting 81 previous expeditions (IODP Phases 1 and 2). He pointed out that 47% of the expeditions relied on seismic data collected on a US ship, and 64% had NSF support. Out of the US ships used to collect the seismics, 53% utilized the *Langseth/Ewing* for deep crustal imaging and 42% used the *Revelle/Knorr/Thompson* for high-resolution surveys. The divestment of the R/V *Langseth* in particular, and the fact that most of the seismic-enabled US research vessels have been retired, is cause for deep concern in the IODP community, and Dr. Koppers reiterated that the statistics show that the US is becoming handicapped in collecting seismic data to fulfill the IODP Science Plan. Dr. Koppers stated it is not acceptable that the US contribution in providing seismic data in support of IODP drops below 47%, which currently is on par with the level of participation of US scientists in *JR* drilling proposals.

Dr. Allan asked about the imaging capabilities of portable compressors versus shipboard ones, and Dr. Koppers said that no US vessel currently has an onboard compressor, which makes carrying out seismic site survey expeditions more challenging as it requires renting these compressors and making certain experienced seismic technicians sail on these vessels.

There was further discussion on the needs and possible approaches for obtaining seismics. Dr. Gulick said that a seismic facility is needed to actually support IODP, as there is a coring facility and a drilling facility, and Dr. Miller added that the US must be part of the solution to provide a facility or mechanism for deep crustal studies. Dr. Armand suggested the use of Australia's R/V *Investigator*, which has the capability to do seismics with onboard compressors. Dr. Austin said that the Forum had considered the issue and was in favor of a coordinated international approach to optimize the process for expensive operations. Mr. Houtman, the acting NSF OCE Division Director, reminded everyone that NSF is committed to making \$10M/year available to support the acquisition of marine seismic data. A proposal could be written to use the R/V *Investigator* using those funds if the PI were to contact the MGG Program Director and work with them to get the facility on board. Because NSF is not making a facility available to the community, they are open to supporting other facilities not owned by NSF, including those associated with industry. There are too many hurdles with NSF owning the vessel, and it is not a sustainable economic model due to industry competitors and user restrictions. Dr. Koppers mentioned the next SEP meeting in Potsdam in June as a potential path forward to learn more about the barter agreement with Germany.

Consensus 14

Marine seismic data are critical to IODP, as every site drilled, cored and logged with the *JOIDES Resolution* requires high quality seismic data. If drilling targets cannot be imaged properly or if sites cannot be occupied safely, the proposals will not be approved by SEP/EPSP and will not be implemented by the JRFB. Over the last 15 years, 47% of the seismic data in support of 81 IODP expeditions have been collected with US seismic-enabled research vessels. The JRFB underscores the deep concern expressed in the 2018 NSF Panel Review of JRFB, which states that a decrease in availability of sufficient high-quality seismic data continues to impact our ability to submit competitive IODP proposals, a trend that ultimately impacts the viability of *JOIDES Resolution* operations. Having the capability to carry out deep-ocean crustal imaging in the US and worldwide is key for the safe operation of the *JOIDES Resolution* and to support IODP in fulfilling its 2013-2023 Science Plan, which requires operation in challenging drilling environments, including seismogenic subduction zones, continental shelves, deep ocean crustal formations, methane hydrates, hydrothermally active regions, and more.

26. Membership of JRFB and the Curatorial Advisory Board

Dr. Koppers noted that 2 Curatorial Advisory Board (CAB) members are rotating off at the end of the US Fiscal Year: Drs. Elisabetta Erba and Hideyoshi Yoshioka. The JRFB Chair will work with the CIB and EFB Chairs to get candidates for their replacement.

Two JRFB members are also rotating off, and Dr. Koppers thanked Drs. Wilson and Coffin for their service. New JRFB Science members will be needed to replace Drs. Wilson (a non-US scientist) and Koppers (a US scientist).

Dr. Koppers also thanked outgoing SEP Co-Chair Dr. Miller, who is rotating off SEP before the next JRFB meeting, for his tremendous energy and retiring NSF Program Director Dr. Janecek for his contributions and career involvement in IODP.

Incoming JRFB Chair Dr. Neal acknowledged outgoing JRFB Chair Dr. Koppers' insightful and effective leadership overseeing the operation of the *JR* and thanked him for his dedicated service.

Action Item 6

The JRFB Chair will work together with the EFB and CIB Chairs and the three IODP Curators for nominations to replace CAB members Elisabetta Erba (ECORD) and Hideyoshi Yoshioka (Japan).

Action Item 7

The JRFB Chair will request that the US Science Support Program (USSSP) solicit applications for the replacement of JRFB non-US science member Paul Wilson and US science member Anthony Koppers. Recommendations from this process will be circulated to the JRFB for approval.

Consensus 18

The JRFB sincerely thanks Paul Wilson and Mike Coffin for their great enthusiasm for everything *JR* and their contributions on the JRFB. Over the past years the JRFB has gained tremendously from Paul's and Mike's extensive knowledge.

Consensus 19

Ken Miller has been the SEP Science Co-chair for the last three years and has done so with the strongest sense of commitment toward IODP science and with great energy! He has done an exceptional job in nurturing a large number of proposals, in particular numerous fast-track proposals, which allowed the JRFB to put together many strong expedition schedules for the *JR*. Ken, your contributions to IODP have been enormous and your work leaves a great legacy in Scientific Ocean Drilling. We hope to see you again on "groundhog day" at Scripps!

Consensus 20

After a versatile career in Scientific Ocean Drilling, Tom Janecek will retire from his program director position at the National Science Foundation. The JRFB and all in IODP are thanking Tom for his many contributions to the program, starting with his work as Expedition Project Manager during the days of ODP, as vice president in the IODP-MI DC office, and his time at the NSF during the two phases of IODP. His leadership has been instrumental in developing the new International Ocean Discovery Program and *JR* business model. Tom, we will miss your straightforward decision making and dry humor from the back of the room!

Consensus 21

Outgoing JRFB chair Anthony Koppers has exhibited insightful and effective leadership over the last 3 years. During his tenure, the development of the regional ship track has allowed more efficient planning and cost-effective implementation of challenging expeditions, while executing the IODP Science Plan and allowing efficient operation of the *JOIDES Resolution*. His knowledge and attention to detail have created a legacy that forms an excellent foundation to not only successfully complete this phase of the scientific ocean drilling program, but to prepare for the renewal of the program beyond 2023. Anthony, the JRFB and the broader international ocean drilling community sincerely thank you for your dedicated service and leadership.

27. Review of Consensus Statements and Action Items

Dr. Koppers led the review of consensus statements and accepted appropriate changes and additions (see below). The final statements are compiled at the front of this document.

Action Item 4

The JRFB Chair, in collaboration with the SEP Co-Chairs, will continue monitoring and deactivating inactive (>5 years) IODP proposals under SEP review as necessary.

Action Item 5

The JRFB Chair will continue monitoring proposals at the JRFB that have been inactive for 5 years or more and request proponent teams to provide the JRFB with an update via an Addendum and/or PRL.

28. Other Business and Next JRFB Meeting

The JRFB discussed options for scheduling the next meeting, as a meeting held at the NSF building would require a 3-week window without a date finalized until January. It was decided that:

- JRFB will meet May 7-8, 2019 in or near Washington DC. The SSO will research venues.

Dr. Given noted that the *JR* will have a port call in San Diego in 2019, which would be of interest to JRFB members. Dr. Koppers, on behalf of the JRFB, thanked NSF for helping host the meeting, the SSO for supporting the meeting, and all participants for their active participation.

Meeting adjourned at 5:30 pm.