

**NSF Response to the *JOIDES Resolution* Science Operator Site Visit Panel Report
February 26 - 28, 2020**

The National Science Foundation's Division of Ocean Sciences, Ocean Drilling Program welcomes the recommendations of the *JOIDES Resolution* Science Operator (JRSO) Site Visit Panel Report and will take action on all of them.

NSF was pleased to receive the Executive Summary that states:

“The JRSO not only operates the unique scientific drillship, *JOIDES Resolution* (JR) during IODP expeditions, but also provides shore-based facilities and personnel in support of JR operations. New during FY19, JRSO provided support for the first JR100 expedition. JR100 is a non-IODP activity that uses the JR to collect 100-m piston cores, replacing and enhancing a discontinued capability on the R/V Knorr. The JR is highly valued by the scientific community, and enables investigation of cutting-edge science across a diverse range of important disciplines related to life and our planet. The JRSO Site Visit Panel concludes that the facility is being managed extremely well by JRSO, with continued positive evolution of management practices, facility enhancements, and efforts related to making data and publications more widely available to the scientific community. JRSO interacts extremely well with the JRFB and related panels to implement the IODP Science Plan.”

The primary finding is that the Facility has been managed “extremely well” by the JRSO, and the Panel was impressed by JRSO’s effective implementation of the JR100 program which represented an additional major effort on top of IODP Expedition implementation. The Panel was impressed with the JRSO’s ability to adapt to the challenging and repeatedly changing circumstances of FY2019 Expedition planning due to repercussions from the August 2018 Subic Bay drydock incidents. Expedition 368X was “planned with little lead time following the unexpected need for propeller replacement,” and “JRSO obtained clearance from both China and Taiwan within 2 months and staffed a 9-person staffing party drawn from previous South China Sea expeditions” in this time frame. The Panel was impressed with laudatory comments from the FY2019 Co-Chief Scientist meeting report which stated that “the JR has been operated as an outstanding scientific drilling platform managed by an extremely professional and skilled team of managers, engineers, technicians and publication staff at JRSO. This drilling platform as well as the operational procedures are well managed and maintained, constantly improved and provide a world-class infrastructure for ocean research.” The operational efficiency in FY2019 of the JR was 96.7% as defined through contractual dayrate reporting, with an overall efficiency of 78% that includes weather delays and other factors not controlled by the ship owner.

The Panel expressed the opinion that “The new IODP panel structure and its associated regional approach to ship scheduling has helped focus planning activities

for ship operations in a specific geographic region,” “has resulted in a considerable savings in transit time,” “a more optimal exploitation of the facility,” and “considerable cost savings facilitated through JRSO planning efforts.” The Panel was deeply impressed with JRSO efforts in publication and data archiving, noting “the publications team to be effective and responsive to previous recommendations.”

The Panel endorsed the concept of the JR100 program and felt that its initial implementation was well done, and represented a highly successful and valuable use of the JR. Indeed, the Panel noted that the “JR is a better platform for this type of sampling than R/V Knorr was. JR100 cored to 100 m while R/V Knorr cored to only 45 m. Therefore, the efficiency of the system is extremely high.”

The Panel’s seven recommendations are directed towards NSF more than JRSO, reflecting the overall excellent performance of the JRSO in FY2019. NSF endorses the recommendations and will take action as described below.

Recommendation 1: JRSO should document outcomes related to removal of equipment (e.g., CORKs) from legacy boreholes to better evaluate the potential for future success and suggest best practices.

The Panel agreed with the JRSO that the experiences of IODP Expedition 385T in failing to remove borehole infrastructure represent a cautionary experience for scientists proposing to make use of legacy boreholes. Boreholes and their installed infrastructure age due to such effects as stress-induced breakouts, hydrothermal activity and microbial activity (both leading to corrosion). Previous efforts at removing borehole infrastructure are mixed.

NSF requests that the JRSO construct a general risk register for the science community that details considerations for proposing reuse of legacy boreholes and their infrastructure. This risk register should be reported to the *JOIDES Resolution* Facility Board (JRFB) and posted on the JRSO website.

Recommendation 2: JRSO should consider having future subcontracts include incentives to maximize operational efficiency and safety.

This Panel recommendation is a response to the JRSO reporting that in its current contract with vessel owner Overseas Drilling, Limited (ODL), only small differences exist in operational, standby, and breakdown day rates. The JRSO noted that a larger day rate differential could possibly reduce times in port, encourage more rapid transit to and from ports, and further reward safe operations. NSF passes this recommendation to the JRSO in case the JRSO is in a position to negotiate a future drillship operational contract.

Recommendation 3: JRSO should document resources (e.g., bandwidth) allocated to E&O activities and report the results to JRFB.

The Panel was concerned that use of limited and expensive satellite communication bandwidth be properly balanced with that supporting the science and operational goals of expeditions. NSF passes on this recommendation to the JRSO for implementation.

Recommendation 4: JRSO should initiate a discussion at the IODP Forum regarding the minimum expectations of educational level and English language proficiency for science party members.

The Panel was surprised to hear (as was NSF) that some staffed FY2019 science party members lacked sufficient fluency in the English language to meet their shipboard science party obligations and responsibilities. English is the accepted language of IODP, as documented in the Memorandum of Agreement. In addition, several JR IODP expedition science party nominations, rejected for staffing by the JRSO, lacked graduate education experience and had not yet obtained an undergraduate degree.

NSF will remind its IODP partners at the JRFB that signed Memoranda formally state that English is the program language and that fluency in English for nominated science party members is required for them to be staffed on JR expeditions. NSF will also state that sufficient academic training is required before a nominated science party member can be staffed. NSF will work with the JRSO to examine the issues at the next IODP Program Management Office (PMO) meeting after the next IODP Forum.

Recommendation 5: The panel recommends that NSF explore ways to make XRF scanning a part of the planning for post-expedition sampling when needed.

The JRSO has proactively taken steps, with NSF and JRFB concurrence, to make whole-core X-ray scanning available for post-cruise use to enable optimal sediment “splice” records to be produced to guide post-cruise science party sampling at the Gulf Coast Core Repository. Unfortunately, financial arrangements are not in place to support such activities at the other IODP core repositories, where science party members need to identify external funds to support such efforts. NSF will work with its European and Japanese partners to examine solutions for supporting such activities at the Bremen and Kochi core repositories.

Recommendation 6: JRSO should continue archiving data from their databases to open access data repositories. The panel recommends that they coordinate

efforts with Lamont-Doherty Earth Observatory (LDEO) regarding the archival of borehole logging data in a similar fashion.

Recommendation 7: JRSO should continue their efforts on associating measurements with core descriptions to facilitate data mining.

These recommendations recognize the innovative activity of the JRSO in preserving and making more broadly available scientific results from prior JR Expeditions. They also recognize ongoing JRSO staff efforts to delineate operational lessons from prior coring results that can be applied to planning future drilling strategies in differing geological contexts. Why is recovery better in some sediments than others? This work represents a bold leap beyond previous anecdotal work in documenting the relative success of coring tools and techniques. NSF encourages the JRSO to continue these innovative archiving and data mining efforts, and notes that they represent a direct response to previous panel recommendations in these areas.

NSF will encourage the LDEO Borehole Research Group, in their Award activities, to examine the data archiving efforts that JRSO is engaged in to see whether IODP borehole data may be archived using similar efforts.