FIRST REPORT OF THE ONR NATIONAL OCEAN BOTTOM SEISMOMETER (OBS) FACILITY REVIEW COMMITTEE

Site Reviews:

West Coast Consortium at Scripps Institution of Oceanography (SIO)
12 November 1991

East Coast Consortium at Woods Hole Oceanographic Institution (WHOI)
14 November 1991

Committee members:

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20 December 1991

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EXECUTIVE SUMMARY:

In 1991, the Office of Naval Research established a National Ocean Bottom Seismometer (OBS) Facility consisting of a West Coast Consortium located at Scripps Institution of Oceanography (SIO) with University of Washington (UW), and an East Coast Consortium located at Woods Hole Oceanographic Institution (WHOI) with Massachusetts Institute of Technology (MIT). A modern, general-purpose OBS was developed with ONR funding and thirty-one systems were initially constructed and delivered with 15 going to the West Coast Consortium and 16 to the East Coast. (EOS 72:(46) p.505, 12 Nov.'91). Terms of Reference for management and operation of the facilities have been established (Attachment A). These Terms call for an annual review of each facility by a review team designated by ONR. On 12 November 1991 the review team met at SIO and on 14 November it met at WHOI. Detailed reports were provided by the facility managers as specified in the Terms of Reference (Attachments B, C, and D) and a tour of the respective facilities was provided.

Following the review, three main findings and recommendations were made. Other more specific observations and recommendations were discussed during the course of the review.

1) The Review Committee was shown that significant progress has been made in a relatively short period of time in establishing the National OBS Facility and in providing an important and unique research capability that is available to the research community. Both consortia are to be commended for their cooperative efforts, on both the managerial and engineering levels. The committee acknowledges that the track records for

providing services to the community are limited because of the recent establishment of the Facility. Also, availability of funds from ONR was delayed, and thereby impeding some technical improvements to the systems.

2) The Review Committee recommends that the West Coast OBS facilities be consolidated at one location (SIO). This is partially in response to the announced departure of the UW facility manager. Consolidation of assets would facilitate the ongoing maintenance and common upgrade of all instrument systems. Investigators at UW are encouraged to become more active as users and participants in the West Coast Consortium oversight functions.

3) The Review Committee recommends that the West and East Coast Consortium managers coordinate their efforts to identify, define, and propose for funding, common upgrades and improvements for the full suite of OBS instruments. The recommended goal is for some common level of instrument functionality so that outside users can plan on similar levels of performance and data management from any and all OBS instruments. To foster and promote this functional commonality and provision of similar services, the Review Committee recommends that some level of sustained and predictable funding from external and internal sources be provided at each consortium site, at least during the Facility's development period. It is further recommended that major system improvements and special capabilities be independently proposed and funded.

REVIEW PROCESS, OBSERVATIONS AND RECOMMENDATIONS:

West Coast Consortium:
On 12 November 1991, the OBS Review Committee plus Dr. Michael Purdy, the East Coast Consortium manager, met at Scripps. Dr. Adam Schultz represented the UW branch facility and Dr. Brian Lewis represented the scientific user community. Drs. Dorman and Schultz led a discussion through the detailed written reports that were provided (attachments B & C) covering the six topic areas identified in the Terms of Reference. The review team also had an opportunity to visit the OBS laboratory areas, and examine several OBS components and units that were in storage.

East Coast Consortium:
On 14 November 1991, the Review Committee plus Dr. LeRoy Dorman, the West Coast Consortium manager, met at WHOI. Dr. Purdy led a discussion through the various elements of the Terms of Reference, and presentations were made by staff members on instrument performance review, instrument engineering issues, and data handling (Attachment D). There was a tour of the OBS laboratory spaces in the village and the data processing facilities at the Quissett Campus.

Following the WHOI review and discussions, the Committee met in executive session to discuss its findings and formulate recommendations. The Committee was unanimous in its view that the availability of 30 state-of-the-art instruments is a significant advance for the marine seismic community and acknowledges the Office of Naval Research for its initiative and funding for the National OBS Facility. The comments and recommendations below follow the annotated guidance to the Review Committee as specified in the Terms of Reference.

1) Responsiveness of Facility Operators to user community:

To date, the number of outside users has been limited to one group from UW, therefore the responsiveness to the community is difficult to judge. From information provided, it appears that the operators have been responsive to inquiries and that sufficient information is made available to potential users so they can adequately plan and budget field programs. The successful deployment of all of the new and virtually untested OBS systems during the summer 1991 NOBS experiment is a testament to the willingness of the operators to make the systems available in a timely manner. The unfortunate loss of one OBS during recovery cannot be attributed to OBS Facility management.

2) Adequacy of proprietary data guarantee?

Operators described their intention to provide all users with raw data on medium of users' choice. They also plan on retaining a copy of the data at the Facility. Formal policies for archiving and guaranteeing the responsible stewardship of proprietary data have not yet been formalized. Establishing data policy guidelines is recommended. The Review Committee also recommends there should be a stated policy on data archiving. Data should be archived in a national repository to the extent funding is available to do so.

3) Adequacy of resources to operate facilities efficiently and effectively?

The Review Committee acknowledges that ONR's start-up funds only become available in early November 1991, and each contract provides engineering time and specifies institutional support as

well. Funded and likely-to-be funded research projects will also provide support for the facilities well into 1992. In addition to support from user fees, the Review Committee recommends that some level of sustained and predictable funding from external funding agencies and internal institutional sources be provided at each consortium site for engineering services to assure some degree of common functionality between systems on both coasts. Sustained funding is especially important during the initial period of Facility establishment and ongoing OBS development. It is further recommended that major system improvements and special capabilities be independently proposed and funded through research grants. Two such examples mentioned during the presentations were increased data storage and longer term deployment capabilities. Time will tell whether there will be adequate funded research projects to fully support the facility in the future. But it is felt that some sustained level of support at each site is essential to provide for the comparable maintenance and upgrading off all OBS systems.

Further, the Review Committee considers that the first priority to facilitate available instrument use by the broader community should be improved documentation, particularly the necessary software procedures for set-up and for downloading and reformatting. Once the full-functioning and thoroughly tested instruments with appropriate documentation are completed, enhancements and improvements can be considered.

4) Shore based operations efficient and sufficient? Adequate personnel and spares? Data loss prevention?

Overall, the Review Committee feels that each facility is adequately staffed. One full-time technician/programmer plus additional help on an as-needed basis for field programs appears to be

adequate for routine operations. WHOI's shore-based facilities and engineering talents are particularly outstanding. The East Coast facility benefits from being a component of a larger technical support operation.

The Review Committee has a significant concern about the role and effectiveness of the UW branch of West Coast Facility. This concern partially results from the imminent departure of the UW Manager, Dr. Adam Schultz. Maintaining a single OBS at UW and partially supporting an engineer to work on it, has minimal apparent net benefit to the objectives of the OBS Facility. Maintaining a common functionality between all OBS systems is not enhanced by a single or small number of units at a separate location. The status of the suite of acoustic releases and the deck unit at UW for the West Coast Consortium is also unclear. This status should be clarified and if appropriate, the equipment should be consolidated at the two primary sites for general community use. The interest in and concern for the OBS facility by UW investigators is appreciated, and the committee encourages their active participation as Facility users and in managerial and technical oversight functions of the Consortium. The Review Committee recommends that the assets of the West Coast OBS Facility be consolidated at one location (SIO).

The issue of spares was discussed. There is an argument, that if a full suite of spares is to be maintained, then it should be fashioned as a fully functional OBS. It can also be argued that one fully functional OBS should be maintained as a last-resort source for spares. The Review Committee endorses the original design goal of modularity so that faulty components can be quickly changed. Deploying 100% of the OBS's at all times may be an unrealistic expectation.

Data management and archiving was mentioned above and formal policies should be established. However, precautions can and should be taken to store copies of original data in such a way to prevent catastrophic data loss. Data transcription practices using SEGY and SEED are considered positive steps and continued development of these standardized formats is encouraged.

5) Quality control assurances? Adequate logs? Facility interactions.

Both East and West Coast operators express appropriate concern for data quality. Being potential OBS users themselves provides reasonable assurance for quality control. However, the instruments are in late stages of development and cannot yet be considered as fully operational. Satisfactory levels of instrument performance and capabilities have yet to be fully defined and achieved, and the Review Committee appreciates that there are legitimate differences in undertaking technical solutions. Both operators agree that instrument noise and time corrections are the most pervasive factors affecting data quality at this time. Other factors such as power density and data recording media for prolonged deployments, integral or detached sensors, tilt compensation, and event detection capabilities are identified as potential enhancements or improvements about which differences of opinion rightfully exist. As a National Facility, striving for some level of routine operational capability, there should be an understanding and documentation of what are common levels of technical services and data gathering capabilities.

The Review Committee saw evidence of individual instrument and major component logs at SIO and WHOI. This systemic level of tracking instrument performance and maintenance is felt to be

important in assuring reliable and consistent operations and inter-comparability of data collected from different units.

There was also evidence of positive interaction between facilities at both the managerial and technical level. At the managerial level, continued communication and a spirit of cooperation between the operators is essential in attaining the overall objectives of the National Facility. There should be a mutual agreement of what are common levels of instrument performance and capabilities to be maintained for all systems and the level of services provided to users. At the technical level, the existing system of Engineering Change Modification (ECM) should be enhanced and formalized to document system specifications and to implement greater functional conformity and interchangability amongst all OBS units.

The Committee recommends that the uniformity of basic functions amongst all instruments at both consortia be maintained to assure users of equal data acquisition quality and data availability in identical formats. For example, the standardization should include identical clock rating methods for the OBSs. One outside user recommends adoption of the method used by WHOI.

6) Publicity and receptivity for outside OBS usage:

Making the community aware of the OBS Facility's availability and providing documentation to assist prospective users prepare proposals and budgets are steps that should be undertaken. Seeking and responding to user comments are critical elements of Facility public relations. Because of the very recent establishment of the Facility and its evolving development, the Review Committee commends what has been done so far, but a proactive marketing function is recommended in the future. Specifically,

an informal information brochure should be prepared that advertises and describes the availability, capabilities, and necessary procedures for using the National OBS Facility. The November 1991 EOS article provides an excellent start and reprints could be appended to the brochure. Suggested distribution would be to all marine seismologists and research institutions.

7) Responsiveness to recommendations:

To date, the facility operators appear to be responsive to recommendations received from different sources. Future site reviews will determine responsiveness as operational experience is gained. To facilitate future reviews, the committee recommends that the operators provide information as described in the Terms of Reference just as they provided for this initial review. This submission of common information assisted the Review Committee in fulfilling its charge.

CONCLUSIONS:

The Review Committee appreciates the hospitality and efforts that the East and West Coast Consortiums took to prepare for the site review. The Committee is favorably impressed with the progress that has been made in developing and initially operating a complex suite of scientific instruments for community use. However, the Committee cautions the Facility operators and ONR, that continued communication, cooperation, and a responsible level of ongoing engineering support will be required to realize the overall objectives of the Facility as described in the Terms of Reference. Maintaining a National Facility with common assets distributed between two or more institutions on opposite coasts is not an optimum strategy to provide uniform capabilities and services. Differing use patterns, scientific interests, institu-

tional budgeting and purchasing policies, and local familiarity with a sub-set of instruments will all tend to diverge the capabilities and characteristics of the East and West Coast OBS systems. Converging the basic set of capabilities and characteristics will require a high degree of cooperative management. The Review Committee looks forward to learning how these efforts are proceeding at next year's review.

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