

**Follow-on Management and Operations Review  
of the  
William R. Wiley Environmental Molecular  
Sciences Laboratory (EMSL)**

**Prepared by a Subcommittee of  
The Biological and Environmental Research Advisory Committee**

**July 2006**



## TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	ii
TABLE OF ACRONYMS.....	vi
REPORT.....	1
Introduction.....	1
Response to Charge.....	2
APPENDIX A: Charge letter to Review Committee.....	13
APPENDIX B: Roster of Subcommittee Members .....	15
APPENDIX C: Agenda .....	17

## **EXECUTIVE SUMMARY**

A subcommittee of the Biological and Environmental Research Advisory Committee (BERAC) was charged by David Thomassen, Acting Associate Director of Science for Biological and Environmental Research (BER), with conducting the Follow-on Management and Operations Review of the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL). The purpose of the review was to assess the appropriateness of the EMSL response to the management and operational findings and recommendations from the May 2005 DOE Office of Project Assessment (OPA) review and the corresponding May 2005 BERAC review findings. This subcommittee focused on the management and operational issues raised during the two reviews, and it did not address the issues that were uniquely scientific in nature. The review took place on May 31 - June 1, 2006, at EMSL.

The Review Committee was extremely impressed by the responses of EMSL and Pacific Northwest National Laboratory (PNNL) management and staff and DOE management from BER and the Pacific Northwest Site Office (PNSO) to the very serious concerns raised by the May 2005 review committees. The action plan was timely, comprehensive, and on target. The implementation is effective, widely accepted, and appears to be on its way to completion by its target date of September 30, 2006. The EMSL staff members are to be complimented on their contributions, their support for the process, and for recognizing that their future science and service could be more efficiently and effectively performed with the new procedures and policies. The Committee believes that these actions should have the desired outcome with regard to addressing the previous review findings. We do have a few recommendations that are identified below.

The Committee especially compliments Allison Campbell, EMSL Director, for her leadership in responding to the findings. The Committee also applauds Len Peters, PNNL Director, for working closely with EMSL staff, for including EMSL in future LDRD funding plans, for facilitating the further development of EMSL as a national user facility, and for asking EMSL's Science Advisory Committee Chair (SAC) to join the PNNL Laboratory Advisory Committee.

The review panel was charged with three objectives in the context of the management and operations findings of the May 2005 reviews:

1. Does the EMSL Action Plan adequately address the findings and recommendations of the May 2005 reviews?
2. Is EMSL's implementation of the Action Plan on track for completion by the end of September 2006?
3. Will implementation of the Action Plan resolve the review findings and lead to fulfillment of the EMSL Mission?

The Committee's findings, comments and recommendations in this context are summarized according to the five questions addressed by the May 2005 OPA Review Committee.

## **1. Are EMSL and PNNL management roles and responsibilities effectively carried out and coordinated?**

Yes, the EMSL Action Plan identifies organizational roles and responsibilities of key staff, and PNNL has provided executive level support for EMSL to hire qualified individuals to serve in most key positions. A sustained commitment by PNNL will be needed to keep EMSL on this initially encouraging path. EMSL has six Strategic Goals; two of the Strategic Goals directly address the management of EMSL by seeking an effective EMSL organization and by defining roles and responsibilities for EMSL management. These efforts are encouraging. Effective management is an important principle that needs to be preserved since there are drivers/obstacles, both internal and external to EMSL that could hamper EMSL's ability to be a model for user facilities.

Recommendation: Several actions should be taken to remove those obstacles. Examples include: (i) document a detailed accounting of the boundaries, interfaces, and areas of leveraging that can be institutionalized and understood by EMSL, PNNL, PNSO and BER; (ii) define practices (*e.g.*, calls for proposals, definitions of users, terms and conditions for using EMSL facilities) that are institutionalized at the EMSL level, but that preserve the special nature of a particular EMSL facility or capability; and (iii) ensure a firm, common understanding, at least down to the Scientific Facility leads, of funding levels, funding sources, staffing levels, leveraging with other EMSL facilities and collaborative partnerships with PNNL directorates at a detailed level.

## **2. Is EMSL management effectively setting priorities, tracking progress, and resolving problems that impact laboratory operations?**

Yes, although a few tasks are not yet complete. The EMSL team appropriately began with extensive discussions of Committee recommendations both to define what processes would be effective for them and to shape their actions and then implementation plans. Importantly, an appropriate and shared Mission Statement was developed and accepted; key senior staff were hired that are talented, creative, and have a shared vision; a tracking and reporting system was implemented that appeared effective to our tests; and a number of "best practices" have been captured in planning. The planning process is not totally complete. While the recapitalization plan to create a plan is on the "right track" and appropriate, its effectiveness could not yet be reviewed. The proposal process was initiated, but the evaluations are just beginning to come in.

Recommendations: Build a vision of a "single" EMSL with coordinated proposal calls to include theme-based, facility-based, and special areas, and standardize the times during the year when such solicitations are issued, probably with calls twice per year. Continue to plan for increasing the user base and monitoring the quality of their experiences. Reevaluate, with BER, the definition of *User* to be more consistent with other user facilities.

**3. Are there adequate resources to accomplish the BER mission at EMSL in the context of a flat budget (FY05 and out years)? Are the EMSL processes for allocating and managing BER resources (manpower and funds) appropriate?**

The EMSL Action Plan and the implementation of that plan will “resolve the management review findings and lead to fulfillment of the EMSL mission,” under the constraints of existing and future budget conditions.

Accomplishments include BER’s acknowledgment of its ownership responsibilities including recognition of the need for increased financial support; the eligibility of EMSL for LDRD funding; a procedure whereby Scientific Facility Leads propose and provide justification for budgets, including prioritization based on alignment with science needs; documented management responses to these budget requests with clearly articulated performance expectations for the facilities; termination of Collaborative Access Teams (CAT)s; rethinking the concept of Grand Challenges, which should allow funds to be redirected to critical needs; and a new process for prioritizing equipment acquisition and prioritizing investments through Science Themes. If these processes are successful as designed, we believe that they will go a long way toward demonstrating good budget stewardship.

Recommendations: Because many of these “accomplishments” have been newly implemented, their success in meeting the goals for which they have been established has not been assessed. In particular, the prioritization of investments through Science Themes must be matched, at some level, with the budget requests for the Science Facilities and with the performance expectations for those facilities. This is a work in progress, and care must be taken to ensure that there is continued effort in this direction. BER, PNSO and EMSL/PNNL need to come to agreement as to whether this should be assessed through internal evaluation or whether, at an appropriate time, external review (*e.g.*, by BERAC or by the EMSL SAC) is appropriate.

**4. Is the BER mission at EMSL impacted by non-BER source of Operations or CE funding?**

Yes. However, it has been acknowledged by BER, PNSO and EMSL/PNNL that non-BER resources are essential to EMSL given the funding constraints of BER. Furthermore, policies and procedures have been put into place to track BER and non-BER funding and to ensure that EMSL space and equipment are focused on its mission as a national user facility. The new policies and procedures will ensure that non-BER funding has a positive impact on EMSL as a user facility.

EMSL has taken the following actions: A Mission Statement was defined by consensus with BER, PNSO and EMSL/PNNL that identifies the primary focus of EMSL as a national user facility; a building-based management tool was adopted to identify costs associated with individual scientific facilities and particular funding streams (*e.g.*, BER vs. non-BER); a utilization policy has been formalized to ensure that all *space* in the EMSL complex benefits the mission of EMSL as a user facility; and a utilization policy has been formalized to ensure that *equipment* in the EMSL complex is available to the user community (95 percent for EMSL

equipment,  $\geq 20$  percent for all other equipment). It should be noted that the equipment allocation policy requires that certain percentages of equipment time be *available* to the user community. It does not ensure that equipment is used by users at that rate (*i.e.*, if users do not request the equipment, it can be allocated entirely to non-users).

Recommendations: EMSL's mission as a user facility: (i) should not preclude the pursuit of high-level science by its staff; (ii) should mandate that when non-BER funds are being requested for equipment, EMSL leadership is involved in such requests early in the process; and (iii) should maximize its outreach to all non-BER funding agencies.

**5. Is there an ongoing program of self-assessment or external benchmarking aimed at continuously improving EMSL's management and operations?**

Yes, extensive self-assessment and benchmarking have taken place since the last review. EMSL has done broad reviews of other user facilities operations and processes and effectively used those findings in establishing "best practices" in EMSL procedures and processes. Self-assessment is part of the PNNL culture; extensive evolution has occurred in EMSL's participation in this process. Actions are now delegated broadly within the management structure and the EMSL Strategy Dashboard has been implemented as a best practice.

Recommendation: Ensure that ongoing benchmarking of best practices continues as part of the documented assessment process.

The Review Committee acknowledges that this was a very well organized review with key questions answered, appropriate summary materials provided, access to detailed material as needed on the review website and rapid response to our requests for further statistical information showed that the new system is working. We thank Allison Campbell, all EMSL staff, PNNL, PNSO and BER leadership for joining together in making this an informative and efficient review.

## **TABLE OF ACRONYMS**

BER	Office of Biological and Environmental Research
BERAC	Biological and Environmental Research Advisory Committee
CAT	Collaborative Access Team
EMSL	Environmental Molecular Sciences Laboratory
ERSD	Environmental Remediation Sciences Division
OPA	Office of Project Assessment
PNNL	Pacific Northwest National Laboratory
PNSO	Pacific Northwest Site Office of Science
SAC	Science Advisory Committee
UAC	User Advisory Committee



## INTRODUCTION

This Follow-on Review was conducted one year after the May 2005 DOE Office of Project Assessment (OPA) review and the Biological and Environmental Research Advisory Committee (BERAC) review. The intent was to assess the response to the findings of the prior reviews and to evaluate whether the current plans and processes position the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL) to achieve its mission. The focus was on the management issues raised during the two reviews, and the review did not address the issues that were uniquely scientific in nature.

The OPA review, led by Mr. Daniel Lehman, was charged with evaluating the following questions relating to EMSL's present performance, cost of operations, staffing and funding:

1. Are EMSL and PNNL management roles and responsibilities effectively carried out and coordinated?
2. Is EMSL management effectively setting priorities, tracking progress, and resolving problems that impact laboratory operations?
3. Are there adequate resources to accomplish the BER mission at EMSL in the context of a flat budget (FY05 and outyears)? Are the EMSL processes for allocating and managing BER resources (manpower and funds) appropriate?
4. Is the BER mission at EMSL impacted by non-BER source of Operations or CE funding?
5. Is there an ongoing program of self-assessment or external benchmarking aimed at continuously improving EMSL's management and operations?

A concurrent review by the BERAC, led by Dr. Michelle Broido, focused on the "mission, operations, and future plans of the EMSL." Questions addressed by the Broido committee were:

1. Does the relationship and management structure among EMSL, PNNL and Environmental Remediation Sciences Division (ERSD) foster the highest quality of science at EMSL?
2. Is the science conducted at EMSL cutting edge? If so, is it appropriate for a BER supported user facility?
3. Is EMSL appropriately structured to support a full range of DOE and national science research priorities?
4. Is the user model for allocating resources for all EMSL facilities appropriate? Does EMSL attract the best mix of users?
5. Could changes be made to increase the impact of EMSL on DOE science goals?
6. Given a flat budget for ERSD, what priority should EMSL have within the Division's portfolio?
7. Does the EMSL have a well-defined plan to refresh capital equipment, and is it appropriate? What short- and long-term strategies should be considered in this context?
8. Does EMSL appropriately manage the acquisition, use and retirement of instruments?
9. How does EMSL manage general user access to equipment purchased with non-ERSD funds? How does this impact EMSL operation as an ERSD-supported user facility?

The May 2006 review panel evaluated the progress made by EMSL to address essentially all the findings of the Lehman review and corresponding (overlapping) Broido review findings – questions 6-9 that dealt with management issues. EMSL has included all facility-specific and facility-wide Broido review findings in their *EMSL Implementation Plan*. The material presented to this review panel indicates that significant progress has been made to address many of these issues. We strongly encourage EMSL, PNSO and BER to track the progress toward resolution of all the findings of the Broido and Lehman reviews. However, the focus of this review is on the Lehman and the related Broido review findings.

The review panel was charged with considering the following three questions:

1. Does the EMSL Action Plan sufficiently address the findings and recommendations from the May 2005 OPA review and corresponding BERAC review findings?
2. Is the EMSL approach to implement the EMSL Action Plan robust and sufficient and in the EMSL on track to complete the implementation of the EMSL Action Plan by the end of September 2006?
3. Assuming that the answer to the above question are positive, does it appear that implementation of the EMSL Action Plan will resolve the review findings and lead to fulfillment of the EMSL mission?

We address each of these questions in the context of the original five questions posed to the Lehman review committee. A number of additional suggestions not pertaining directly to the Lehman review questions, but arising from the Broido questions 6-9, as well as observations and suggestions from the experiences of the committee, are provided as additional comments and suggestions.

## **RESPONSE TO CHARGE**

### **1. Are EMSL and PNNL management roles and responsibilities effectively carried out and coordinated?**

#### **Findings:**

At the time of the May 2005 review, EMSL was about to embark on a profound transformation to align its mission, vision, and management approach to be a best-in-class national scientific user facility and a focal point for PNNL's research campus of the future. Reviews of EMSL conducted at that time ignited that transformation to a large extent by bringing EMSL's management systems, management roles and responsibilities, and the organizational relationship with PNNL to the forefront as areas of concern and in need of updating, communicating, and institutionalizing. EMSL was charged with putting into effect new management systems and related documentation by October 1, 2005.

In order to respond adequately to the findings from those reviews and to meet the deadline, EMSL analyzed its business, developed a clear mission statement, and documented every key aspect of its operations, including management roles and responsibilities and organization. The PNSO and BER communicated with each other and EMSL on a regular basis to assess the credibility and the thoroughness of EMSL's Action Plan as it was being developed and to provide a coordinated DOE management oversight of EMSL. BER and the PNSO regularly briefed Executive Leadership within the Office of Science on the overall effort underway at EMSL.

#### **Comments:**

- **The EMSL Action Plan and supporting documentation identify organizational roles and responsibilities of key staff, thereby satisfying, in principle, the issues associated with management roles and responsibilities identified during reviews last year.**
- There is ample evidence that, over the past year, PNNL has provided executive level support for EMSL to attract and to hire qualified individuals to serve in most key positions within EMSL. A sustained commitment by PNNL executive leadership (the laboratory director and his direct reports) will be needed to keep EMSL on this initially encouraging path.
- EMSL has committed to six Strategic Goals. Two of those goals directly relate to the management organization, and to the roles and responsibilities of EMSL management. The Review Committee is encouraged that EMSL has decided to be held accountable at the strategic level for its management organization, and senior leadership roles and responsibilities. This is a bold step for EMSL, because in the view of the Committee, there are drivers, internal and external to EMSL that could impede EMSL's ability to advance toward those goals, and, as a consequence, hamper EMSL's ability to be a model user facility.

#### **Recommendations:**

- 1) EMSL should identify the suite of key actions needed to neutralize the influence of those internal and external drivers that could dilute EMSL's ability to meet its mission. Examples of early actions include:
  - A detailed accounting of the boundaries, interfaces, and areas of leveraging that can be institutionalized and understood by EMSL, PNNL, PNSO and BER.
  - Practices (*e.g.*, calls for proposals, definitions of users, terms and conditions for using EMSL facilities) that are institutionalized at the EMSL level, but that preserve the special nature of a particular EMSL facility or capability.
  - A firm, common understanding, at least down to the Scientific Facility leads, of funding levels, funding sources, staffing levels, leveraging with other EMSL facilities and collaborative partnerships with PNNL directorates at a detailed level.
- 2) EMSL should immediately partner with BER and the PNSO to identify the full suite of key actions needed and to develop an implementation schedule.

## 2. Is EMSL management effectively setting priorities, tracking progress, and resolving problems that impact laboratory operations?

### Findings:

The process by which the management questions were addressed involved EMSL management, BER, and the PNSO site personnel. There was also strong support from the PNNL Director. These discussions provided a way for the major questions and recommendations from the two Committees to be addressed in an effective way. The involvement of BER directly in these discussions was unusual, in the experience of the Committee, but clearly an effective way to reach consensus in a timely manner.

The first issue addressed was the Mission Statement. It is: **The William R. Wiley Environmental Molecular Sciences laboratory (EMSL) a U. S. Department of Energy national scientific user facility located at Pacific Northwest National Laboratory (PNNL) in Richland, Washington provides integrated experimental and computational resources for discovery and technological innovation in the environmental molecular sciences to support the needs of DOE and the nation.** This Mission Statement focuses on the nature of the facility as a national scientific user facility – a key recommendation of previous Committees - and describes the research support area in which it will utilize its resources. From that strong and clear statement it was then possible to create broad goals and follow these with measurable objectives to measure the progress in achieving the goals.

In order to accomplish this next phase of planning, additional staff positions were added to the management structure including an Associate Director of Scientific Resources, a Chief Scientist for Scientific Programs, an Associate Director for Business Operations, a Manager for Facility Operations, and an open slot for an Associate Director for the Molecular Science Computing Facility. In addition to these direct management positions, a revitalization of the SAC and the User Advisory Committee (UAC) was implemented, and a project management specialist was added to the EMSL staff.

In the strategic planning process, six major goals were identified. They are: (i) Focus Research on Challenging Scientific Problems in the Environmental Molecular Sciences in Support of the Needs of DOE and the Nation; (ii) Maintain EMSL's Strategic Capabilities at the Scientific Forefront; (iii) Optimize Management in Support of the User Program; (iv) Operate with Excellence; (v) Attract the Best Users and User Research; and (vi) Optimize Services to Users.

The second process followed by the EMSL management in responding to the previous Committee reports and in developing their vision for the facility was to divide the strategy development into considerations of what was needed for High Impact Science, for Management and Operations, and for User Outreach and Services. These were presented in a "Strategy Dashboard" format. In the first and last areas, the specific goals were further developed and followed by clear objectives. The Management and Operations strategies were then developed to track and assess the progress in these two areas. There was, obviously, great thought placed on the tracking process in response to major concerns expressed by the previous Committees. Charts were provided to show that the major questions raised by the previous Committees were

covered with additional steps included that arose from discussions of best practices from other facilities.

**Comments:**

**The major conclusion of this Committee is that the strategy development has been correctly done, that the priorities have been correctly set, and the essential reporting and tracking processes are in place for monitoring the accomplishments of the various objectives.**

We suggest that instead of using the first author designation as a way of tracking the major origin of a particular publication, that EMSL use the "lead or primary author" to determine how to assign the major contributor organization - user, EMSL, PNNL, etc., for a publication, to avoid the cultural differences in the way that authors are traditionally listed on publications.

We note that in order to begin to view EMSL as a complete user facility, the management has begun the process of moving to external peer review of proposals as a way of determining access. The process has just recently been initiated, a proposal submission form has been developed, criteria for reviewers have been established, potential reviewers have been identified, the proposal process has been tested, the first call for proposals has been announced, and 99 proposals have been received and sent out for review. This Committee believes that the management is moving toward a situation where all work done in EMSL will be peer reviewed, but currently there are some facilities that call for proposals twice a year based on facility use, some are theme-based calls, and others are renewals for current users. It is not clear that the management has considered ways of resolving all the problems arising from instituting the new proposal process and assuring that all parties are aware that a change in culture is arising from the new approach, but there is confidence on the part of the Committee that EMSL is on the correct path with the review process and has considered ways to resolve the major conflicts that will surely arise. The fragmentation in the timing of the calls and the variety of types of calls does provide some concern for the Committee and leads to the following recommendation. **The Committee suggests that there be unified calls for proposals – regular facility use, theme-based – that occur with a frequency of at least twice per year. This approach would provide a unified door through which EMSL resources could be allocated, provide a way that the balance of needs could be evaluated and deployed and fit a time schedule that is attractive to the user community.** It may take some time to provide this unified approach, but the Committee urges that it be considered because of its importance in preventing problems that may arise from piecemeal allocation of resources.

As we note elsewhere, the allocation by BER for replacement capital equipment is low in relation to the needs for a national scientific user facility. When additional funds become available, however, there needs to be a process for deciding what equipment to purchase, what space will be utilized, and what priorities will pertain to an anticipated recapitalization process. EMSL management has described a plan to create a Recapitalization Plan, but the final plan was not available to this Committee to review. We note that the plan to create a plan is on the right track to accomplish the desired results, but it is a process in progress. The upcoming workshop

focused on getting user input on the capital equipment plan was regarded as an excellent part of the planned process.

Developing a strong, supportive user base will be critical for the long-term success of EMSL. Various strategies for making known the Mission of EMSL will likely be followed, and the Committee noted that a specific staff has been assigned the task of User Administration. The concept of collecting and creating “nuggets” as descriptions of research accomplishments written for the lay public is one approach that EMSL is currently using for making potential users aware of what can be accomplished. We urge that these nuggets be displayed or linked to the BER webpage in addition to being included on the EMSL web (a current practice) and possibly in the halls of the facility.

As a result of the coordinated efforts of the EMSL management, PNSO, BER and strong support from the PNNL Director, the Committee found a substantial management and tracking system in place. The process for establishing such a system began with a revision of the Mission Statement, detailed discussions of the findings of the previous two Review Committees, and the creation of a variety of action plans based on the specific goals that were identified to characterize the new and improved operation of EMSL. From those goals, specific objectives were created along with appropriate assessment and reporting criteria. Visits and discussions by EMSL management with other DOE laboratories created a series of “best practices” which were incorporated as objectives.

Particularly impressive to the Committee was the way in which various elements for personnel accounts and funding management could be tracked and captured for the reports required to assess management and report to BER. Although the management system is currently not complete, there are strong indications that the process is on the correct track to support the revised Mission Statement and the new and improved goals of EMSL.

### **Recommendations:**

- 1) Our recommendation for the future proposal process is for EMSL to consider appearing to all users as a “single entity” in the spirit of being a national scientific user facility. To accomplish this, proposals for all purposes would be received at regular intervals – ideally twice a year – and considered together for theme-based work, facility usage, special efforts, etc. Such a process would follow the stated mission of providing an integrated resource.
- 2) We recommend that EMSL and BER revisit the definition of user to eliminate the possible double counting of individuals within a year who have multiple projects. Moving to the counting of only unique individuals would bring the EMSL definition into alignment with other Office of Science national user facilities. This would also be beneficial in better reflecting the percentage of individual users from the community beyond PNNL since it is more likely PNNL staff would be counted multiple times due to the proximity factor.

3) We recommend that the Recapitalization Plan be a high priority task, discussed widely with various advisory groups and committees, and finalized as soon as possible to aid BER in justifying and prioritizing investment of additional capital funds.

**3. Are there adequate resources to accomplish the BER mission at EMSL in the context of a flat budget (FY 2005 and outyears)? Are the EMSL processes for allocating and managing BER resources (manpower and funds) appropriate?**

**Findings:**

The Lehman review committee stated: *No, because the Office of Biological and Environmental Research (BER) mission priorities have been poorly defined, and the Committee observed no formal process for linking mission and budget.*

It is not hyperbole to state that one observation made by both the OPA review committee and the BERAC review committee was a thread that was woven extensively through all other observations articulated in the two reports of May 2005. To wit, and as worded by the BERAC committee, "... it does not appear that BER leadership, EMSL leadership, and PNNL share a coherent vision as to what the EMSL mission is." The 2005 BERAC Committee also noted that "[t]he EMSL is a unique national resource, and it should have a very high priority within the [Environmental Remediation Science] Division's portfolio." In addition, both the OPA review and the BERAC review noted a need for the development of a plan for prioritization and decision making. Both committees recognized that budget expenditures had to be managed in a documented, prioritized, and defensible way.

**Comments:**

**It is the opinion of the May 2006 review committee that the EMSL Action Plan and the implementation of that plan will, indeed, "resolve the review findings and lead to fulfillment of the EMSL mission," to the fullest extent possible under existing and future budget conditions.** Factors that lead to this conclusion are summarized below.

EMSL, PNNL, and BER are now in agreement that EMSL is, first and foremost, a national scientific user facility. One of the results of both the process of coming to this agreement and the agreement itself is that BER has taken ownership responsibilities for EMSL at a level that was heretofore missing. At the level appropriate for a sponsoring federal agency, ERSD has become an active partner in the efforts to develop and promote EMSL as a unique national resource and national user facility. Furthermore, to the extent possible through the appropriations process, BER intends to provide additional funds for EMSL, emphasizing capital equipment expenditures that will help EMSL retain a high level of cutting edge equipment, but also recognizing the need for increases in operations funding.

EMSL also has made great strides in efforts to ensure that the budget provided is used to maximum efficiency. Robust business systems have been developed and put into place that allow consistent and validated reporting of expenditures. The Scientific Facility Leads are now asked to propose – *with justification* – annual budgets for their facilities; when budget decisions

are made, each Lead is given his/her allocation with a written statement of the expectations that accompany that allocation, and he/she is held accountable to those expectations. Processes are being put into place that prioritize expenditures based on their alignment with enabling research in support of the EMSL Science Themes. Both the space and the instrumentation acquisition policies are focused on the question of how the usage of that space/instrumentation will “support ... EMSL’s mission as a national user facility.”

Although perhaps not on the scale of the detailed processes summarized above, other changes illustrate a change in mindset that extends to all parties involved. The termination of the Collaborative Access Teams has allowed a redirection of funds from the CATs back into the user support program. The re-examination of the Grand Challenge process may lead to a similar redirection of funds. PNNL, under the guidance of the director, Len Peters, will entertain LDRD proposals to enhance EMSL capabilities attesting to the partnership between PNNL and EMSL.

In conclusion, EMSL, in partnership with PNNL and with DOE (BER and PNSO), has made significant strides in ensuring that the resources provided to it are put to maximal use for achieving its mission as a national user facility and a unique national resource.

**Recommendation:**

- 1) Because many of these “accomplishments” have been newly implemented, their success in meeting the goals for which they have been established has not been assessed. In particular, the prioritization of investments through Science Themes needs, at some level, to be matched with the budget requests for the Science Facilities and with the performance expectations for those facilities. This is a work in progress, and care must be taken to ensure that there is continued effort in this direction. BER, PNSO and PNNL/EMSL need to come to agreement as to whether this should be assessed through internal evaluation or whether, at an appropriate time, external review (*e.g.*, by BERAC or by the SAC) is appropriate.

**4. Is the BER mission at EMSL impacted by non-BER source of Operations or CE funding?**

**Findings:**

The Lehman review committee stated: *The Committee was unable to evaluate the impact of non-BER funding on mission; however, EMSL is dominated by non-BER funding. In comparison to the total business volume at EMSL (approximately \$90 million), BER is a relatively minor stakeholder in its operations (approximately \$35 million). Further, consideration of the total business volume has not been integrated into the strategic scientific direction, BER’s landlord responsibilities of the program, or the EMSL management structure. A challenge is to manage EMSL such that the significant non-BER user activities are leveraged to benefit EMSL as a national user facility.*



The Lehman review committee recommended: (i) include the issues and impacts of the full spectrum of funding that goes into EMSL's business volume and user environment for all future activities, and (ii) develop a methodology to understand the impact of non-user activities on the EMSL's performance and optimize management systems to leverage these to enhance EMSL as a national user facility by the end of FY 2005.

Scientific staff have been brought back into EMSL to provide science direction. The Chief Scientist (Andy Felmy) has an excellent grasp of activities in all six EMSL facilities and has been proactive in developing consistency in the user model. It is unclear whether the Chief Scientist and two Lead Scientists will have enough time to provide sufficient scientific oversight to the EMSL facility. However, discussions with the Chief Scientist suggest that the structure of the scientific leadership is still evolving (for example, the biology Lead Scientist has yet to be identified).

#### Comments:

**The May 2006 review committee finds that the EMSL action plan clearly identified the most pressing issues identified by the Lehman review. The EMSL has made great progress in measuring the total, BER, and non-BER sources of operations and CE funding, evaluating the impact of non-BER funding, and ensuring that non-BER sources of funding can be leveraged to enhance EMSL as a national user facility.** The following actions were identified in the EMSL Action plan:

A mission statement was defined by consensus with BER, PNSO and PNNL/EMSL and identifies the primary focus of EMSL as a national scientific user facility. This ensures that the impact of non-BER funding is evaluated based on a defined EMSL mission. Without a clear mission statement, the effect of various funding streams cannot be evaluated.

A building-based management tool was adopted to identify costs associated with each individual scientific facility. BER and non-BER funding can be tracked along with all other funding streams. Costs can be evaluated by room number, type of equipment, or facility. Costs that are incurred by users cannot be tracked since their costs are tied to their home institution.

A utilization policy has been formalized to ensure that all *space* in the EMSL complex benefits the mission of EMSL as a user facility. Assignment of both office and lab space is based on the level of support the individual or capability brings to EMSL's mission as a national scientific user facility. The EMSL Director approves all space allocation decisions.

A utilization policy has been formalized to ensure that *equipment* in the EMSL complex aligns with the mission of EMSL as a user facility: 95 percent of instrument time must be made available to the EMSL user for EMSL-owned instruments, 5 percent is allocated for EMSL staff research, 20 percent of instrument time must be made available to the EMSL user for non-EMSL-owned instruments. The fraction is reviewed annually. For co-purchased instrument, user access is determined by the fractional ownership of the instrument by EMSL. EMSL estimates that \$97M in equipment is EMSL-owned and \$38M is non-EMSL-owned. The EMSL Director tracks all equipment utilization and can remove equipment from the facility if it does

not align with EMSL's mission. It should be noted that the equipment allocation policy requires that certain percentages of equipment time be *available* to the user community. It does not ensure that equipment is actually used by users at that rate (*i.e.*, if users do not request the equipment, it can be allocated entirely to non-users). Furthermore, discussion with EMSL staff indicates that the allocation policy is relative to total running time; if funding is only available to run an instrument at half time (*e.g.*, due to financial or other limitations), the allocation policy is based on that 50 percent running time. Statistics need to be developed to measure the maximum time that can be made available, the total hours used, and the hours used by EMSL and non-EMSL users for each instrument. This will allow tracking the availability, demand, and user allocation for a particular instrument. A detailed description of the statistics presented will reduce the likelihood of misinterpreted instrument use statistics. As part of the EMSL reorganization, the resource tracking system was upgraded to track utilization of instruments and ensure compliance with new utilization policies, but should include the above so as to prevent misleading statements.

Outreach activities have begun to track non-BER sources of funding that presently enter the EMSL facility and develop relationships with those funding sources. This will ensure that non-BER funding streams benefit EMSL and are aligned with its mission.

This review committee finds that the EMSL Action Plan addresses the major findings and recommendations from the May 2005 OPA review and corresponding BERAC review, its implementation plan is on track to completion by September 2006, and is well aligned to the mission and goals of building EMSL as a premier national scientific user facility.

### **Recommendations:**

- 1) The reconstitution of the SAC and UAC, as recommended by the Broido and Lehman reviews, is on track. The placement of the SAC Chair on the PNNL Laboratory Advisory Committee is an excellent decision. The members of the revised SAC represent a broad range of science expertise with excellent credentials and will be invaluable to the successful evolution of EMSL. The UAC has not yet been fully reconstituted. Election of new members is planned for this summer. A revised charter has been established. We suggest that a role for the UAC in the annual or semi-annual review of user surveys should be explicitly listed as one of its obligations. Using the UAC to document and summarize the results of the user surveys for the EMSL Director may be appropriate.
- 2) EMSL's mission as a user facility should not preclude the pursuit of high-level science by its staff. EMSL will not be a successful national scientific user facility unless the staff and scientists located at EMSL are of the highest caliber.
- 3) EMSL/BER should be strongly engaged in any pursuit of non-BER capital equipment by EMSL's/PNNL's staff at an early stage. An example of this was the discussions held between EMSL and the National Science Foundation funding agency. However, it is not enough that the EMSL Director have control over space and equipment utilization by non-BER funds. Outreach to non-BER funding sources should be integrated with the capital equipment refreshment strategy and the vision of EMSL.

**5. Is there an ongoing program of self-assessment or external benchmarking aimed at continuously improving EMSL's management and operations?**

**Findings:**

At the 2005 OPA and BERAC reviews, there were concerns about EMSL's assessment processes – both internal and with respect to external factors. Recommendations included establishment of cohesive self-assessment and benchmarking activities, addressing of the recommendations from the Committee of Visitors for BER, establishment of processes for strategic and operational decisions, and generally instilling discipline within the management of the EMSL to become “best in class.”

**Comments:**

**In the past year, the EMSL management staff has aggressively addressed these concerns. A significant benchmarking activity was undertaken which looked at a wide range of operational issues including assessments of the processes used to establish user agreements, external reviews of user proposals, user advisory committees, user surveys, and funding of service functions.** The output of these assessments was used in the revision of the EMSL procedures, user surveys, and the reformation of their UAC.

In addition, EMSL has fully implemented the established Battelle/PNNL self-assessment process for EMSL operations and activities. EMSL has established a proactive Strategic Plan. A best practice that has evolved from this process is the establishment of a “Strategy Dashboard,” a tool for tracking and reporting progress on the objectives in the Strategic Plan. These items are reported to, and discussed with DOE, on a quarterly basis.

As part of its action plan response, EMSL added a project management expert to its staff. The implementation of the Action Plan from the 2005 reviews was based on project management principles and was very successful. Significant were the tracking processes and the inclusion of work breakdown structure managers for each item. The assignment of responsibilities through this approach involved the entire leadership of the EMSL in the Action Plan. To the credit of EMSL leadership, project management expertise will be preserved within the EMSL and used in its operations.

The revisions of the EMSL Operations Manual and the Staff Resource Guide were the final elements of the response to the recommendation. These documents include the decision making processes used in daily EMSL operations. The communication value of these documents will be beneficial for the facility staff as well as others with whom they interface at PNNL.

**Recommendation:**

- 1) While the benchmarking activities were done well, there are no statements of ongoing benchmarking activities in the Strategic Plan. It is important that comparison to other facilities becomes systematic and be institutionalized into the operations and assessment process. We recommend incorporating benchmarking into the EMSL Strategic Plan as a strategy for building the facility to “best in class.”

## APPENDIX A – CHARGE TO REVIEW COMMITTEE



**Department of Energy**

Germantown, MD 20874-1290

April 20, 2006

Dr. James Tiedje  
Director, Center for Microbial Ecology  
Michigan State University  
East Lansing, MI 48824

Dear Dr. Tiedje: *JTW*

The Biological and Environmental Research (BER) program within the U.S. Department of Energy (DOE) supports the operation of the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL), a national scientific user facility located at the Pacific Northwest National Laboratory (PNNL) in Richland, Washington. The mission of the EMSL is to provide integrated experimental and computational resources for discovery and technological innovation in the environmental molecular sciences to support the needs of DOE and the nation.

To ensure that the EMSL is meeting its mission and is being operated and managed in an efficient manner, BER periodically conducts a peer review of the EMSL's operations and plans. In November 2004, BER's advisory committee (BERAC) was charged to provide Dr. Orbach and BER with "advice on the mission, operation and future plans of the EMSL." A copy of the charge letter is enclosed. The BERAC review was held at the EMSL from May 17-19, 2005, and was led by Dr. Michelle Broido. A copy of the report from the BERAC review is also enclosed. In addition to the BERAC review, BER charged the DOE Office of Project Assessment (OPA) within the Office of Science on February 5, 2005, to evaluate the EMSL's "present performance and cost of operations, staffing and funding." The OPA review was held concurrently with the BERAC review, and was led by Mr. Daniel Lehman. A copy of the charge letter and report from the OPA review is being enclosed. Both the BERAC review and the OPA review included a number of findings and recommendations for EMSL, PNNL and BER.

In response to the BERAC and OPA reviews, EMSL and PNNL management worked with BER and DOE's Pacific Northwest Site Office (PNSO) to develop an Action Plan to respond to the findings and recommendations from the OPA review and the corresponding operational and management recommendations from the BERAC review. The EMSL completed all of the actions identified in the Action Plan on December 30, 2005. An introduction, a copy of this charge letter, the two reviews from 2005, the complete Action Plan and all associated deliverables are available at: <https://www.emsl.pnl.gov/mayreview> (user name: review; password: Docs4u2c)



Printed with soy ink on recycled paper

By this letter, I am requesting that you convene a review panel and prepare a report on the appropriateness of the EMSL response to the findings and recommendations from the May 2005 OPA review and corresponding BERAC review findings. The review panel should consider and evaluate the following questions:

- Does the EMSL Action Plan sufficiently address the findings and recommendations from the May 2005 OPA review and corresponding BERAC review findings?
- Is the EMSL approach to implement the EMSL Action Plan robust and sufficient and is the EMSL on track to complete the implementation of the EMSL Action Plan by the end of September 2006?
- Assuming that the answers to the above questions are positive, does it appear that implementation of the EMSL Action Plan will resolve the review findings and lead to fulfillment of the EMSL mission?

I very much appreciate your assistance in this follow-up review. The insights and recommendations of your review will be important to our future management of the EMSL. I request that BERAC report on its findings and recommendation at the fall 2006 BERAC meeting.

Sincerely,



David Thomassen  
Acting Associate Director of Science for  
Biological and Environmental Research

Enclosures

## **APPENDIX B**

### **BERAC Subcommittee Follow-on Review of the Management and Operations of the William R. Wiley Environmental Molecular Sciences Laboratory (EMSL)**

**May 31 – June 1, 2006**

James M. Tiedje – Follow-on Review Chair and BERAC representative  
Director, Center for Microbial Ecology  
Michigan State University  
540 Plant and Soil Sciences Building  
East Lansing, MI 48824-1325  
Phone: 517-353-9021  
Fax: 517-353-2917  
[tiedjej@msu.edu](mailto:tiedjej@msu.edu)

Michelle S. Broido - BERAC representative & Chair, 2005 BERAC review panel  
Associate Vice Chancellor for Basic Biomedical Research and Director, Office of  
Research, Health Sciences  
University of Pittsburgh  
Scaife Hall, Suite 401 3550 Terrace Street  
Pittsburgh, PA 15213  
Ph: (412) 648 2232  
Fax: (412) 648 2741

Linda Horton – member of 2005 OPA review panel  
Director, Center for Nanophase Materials Sciences  
Oak Ridge National Laboratory  
P.O. Box 2008, MS 6496  
Oak Ridge, TN 37831-6496  
865-574-5081  
[hortonll@ornl.gov](mailto:hortonll@ornl.gov)

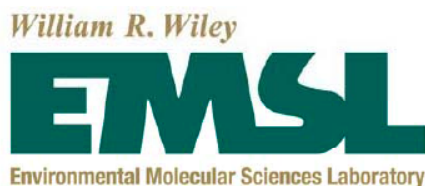
Walt Polansky - member of 2005 OPA review panel  
Program Manager  
U.S. Department of Energy  
Office of Advanced Scientific Computing Research  
SC-21.2, Germantown Building  
1000 Independence Ave., SW  
Washington, DC 20585-1290  
301-903-5935  
[walt.polansky@science.doe.gov](mailto:walt.polansky@science.doe.gov)

Mavrik Zavarin – incoming BERAC member, member of 2005 BERAC review panel  
Lawrence Livermore National Laboratory  
7000 East Avenue, L-231  
Livermore, California 94551  
phone: (925) 424-6491  
fax: (925) 422-3160  
email: [zavarin1@llnl.gov](mailto:zavarin1@llnl.gov)

James W. Taylor - former Director of University of Wisconsin Radiation Research Center  
John Bascom Professor of Chemistry, Emeritus  
University of Wisconsin-Madison  
57 Wood Brook Way, Fitchburg, WI 53711-6490  
Phone: 608-663-0826; FAX: 608-663-0827  
e-mail - [jwtaylor@wisc.edu](mailto:jwtaylor@wisc.edu)



## APPENDIX C – AGENDA



## BERAC Follow-On Management and Operations Review of EMSL May 31 – June 1, 2006

**Please Note:**

- Reviewers = Jim Tiedje, Michelle Broido, Linda Horton, James Taylor, Mavrik Zavarin, Walt Polansky
- DOE = Mike Kuperberg, Paul Bayer, Marc Jones, Julie Erickson, Julie Turner, Jeff Day, Lance Vickerman
- EMSL Core Team = Allison Campbell, Gordon Anderson, Tom Sheridan, Andy Felmy, Monty Rosbach, Don Baer
- EMSL Management Team = Core Team, Roy Gephart, Theva Thevuthasan, Theresa Windus, Harold Udseth, David Hoyt, Nancy Hess, Kevin Regimbal, Dan Gaspar, Kline Welsch, Scott Tingey, Myra Wyant, Eva Baroni, Loren Peterson, Nancy Foster-Mills, Terry Law, April Green, Mary Ann Showalter
- Guests = Len Peters, Doug Ray, Rod Quinn, Mike Kluse, Mike Davis, George Michaels, Don Boyd, Tom Baranouskas, Blaine Metting, Pat Lamberson

Wednesday, May 31	Topic	Participants	Location
7:30 a.m. – 8:00 a.m.	Committee Breakfast <i>(closed session)</i>	DOE, Reviewers	EMSL Board Room
8:00 a.m. – 8:30 a.m.	Executive Session <i>(closed session)</i>	DOE, Reviewers	EMSL Board Room
8:30 a.m. – 8:45 a.m.	Introductions, Charge, Background <i>Mike Kuperberg, Jeff Day</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
8:45 a.m. – 9:00 a.m.	PNNL Welcome and Commitment to EMSL <i>Len Peters</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
9:00 a.m. – 9:45 a.m.	Management, Leadership, Strategy <i>Allison Campbell</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
9:45 a.m. – 10:00 a.m.	BREAK		
10:00 a.m. – 11:00 a.m.	Science Directions <i>Andy Felmy</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
11:00 a.m. – 11:30 a.m.	Business Operations <i>Tom Sheridan</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
11:30 a.m. – 12:00 p.m.	Finance Systems <i>Peter Smith, Iris Anderson</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
12:00 p.m. – 12:45 p.m.	LUNCH	DOE, Reviewers, EMSL Core Team	EMSL Board Room

**BERAC Follow-On Management and Operations Review of EMSL**  
**Page 2 of 3**

<i>Wednesday, May 31</i>	<i>Topic</i>	<i>Participants</i>	<i>Location</i>
12:45 p.m. – 1:15 p.m.	User Outreach <i>Nancy Foster-Mills</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
1:15 p.m. – 2:00 p.m.	Utilization, Tracking, Peer Review <i>Gordon Anderson</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
2:15 p.m. – 2:30 p.m.	Documentation and Closeout <i>Allison Campbell</i>	DOE, Reviewers, EMSL Management Team, Guests	EMSL Board Room
2:30 p.m. – 2:45 p.m.	BREAK		
2:45 p.m. – 4:30 p.m. 2:45 – 3:15 3:15 – 3:45 3:45 – 4:15	Breakout Session Theresa Windus/Kevin Regimbal David Hoyt Harold Udseth	Review Team 1	EMSL Board Room
2:45 p.m. – 4:30 p.m. 2:45 – 3:15 3:15 – 3:45 3:45 – 4:15	Breakout Session Roy Gephart Theva Thevuthasan Nancy Hess	Review Team 2	EMSL 1385
4:30 p.m. – 5:30 p.m.	Executive Session <i>(closed session)</i>	DOE, Reviewers	EMSL Board Room
5:30 p.m. – 6:00 p.m.	Questions for EMSL Management	DOE, Reviewers, EMSL Management Team	EMSL Board Room
6:00 p.m. –	ADJOURN		
6:30 p.m. –	DINNER – Depart from Guest House	DOE, Reviewers, EMSL Core Team	Cedars Restaurant

**BERAC Follow-On Management and Operations Review of EMSL**  
**Page 3 of 3**

<i>Thursday, June 1</i>	<i>Topic</i>	<i>Participants</i>	<i>Location</i>
8:00 a.m. – 8:30 a.m.	Breakfast	DOE, Reviewers, EMSL Core Team	EMSL Board Room
8:30 a.m. – 9:30 a.m.	EMSL Response to Reviewer Questions	DOE, Reviewers, EMSL Management Team	EMSL Board Room
9:30 a.m. – 11:00 a.m.	Executive Session <i>(closed session)</i>	DOE, Reviewers	EMSL Board Room
11:00 a.m. – 12:00 p.m.	Committee Findings & Recommendations	DOE, Reviewers, EMSL Management Team, Len Peters, Don Boyd	EMSL Board Room
12:00 p.m. – 1:30 p.m.	ADJOURN AND LUNCH	DOE, Reviewers	Katya's Bistro
1:30 p.m. – 3:30 p.m.	Miscellaneous Meetings as Needed		
3:30 p.m. – 4:30 p.m.	MT Thomas Seminar/Award Ceremony	All	EMSL Auditorium
4:30 p.m. – 5:30 p.m.	MT Thomas Reception	All	Dr. Bill's Bistro
5:45 p.m. -	DINNER – Depart from EMSL	DOE, Reviewers, Invited Guests	Terra Blanca