Report of the External Members
Working Group

The Laboratory Operations Board

Evaluation Processes for the National Laboratories

Draft Final Report
U.S Department of Energy
December 20, 2004

DRAFT

This draft report has been approved by the Laboratory Operations Board's External Members Working Group on Evaluation Processes for the National Laboratories, and as with any consensus product, the views of any individual member may differ slightly from the specific detailed recommendations contained in this report. The draft report is not a Department of Energy or Administration document and will not be transmitted officially to the Secretary of Energy without the consideration of any public comments received and approval of the Secretary of Energy Advisory Board.

Evaluation Processes For the National Laboratories

Report of the External Members of the Laboratory Operations Board

Draft Final Report
December 20, 2004

Laboratory Operations Board
U.S. Department Of Energy

Page Intentionally Blank

TABLE OF CONTENTS

EXTERNAL MEMEBERS OF LABORATORY OPERATIONS BOARD

Robert W. Lucky, Chair
Corporate Vice President for Applied Research
Telcordia Technologies, Retired

Linda Trocki, Vice Chair
Principal Vice President, Research & Technology, Bechtel National, Inc.

William Brinkman
Vice President of research, Lucent Technologies, Retired
Physics Department, Princeton University

Mike Henshaw
President and COO
Lockheed Martin Energy and Environment Sector, Retired

Uma Chowdhry
Vice President of DuPont Central Research and Development

Lawrence Papay
Vice President for the Integrated Solutions Sector
Science Applications International Corporation, Retired

William F. Powers
Vice President – Research, Ford Motor Company, Retired

Dr. Burton Richter
Paul Pigott Professor of Physical Sciences, Stanford University
Director Emeritus of the Stanford Linear Accelerator Center

Maxine Savitz
General Manager, Technology Partnerships, Honeywell, Retired

Harrison Jack Schmitt
Chair Emeritus, the Annapolis Center
Adjunct Professor, Department of Engineering Physics, University of Wisconsin

Lilian Shiao-Yen Wu
Research Scientist, Corporate Technology Strategy Development, IBM

EXECUTIVE SUMMARY

In a 2003 study, a Blue Ribbon Commission noted that the performance of the Laboratories is consistently rated as "outstanding" or "excellent," suggesting rating inflation. Furthermore, the Blue Ribbon Commission noted, and the Laboratories have complained about, the excessive number of metrics required in the appendices to their contracts, the number of reviews performed at various levels by different reviewers, and the cost in terms of time and money that these reviews take away from research. The Commission suggested that the review processes, responsibilities of the contractor and the Department, and the Department's use of the reviews (particularly the linkage of reviews to contract decisions) are unclear and require examination.

On March 2004, the Department of Energy (DOE) asked the External Members of the Laboratory Operations Board to propose evaluation metrics, processes and practices the Department of Energy uses in evaluating the performance of its National Laboratories. The External Member Working Group analyzed the current Laboratory performance measurement systems DOE uses with M&O contractors, conducted a survey, met with DOE and Laboratory officials, and considered best practices from academia and industry in reaching their conclusions and recommendations.

The three Working Group recommendations challenge the Department's leadership to significantly revamp and simplify the performance assessment system, and to restructure the incentive system. We recognize, however, that the DOE complex covers a wide breath of operations and unique situations that will require a studied application of these recommendations. In particular, there are significant differences in the missions between those labs primarily devoted to science and those primarily reporting to NNSA. Nonetheless, there are some broad evaluation metrics and criteria that can be common across these institutions. The recommendations are the following:

1. Establish A "Vital Few Metrics" For All Laboratories

There are many, probably too many, metrics now that may be appropriate for the evaluation of specific program elements, but do not really focus on the laboratory as a whole. The five vital few metrics that the Working Group recommends are:

1. DOE Laboratory R&D climate, measured by employee surveys, and peer review.
2. Laboratory adoption of best practices for administration and operations, measured by independent third parties, rather than DOE field offices.
3. Project performance, measured for a few select projects.
4. Quality of workforce and the resulting Science and Technology products, assessed by peer review.
5. Laboratory strategic vision, also assessed by peer review.

2. Create And Institutionalize A Consistent Laboratory Evaluation Process

In general, a variety of evaluation processes, performed by different site and headquarter offices as well as the laboratories themselves, are currently in place. This has lead to a system that is not consistent across the entire DOE complex. Objective third-party evaluations should become the standard method for DOE Laboratory performance evaluations, particularly in the business and operations management arena. Furthermore, it is imperative for DOE to distinguish between poor, adequate and exceptional performance. This will require stricter evaluation guidelines and the requirement of evidence to support all performance ratings, such as those contained in Table 1 of this report.

3. Create Meaningful Incentives For M&O Contractors

The present system of incentives does not seem to recognize what motivates the contractors, and does not necessarily incentivize outstanding performance. The Working Group recommends the following three incentives: first, a direct and explicit tie between annual performance grades and extend/compete decisions and award terms (reinforcing the Blue Ribbon Commission's recommendation); second, balancing reward fee and contractor risk; and third, making performance assessments public.

Unless the above recommendations are implemented, the Working Group is seriously concerned about the ability of DOE to attract top caliber M&O contractors and managers for its laboratories. The current disincentives to competing for a Laboratory include financial risk or liability, possible damage to reputation, the cost to prepare a bid, and burdensome oversight by DOE.

Evaluation Processes for the DOE Laboratories

I. INTRODUCTION

Areas of concern and complaint were brought to the attention of the Secretary of Energy regarding the evaluation of DOE's Laboratories. For one, there are disparities between Department of Energy Laboratory performance evaluations and various reported problems at the Laboratories in the recent past. In a 2003 study, a Blue Ribbon Commission noted that the performance of the Laboratories is consistently rated as "outstanding" or "excellent." They viewed these results as suggestive of possible rating inflation. Secondly, the Blue Ribbon Commission noted, and the Laboratories have complained about, the excessive number of metrics required in the appendices to their contracts, the number of reviews performed at various levels by different reviewers, and the cost in terms of time and money that these reviews take away from research and technology development. The Commission suggested that the review processes, responsibilities of the contractor and the Department, and the Department's use of the reviews (particularly the linkage of reviews to contract decisions) are unclear and require examination.

The Secretary of Energy requested the External Members of the Laboratory Operations Board (LOB) develop a design for the M&O contractor performance assessment. The External Members Working Group was asked to review and assess if the current evaluations are measuring the right things. The current evaluations are expected to be linked to funding and contract decisions related to competing or extending the M&O contracts, as well as the determination of the award level of performance-based fees. The LOB charter is found in Appendix A. Appendix B contains the report sections that provide the External Members Working Group's response to these questions.

II. APPROACH

The approach the External Working Group took to review and assess if the current Laboratory performance evaluations measure the right things included the following:

- Analyze the current Laboratory performance measurement systems DOE uses with M&O contractors, and briefings by DOE Program Support Offices on their approach to contractor and laboratory evaluation. See Appendix D for one example of a current Laboratory's performance system.
- Analyze results of a survey from current M&O contractors identifying incentives, disincentives, and what the most important contributions of an M&O contractor to DOE are (See Tables 2 and 3 for summary of results).
- Visit Sites, one to an Office of Science Laboratory and one to a National Nuclear Security Administration Laboratory, to discuss how DOE measurement systems are developed and evaluations are performed (see Appendix C).
- Identify application of best practices from industry and academia, and use these to develop recommendations for application within DOE.

III. FINDINGS AND RECOMMENDATIONS

The External Members Working Group of the Laboratory Operations Board reached the following three recommendations as a result of their analyses and reviews.

1. Establish A "Vital Few Metrics" For All Laboratories

In reaching our conclusions concerning the need to establish a vital few set of metrics that DOE should use to evaluate M&O contractor performance, the External Members Working Group first identified those activities over which the M&O contractor has control in delivering DOE's science and technology products. Based upon the responses to the survey the M&O contractors provided (see Tables 2 and 3) and our experience with R&D and general management, we recommend the following vital few metrics. We recognize, however, that the DOE complex covers a wide breath of operations and unique situations that will require a studied application of these recommendations. In particular, there are significant differences in the missions between those labs primarily devoted to science and those primarily reporting to NNSA. Nonetheless, there are some broad evaluation metrics and criteria that can be common across these institutions. The list includes our response to the question,"what beyond quality of science and technology (S&T) should be used?"

1) **Measures of R&D climate**: Evaluation of the research climate should be based on the staff and their peer's perceptions. Laboratory climate can be measured via one of three means:
    1a. An annual employee satisfaction survey, capable of providing trendable data across the Laboratories, of the R&D staff and Laboratory management, in the following areas (from Jordan, 2003)[1]:
        - Research vision and strategy,
        - Investment in future capabilities, including people and infrastructure,
        - Sense of challenge and enthusiasm,
        - Project-level measures of success,
        - Decisive, informed management,
        - Reward and recognize merit,
        - Systematic process for identification of new opportunities,
        - Championing long-term foundational research.

    .

    1b. 360-degree assessments of senior management.

2) **Measures on Laboratory adoption of best practices in the administrative and operational areas,** including human resources, finance, ES&H, facilities operation, security, procurement and property management. The M&O contractor can be assessed on how well their laboratory performance compares

[1] From "What matters to R&D workers: Adding data to our hunches" by Gretchen Jordan, accepted for publication to *Research Technology Management*, May 2003 (forthcoming)

in various areas to other research institutions with known best practices, their rate of adoption of identified best practices, and the commensurate benefits tracked over time. An M&O contractor may be the benchmark in particular areas. In such a case, laboratories and other institutions should consider adopting the identified best practices. For continuity, we believe one outside entity should periodically perform assessments of Laboratory benchmark study programs across all the Laboratories. Firms the laboratories or DOE have hired in the past to perform benchmark studies would be acceptable.

3) **Project performance measures**, assessed by the percent of deliverables produced on budget and on schedule, as well as their quality, are a measure of excellence. However, based on their collective R&D management experience, the Working Group members are not in favor of detailed project management systems as a primary focus/tool to evaluate M&O contractor performance. We believe project management systems have been taken too far, and can, if taken to extremes, be too time intensive to use. They may also drive too much of a short-term, product-oriented mentality, which is not conducive to good long-term laboratory stewardship. Still, we recommend a "graded approach"—in which DOE picks one or two representative major deliverables per year per Laboratory to assess project management performance. For major projects such as the National Ignition Facility, or the Spallation Neutron Source, we do agree that at least annual project management reviews are needed.

4. **Measures on quality of the workforce and its science and technology products**. Peer review committees should measure the quality of the workforce and Laboratory products, in general. The following are also highly recommended:
   - Use of retention rates for high potential /high priority staff,
   - A few metrics to assess science and technology productivity, including:
     a. a science citation index,
     b. election to Fellows of professional societies, and
     c. patents and licenses of intellectual property for the more applied R&D Laboratories working on energy technologies.

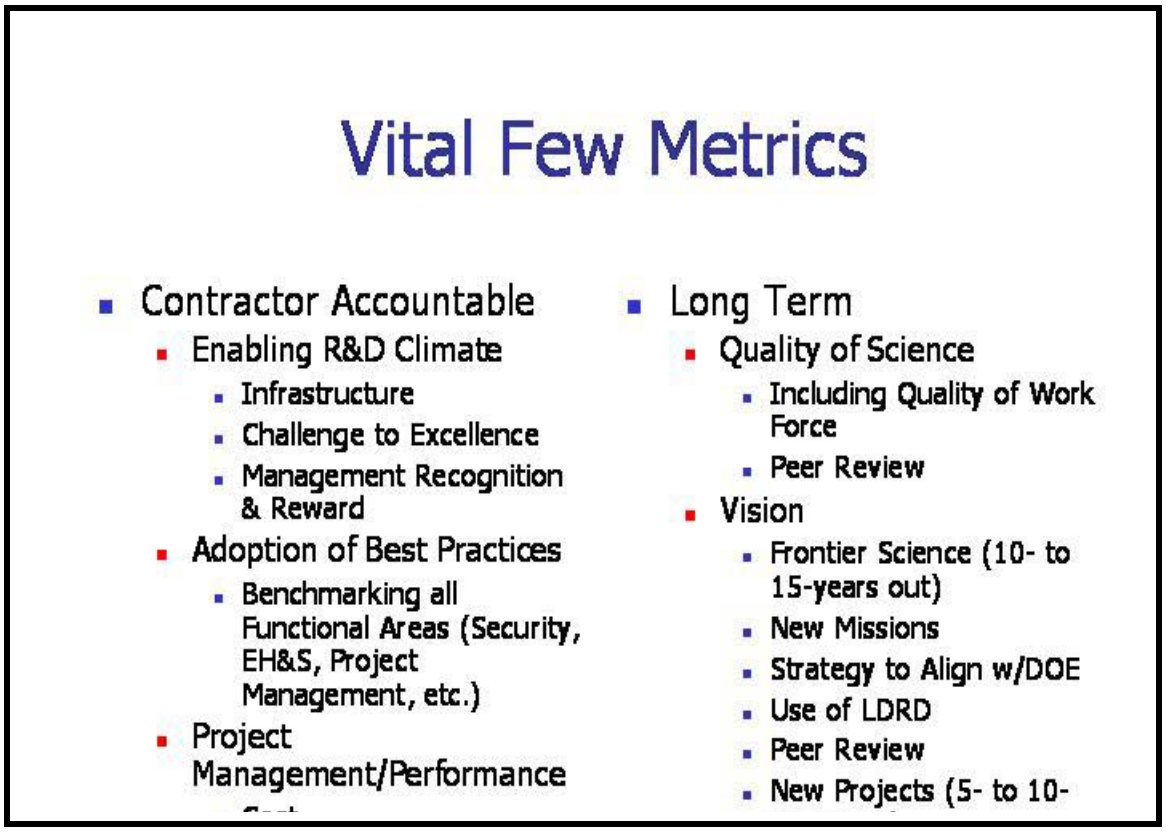
For the nuclear weapons laboratories, the quality of staff and their products relevant to stockpile stewardship or other missions would need to be evaluated.

5) **Measures on Laboratory strategic vision**, i.e., the identification and pursuit of new opportunities for frontier science and technology. The basic questions to ask are what challenges or frontiers will the Laboratory be working on in 3 – 5 years? In 10 – 15 years? This can be measured by peer review committees, and by assessment of Laboratory-Directed Research and Development Program (LDRD) utilization, if the Laboratory has LDRD.

The last two measures—quality of the staff and their S&T, and strategic vision—are longer-term indicators of how well the M&O contractor is doing on getting the R&D climate, their business and operational practices, and their project management "right".

The LOB recommends that these five vital few performance measures be used for all Laboratories. To the extent reasonable, they should replace the existing, excessively detailed performance evaluation systems, recognizing that the missions of each DOE program and the subsequent outputs of each Laboratory are different, and the level of management excellence may vary. We understand that even these few upper level measures will drive additional measures. However, as a general rule, we would expect to see substantial reductions in the number of measures used as well as the effort and paper work involved. In *some* cases, additional measures may be required, e.g., where there are sensitive community relations, or high-risk operations in the areas of ES&H.

Our answer to how to assess quality of S&T is to continue to conduct "business as usual." Specifically, we endorse the continued use of external peer review, which is the most commonly accepted means for assessing the quality. The peer review committees must be truly independent, so DOE may wish to exercise the right to review the composition of the peer review committees. Additional measures such as science citation indices, and numbers of staff honored as Fellows of professional societies for example, are additional indicators of quality of S&T. For the applied technology Laboratories, or the applied technology programs, if any, at Office of Science Laboratories, we recommend, as measures of quality of S&T output, the number of patents and licensing activities.



2. Create And Institutionalize A Consistent Laboratory Evaluation Process

For the evaluation *process*, we recommend that the Department have an objective third party assess all the Laboratories performance in metrics 2 and 3 above, and use the results of Laboratory annual employee survey, and/or 360-degree assessment to assess remaining metrics. The practice today is to use DOE Site Offices primarily for assessment of metrics 2 and 3. We also recommend that the scores in each of the five vital few metrics be reported separately, rather than averaged into a single score.

In terms of 'scoring' an evaluation, or distinguishing the differences between poor, adequate, and exceptional performance, we suggest that the peer review committees or objective third parties be provided stricter guidelines, and that they cite evidence to support their ratings. Examples of "more explicit" criteria appear in Table 1 for DOE's consideration. We recommend that a numeric system replace the adjectives currently in use, with 1 denoting worst and 10 denoting best. If an objective third party is used to assess performance of all of the Laboratories for items 2 and 3 above, it will be possible to assess "best" and "worst". Employee surveys typically have numerical ratings that can be compared to other organizations of similar types. The top 90% should be outstanding (i.e., 10 for criteria 2 and 10 for criteria 3 for a total of 20) and the bottom percentile should be one. Means could be developed to translate the results of the employee survey and 360-degree review of executives, and peer review assessments into a numeric rating of 1 to 10 for metrics 1, 4, and 5.

The LOB recommends that DOE use the *trend* in annual performance against the recommended critical five vital few metrics together with the flow chart recommended by the Blue Ribbon Commission to make an extend or compete decision (Figure 1— Flow Chart of Decision Process). DOE has already implemented a similar process for Sandia's new contract, and the LOB supports DOE's action. A contractor could be required to achieve a score of 7 or more on each of the five metrics over the past three years of a five-year contract in order to be extended. We recommend, as in the current Sandia contract, that DOE take swift action to replace a contractor if they score poorly in the first three metrics over two consecutive years.

Further, for laboratories that are embedded within a university's campus and where performance is good, DOE should consider streamlined processes if they must compete the Laboratory, such as asking for short concept papers to determine if there are significant improvements that might result from a competition. If there are none, it is severely burdensome to require a full proposal that will cost $3 million or more.

Table 1. Example of Possible Guidance to Peer Review Committees

S&T Output for Basic R&D	**Evaluated by peer review committees, and publications, awards, and honors**
Rating	**Requirements**
10	World class work on a sustained basis: seminal contributions to their field of science as recognized by international honors and recognition, e.g., Nobel Prizes, Fermi Awards, highest no. of peer-reviewed publications per scientist/engineer.
7	"Best in the nation" work on a sustained basis: recognized as the foremost center of excellence for its R&D in the US, as evidenced by number of Fellows of professional societies, 75% ranking per S/E science citation indices.
5	Advances the state of knowledge in a field of interest on a sustained basis, and 50% (Average) science citations.
3	Some contributions to the state of knowledge in select fields.
1	No significant contributions to the state of knowledge in a given year.
S&E Excellence for Applied R&D, e.g., NREL	**Evaluated by peer review, license revenues, number of patents, etc.**
10	Sustained innovative technology that has the potential to make a major difference to peoples' lives, e.g., products have the potential to lead to far efficient use of or substitution of oil at cost less than or equivalent to that of oil, and have been licensed or introduced to the market, or breakthrough that leads to public acceptance of, e.g., nuclear power, nuclear waste. Highest per S/E patents, license revenues.
7	Sustained contributions to products that will make a significant contribution to US citizens, e.g., products have the potential to compete at a levelized life cycle cost of less than $X/MBOE or Y cents/kwh in the US, and progress made toward commercializing them.
5	Advances in particular areas of applied technology in a given year, as evidenced by R&D 100 awards, patents, license revenues.
3	Some advances in particular, more narrow fields.
1	No significant progress.
National Nuclear Security applied R&D	**Evaluated by peer review, but progress against milestones, and quality of deliverables must also be evaluated via assessment of "project management" type assessments of a few key deliverables.**
10	Breakthrough that leads to major improvement in stockpile stewardship, non-proliferation, nuclear waste disposal, or homeland security for the nation.
7	Significant improvements in stockpile stewardship, non-proliferation, nuclear waste disposal, or homeland security for the nation.
5	Satisfactory performance of assigned responsibilities.
3	Adequate performance in most areas.
1	Unsatisfactory performance in more than half of their work.
Operations (business, ES&H, Security, Facilities Management)	**Evaluated by a third party.**
10	Best in class for business, safety, facilities and security operations among R&D organizations in the US.
7	Best among DOE institutions for business, safety, facilities, and security operations.
5	Satisfactory performance, i.e., acceptable (average?) recordable case rate, no fines or penalties, adequate cost effectiveness, so significant security infractions
3	Performance needs improvement—below average in the areas cited in 5 above
1	Unsatisfactory performance.
Vision	**Evaluated by peer review of past successes and viability of future**
10	The Laboratory consistently identifies and champions the key challenges in their field of science and engineering, and is viewed as the world "thought leader" in their respective field. They have achieved outstanding progress against their strategic objectives.
7	They are viewed as thought leaders on some areas of their expertise, and are making significant progress against their strategic plan.
5	They are asking the right questions, are influential in the right areas, and are making reasonable progress against their strategic plan.
3	Their strategic plan and their "thought leadership" need improvement.
1	The quality of their strategic plan is unsatisfactory and they have made no progress.

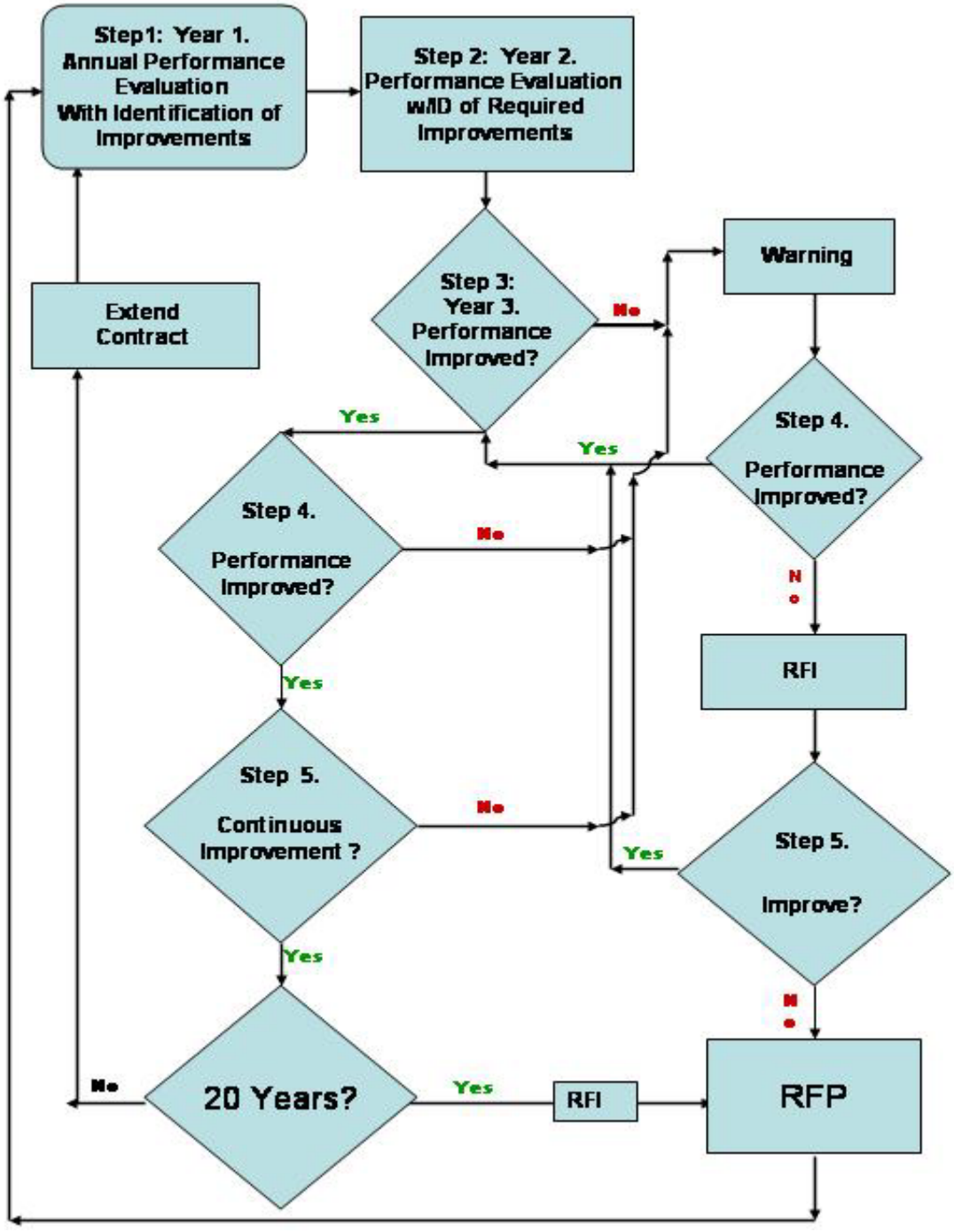


Figure 1: (Report *of the Blue Ribbon Commission on the Use of Competitive Procedures for the Department of Energy Labs*. November 24, 2003. U.S Department of Energy

3. Create Meaningful Incentives For M&O Contractors

From our survey of the contractors (Tables 2 and 3), we concluded the top three motivators to being a DOE Laboratory M&O are:

1. Service to the Nation,
2. Access to the technical talent in the laboratory that complements the corporate or university mission,
3. Prestige.

Other reasons cited for pursuing a Laboratory management and operating contract, although less important (or not important to some contractors) include the following: the increased partnering opportunities afforded by being an M&O contractor; Bayh-Dole rights to the Laboratory's intellectual property, and fee or other monetary compensation.

Assuming that the disincentives (discussed below) do not outweigh the incentives, the LOB believes the Department has adequate competition among competitors for Laboratory M&O contracts to assure good management.

Based upon our analysis of incentives to M&O contractors, we recommend the following as the top ways to incentivize good performance:

- **Award term incentives**—since many of the rewards of being a Laboratory contractor are "intrinsic", the desire to perform well in order to keep a Laboratory M&O contract is a powerful incentive. As in the Blue Ribbon Commission, we discourage "churn" in Laboratory M&O contractors because of its detrimental effect on the staff. We recommend 20 – 25 year tenures for Laboratory M&O contractors without bid competition become the norm for M&O contractors that are performing well.

- **Ensure fee balances risk and reward**. Fees are minimal, compared with those that the private sector can expect to earn elsewhere, ranging from 0.5% to 3% for most national Laboratories. Fee is more important to for-profit contractors compared to university contractors. For example, a for-profit contractor will balance the risk to reputation should there be a major incident at the Laboratory, and the opportunity cost of the Laboratory's executive management--which a for-profit M&O contractor might put to more profitable use in its more profitable business sectors. Even university contractors need some fee to cover overhead expenses and to fund university-laboratory collaborations.

- **Praise or criticize M&O contractor performance**: An M&O contractor wants to perform well to preserve its reputation and maintain or improve its good name. No entity wants to be embarrassed by a "bad grade." Publication of the performance ratings of all Laboratories will encourage good performance.

The serious disincentives that may discourage competition for Laboratory M&O contracts are the following:

- **Financial risk or liability**: While the DOE considers many of its Laboratory contracts "low risk" (i.e., there is little opportunity to actually lose money on a contract-the worst risk might be a earn zero fee), a serious ES&H incident might result in civil lawsuits, and, if the Price Anderson Act Amendment is not renewed, financial liability may be greatly increased. DOE's current indemnification of contractors must be preserved, and DOE must very carefully exercise the conditional payment of fee clause.

- **Risk to reputation**: For a university as well as many not-for-profits and for-profit entities, the potential for a serious incident at the Laboratory damaging their reputation affects their ability in the long term to attract quality staff, to win other contracts, and to have credibility with their constituents. Damage to reputation may even affect stock prices for publicly held corporations, which pushes this risk into the previous category. This disincentive may seriously limit qualified competitors for DOE's national laboratories. DOE could reduce this risk by entering into "partnerships" for new contracts at Laboratories where there is "no blame, no foul" for the first one or two years of a contract, for example.

- **The cost to prepare a bid for an M&O contract**. This cost is typically a minimum of $3 million or more for a national Laboratory contract, which is a significant sum for a University. The LOB endorses the recommendations of the Blue Ribbon Commission that DOE "prequalify" a small number of contractors to submit a bid, and provide financial support to them to prepare the bid where necessary.

- **Burdensome oversight by DOE**: The LOB remains concerned about the level of micromanagement by some parts of DOE, and by the amount of management time Laboratory executives and staff spend on myriad assessments and oversight. We believe that adoption of the vital few metrics described above, strong third party evaluations, less day-to-day oversight by site offices, and reasonable management of, for example, the DOE Inspector General's office and the DNFSB, are critical to retaining qualified M&O contractors and Laboratory executives, as well as improving Laboratory productivity and morale.

Summary Tables of LOB Survey Data

Table 2. Contractors' Motivations for Managing a DOE Laboratory (1=Most Important)

Reasons Selected by DOE M&O Lab Contractors for Seeking & Maintaining M&O Contracts	**Overall Ranking (Median)**	Median Ranking by Type of Contractor		
		Not-For Profit	**University**	**For Profit**
Service to Nation	1	1	2	1
Access to Technical Talent	2	2	2	4.5

Prestige	4	2	5	3
Increased Partnering Opportunities	4	3	5.5	4.5
Management Fee	5	4	7	3.5
Bayh-Dole Rights to Intellectual Property	6	6	6	7.5
Diversification of Portfolio	6	6	6	5.5
Note: Medians were calculated using Microsoft Excel.				

Table 3. Contractors' Identification and Ranking of Important Management Skills (Total Number of Respondents = 10)

Skill	**Importance**		**Priority** (**1**=Highest Median Ranking)
	Somewhat	**Very**	
Caliber of Management Team		10	1
Ability to Attract Best and Brightest		10	2
Accomplishment of DOE Goals		10	3
Highest Quality of Science		10	3
Excellence of Safety Practices	1	9	4
Outstanding Business Practices	1	9	5
Excellence of Security Record	2	8	5
Ability to Deliver Results Within Budget and Schedule		10	5
Compelling, Exciting Mission for the Laboratory[1]		4	5

[1]Six contractor respondents indicated that this attribute was not largely controlled by the laboratory contractor. By default, one might infer that the respondents view the quality of the science at a laboratory as being within the control of the laboratory contractor.

IV. SUMMARY

The LOB recommends that DOE set performance goals at a high enough level to focus the M&O contractor on the critical few metrics, as well as focus DOE's oversight and evaluation. Further, we recommend that the contractor be offered sufficient incentive and DOE be structured to take low-value added work out of the system. DOE adoption of best practices driven by DOE management insistence on benchmarking as reviewed by third-party entities can provide the means to accomplish this objective. We believe that these measures will lead to improving accountability and strategic management.

In addition, DOE needs to focus more intently on "risk versus consequence". In the area of property management, for example, the cost and time to track low-value or fully depreciated equipment is far more than potential consequence of its loss. DOE and Laboratory improvement efforts have been considered and carried out previously. DOE's consistent inability to institutionalize previous improvement efforts is of great concern to the members of the LOB. Such changes can only be driven by a constancy of purpose led by DOE senior management over time.

Appendix A: Laboratory Operations Board Charge

LABORATORY OPERATIONS BOARD

EVALUATION PROCESSES FOR THE DEPARTMENT OF ENERGY LABORATORIES: CHARGE TO EXTERNAL MEMBERS WORKING GROUP

Purpose of Study

This study will propose evaluation metrics, processes and practices to be used by the Department of Energy in evaluating the performance of its National Laboratories. The evaluations of interest are those that (1) assess the science and technological output of the Laboratories and (2) assess the strategic and tactical performance of the management and operations (M&O) contractors that are responsible for the day-to-day laboratory business activities. The effort will assess the validity of the metrics and the processes that are currently used to evaluate the contractor's performance and propose alternatives where those metrics are lacking. These evaluations represent the DOE's annual evaluations of the Laboratories, and the study is intended to determine if the evaluations are measuring the right things. The evaluations are expected to be linked to funding and contract decisions related to competing or extending the M&O contracts as well as the determination of the award level of periodic performance incentive-based fees.

Background

Attention has been focused on disparities between laboratory performance evaluations and various problems that have emerged at the Department of Energy Laboratories during the recent past. In a 2003 study, a Blue Ribbon Commission noted that the performance of the Laboratories is consistently rated as "outstanding" or "excellent," suggesting rating inflation. Furthermore, the Blue Ribbon Commission noted, and the Laboratories have complained about, the excessive number of metrics required in the appendices to their contracts, the number of reviews performed at various levels by different reviewers, and the cost in terms of time and money that these reviews take away from research. The Commission suggested that the review processes, responsibilities of the contractor and the Department, and the Department's use of the reviews (particularly the linkage of reviews to contract decisions) are unclear and require examination.

The complexity of the Department's laboratory system contributes to this confusion. The Laboratories perform work related to a wide range of the Department's strategic missions. For example, the large multi-purpose Laboratories perform various research and development work in the basic sciences, operate user facilities, and, in several cases, are also involved in maintenance of the Nation's nuclear stockpile, nuclear weapons research, or other defense-related production activities. Other national Laboratories are devoted largely to performing basic scientific research and/or operate user facilities, and

special purpose Laboratories perform research related to the nation's energy supply or environmental issues. This mix of activities suggests that evaluation strategies and metrics will require tailoring according to the Laboratory's tasks and core competencies.

Concerns related to the performance of the DOE Laboratories and of the M&O contractors also pervade a 2003 study by the External Members Working Group of the Laboratory Operations Board (LOB), the *Management Best Practices for the National Laboratories*. This study focused closely on management within the Laboratories but identified a need to develop appropriate metrics and the use of benchmarking as a means of improving the efficiency, quality and productivity of the Laboratories. The Working Group recommended this as an activity in which the Office of the Secretary of Energy would be actively engaged.

Scope and Study Questions

Through discussions with the DOE and a candidate study laboratory, the study team will develop a design for the laboratory's performance processes and metric system.

1. What should be the "vital few" performance measures to evaluate each five-year contract term? How will the differences between poor, adequate, and exceptional performance be distinguished?

2. What methodology should be used in the evaluation of Laboratories' science and technology performance? What other approaches should the Department consider?

3. Laboratory evaluation is considered to be the evaluation of the contractor. While this is certainly an important ingredient, the evaluation of the performance of the contractor needs to be broader than just the evaluation of the laboratory scientific and technological output, and this needs to be articulated in a practical manner. What, if anything, beyond the evaluation of the laboratory's science and technology performance should be considered in evaluating the performance of the contractor?

4. What motivates the current M&O contractors to have an interest in managing a DOE laboratory? Are there serious disincentives currently in place or incentives that should be in place that should be addressed? How should contractors be motivated to achieve exceptional performance?

5. What improvements need to be considered to improve accountability and strategic management of the laboratory assets (from a performance perspective)?

Duties of Working Group

1. The Working Group should provide the Secretary through the Secretary of Energy Advisory Board (SEAB) with Department-wide policy recommendations on evaluation strategies and processes that will contribute to the efficient and productive management of the DOE Laboratory complex.

2. The Working Group is asked to identify performance metrics that will contribute to a better understanding of performance expectations, better linkage to contract decisions, and greater validity in the evaluation process.

The LOB will provide findings to the SEAB in its semi-annual progress reports. A separate report will be submitted to the Secretary through the SEAB at the end of the study.

Estimated Number and Frequency of Meetings

The Working Group will meet as required. In order to enhance members' knowledge and understanding of DOE management policies and practices and the relationships between DOE headquarters and its Laboratories, the DOE may organize site visits as needed. Headquarters personnel will be available to explain current policies and to conduct staff work. The Working Group may hold meetings outside of Washington, D.C., as required to fulfill its charge.

Membership

The Working Group shall have at least five members, including at least four individuals who are external members of the LOB. Additional members with knowledge pertinent to the scope and objectives of this study and representing a balance of viewpoints may be appointed to the Working Group. The External Chairman of the Laboratory Operations Board, in consultation with the Chairman of the Secretary of Energy Advisory Board, shall appoint the Chair, as well as all other members.

Duration and Termination Date

The Working Group shall serve for approximately six months, subject to the extension or dissolution by the External Chairman of the Laboratory Operations Board and the Chairman of the Secretary of Energy Advisory Board. Work will begin no later than March 30, 2004, and should be completed by December 2004.

Approved March 22, 2004

Page Intentionally Blank

Appendix B: The External Working Group Responses to Scope and Study Questions

The Laboratory Operations Board's findings and recommendations to the following questions contained in our charter (see Appendix B) are discussed in the following Sections of this report:

1. *What should be the "vital few" performance measures to evaluate each five-year contract term?*

Section III, Recommendation 1

How will the differences between poor, adequate, and exceptional performance be distinguished?

Section III, Recommendation 2

2. *What methodology should be used in the evaluation of laboratories' science and technology performance?*

Section III, Recommendation 2

What other approaches should the Department consider?

Section III, Recommendation 2

3. *What, if anything, beyond the evaluation of the laboratory's science and technology performance should be considered in evaluating the performance of the contractor?*

Section III, Recommendation 1

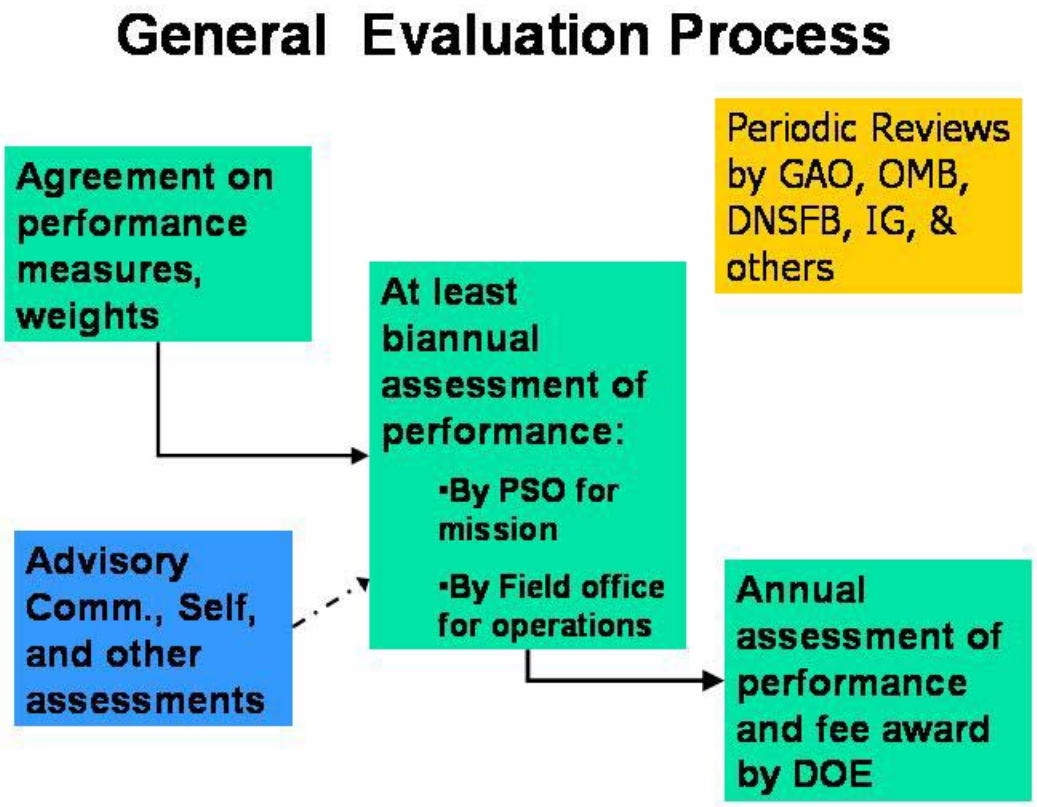
4: *What motivates the current M&O contractors to have an interest in managing a DOE laboratory? Are there serious disincentives currently in place or incentives that should be in place that should be addressed? How should contractors be motivated to achieve exceptional performance?*

Section III, Recommendation 3

5: *What improvements need to be considered to improve accountability and strategic management of the laboratory assets (from a performance perspective)?*

Section IV and Summary

Appendix C: General Evaluation Process



Page Intentionally Blank

Appendix D: Sample of Current Laboratory Metrics

Brookhaven National Laboratory Sample from PEMP

Performance Evaluation System

I. Introduction

This Contract Appendix sets forth the performance evaluation system (including processes, criteria, schedules, and measures) that will be used to evaluate the overall performance of Brookhaven Science Associates (BSA) in the management and operation of Brookhaven National Laboratory (BNL) in Fiscal Year 2003 (FY03).

For FY03, in accordance with Article 6 of the Contract, the Parties have agreed to use a Performance-Based Management System (PBMS) that includes clear and reasonable objectives, against which BSA's overall performance will be evaluated. For this purpose, the parties have agreed to an objective hierarchy consisting of Critical Outcomes, underlying Objectives, and associated weighted Performance Measures and Metrics for the assessment of BSA's performance and the resulting determination of fee.

The DOE Office of Science (SC) identified high-level expectations in six critical activities/functional areas that SC would use to guide its regular assessment of Laboratory performance. These critical areas are Science, Environment, Safety & Health (ES&H), Infrastructure, Business Operations, Leadership and Stakeholder Relations. SC expects SC/Headquarters (HQ) program managers, field offices, and Laboratories to work in partnership to develop laboratory-specific outcomes, objectives, and measures that support these high-level expectations and to use self-assessment as a tool to achieve desired outcomes and continuous improvement.

This "Critical Outcome Process" is designed to measure overall performance and drive the improvement agenda of the Laboratory by linking Laboratory rewards, i.e., performance ratings and associated fees, to a prioritized set of objectives that have been mutually developed by the Department of Energy (DOE) and BSA. DOE and BSA have mutually agreed to the specific Critical Outcomes, Objectives, and Performance Measures contained herein, and, as described in Articles 6 and 7, agree to a reassessment of the process, prior to the beginning of each evaluation period.

II. Critical Outcome, Objective, and Measure Development

The following concepts are used in the development of the Performance Measures and are provided for information and clarification in the process:

A. The Critical Outcome process must be flexible to accommodate changes as planned improvements are realized and/or customer priorities vary. For example, even though the Critical Outcomes and Objectives are intended as sustainable targets over a 3-5 year and 1-3 year time frames respectively, their relative weights are expected to change more frequently. Re-prioritization of the Critical Outcomes and Objectives is a fundamental part of the annual Critical Outcome process.

B. Critical Outcomes, their underlying Objectives, and associated Performance Measures should influence the improvement agenda of the Laboratory. They should incorporate best practices and reflect the DOE and BNL functional managers' judgment as to the key performance elements for overall successful operations. Best practices should consider cost/risk/benefit effectiveness. Examples of key elements addressed are:

- Quality of product
- Timely delivery
- Cost reduction
- Cycle time reduction
- User friendliness
- DOE requirements

C. Performance Measures should be results-oriented and should focus on criteria that are objectively measurable and allow for meaningful trend and rate-of-change analysis where possible. They should use qualitative criteria in those cases where objective criteria will not produce meaningful evaluation results.

D. Performance Measures may reference industry business standards that are meaningful, appropriate and consistent with DOE requirements, rather than arbitrary standards. To this end, benchmarking initiatives are encouraged. Using benchmarks to change targets should consider whether it is cost effective to make further improvements or if the target level should be raised.

E. The relative weighting and metrics for each Performance Measure shall be established prior to the start of the performance period by mutual agreement of the Contractor and the DOE Contracting Officer. If the parties cannot reach agreement, the Contracting Officer shall have the right to establish such weights, subject to the provisions outlined in Article 7 of the Prime Contract.

F. Background and supporting information (such as purpose, means and strategies, assumptions definitions, etc.), shall be documented as appropriate.

G. Measures are to be developed in a team approach involving DOE personnel and Laboratory functional managers. Care should be taken to ensure that the resulting measures reflect performance in areas for which the Laboratory functional manager is accountable, correctly reflecting their status as responsible for the performance and desired improvement.

H. If the desired end state of a performance measure is not achieved, and that measure is the final step in achieving its overall Objective, the accomplishment of the measure will move to a DOE requirement until the measure is complete. Lack of attention to the completion of the work identified in the measure may impact the performance ratings in subsequent fiscal years.

I. Absence of a Performance Measure does not diminish the compliance with specified contractual requirements in that area of performance. Failure to meet a significant contractual requirement may result in the Contracting Officer overriding the Performance Measures.

III. Change Control

DOE and BSA acknowledge that implementation of this performance-based contract requires both parties to continually refine selected Performance Measures and metrics, implement data collection and reporting mechanisms, and seek benchmarks against which to set appropriate targets for performance improvement and/or measurement. Continuing effort is needed to refine the system for scoring performance in each of the Critical Outcomes included in this Appendix and for integrating these scores into an overall evaluation rating for each performance period.

The process to change aspects of performance within the fiscal year, if necessary, is described in the Standards Based Management System (SBMS) Subject Area entitled, "Critical Outcome Performance Measures."

IV. Self -Evaluation Scoring

Each Measure, Objective, and Critical Outcome is rated in accordance with the following:

OUTSTANDING	>3.5 to 4.0
EXCELLENT	>2.5 to 3.5
GOOD	>1.5 to 2.5
MARGINAL	>0.5 to 1.5
UNSATISFACTORY	$\leq$ 0 to 0.5

Once the adjectival rating is determined, the cognizant BSA manager (owner) considers other related aspects of performance (e.g., quality, efficiency, etc.) and determines an appropriate numerical rating. For example, a performance measure that met schedule quality expectations with an adjectival rating of Excellent, but an external review indicates that the work represented a "best-in-class" effort, may warrant a 3.5 rating. Similarly, a measure that met quality requirements for an excellent rating but required substantial re-work to achieve it may warrant a numerical score on the lower end of the excellent range, perhaps a 2.6.

A roll-up score is determined by multiplying the weight of each Performance Measure in that Objective by its score. These are added together to develop an overall score for each Objective, which is then translated into an adjectival rating. The process is continued for the Critical Outcomes by multiplying the scores for each Objective within a given Critical Outcome by its corresponding weight, adding the resulting numbers to get a Critical Outcome score, and converting this score to an adjectival rating as done for the Objective level. The same process is then used to calculate an overall score, and then the adjectival rating, at the Laboratory level.

V. Self-Evaluation and Improvement Agenda

BSA and DOE will conduct a mid-year review of status against performance measures defined in Critical Outcomes 1-3. BSA is responsible to define and coordinate the process for conducting the review and to ensure the involvement of appropriate DOE counterparts and BSA management.

On an annual basis, the Laboratory will conduct a formal Self-Evaluation of its performance relative to each Critical Outcome, Objective, and Performance Measure identified. This Report will also address other significant issues or opportunities that arise from the Laboratory's broader Integrated Assessment Program, whether or not they specifically impact the Critical Outcomes.

As part of the mid-year review and the annual self-evaluation process, both BSA and DOE will confirm that performance measures defined (for the current and next FY) adequately reflect the scope and priorities for Laboratory management focus.

(1)

VI. DOE Evaluation

The DOE evaluation of BSA's performance, and, in turn, the DOE determination of BSA's Fee, will be based primarily on the performance levels achieved against the weighted Performance Measures identified above. In addition, for each Critical Outcome area, the Contracting Officer may also consider any other relevant information directly or indirectly related to the Critical Outcome, including areas of performance monitoring defined by the Self-Assessment process, that is deemed to have had an impact (either positive or negative) on the Contractor's performance. The fact that the Self-Assessment is "topically aligned" under a particular Critical Outcome Area does not preclude the Contracting Officer from considering the Self-Assessment's impact upon other Critical Outcome areas. Should the Contracting Officer consider other relevant information in establishing the final performance rating for any Critical Outcome, the Contractor will receive written notice of such intent and will be given the opportunity to respond in writing. This agreement does not impact DOE's rights under Article 6, Paragraph (f), of the Prime Contract.

The Director of the Office of Science (SC-1) has the primary responsibility for evaluating Science and Technology performance (Critical Outcome 1), but practical input also will

be sought from cognizant DOE Assistant Secretaries, Office Directors, and Program Managers. The Contracting Officer has the primary responsibility for evaluating performance relative to Critical Outcomes 2 and 3 in accordance with the Objectives, Performance Measures, and Metrics of Attachment 1. However, the Contracting Officer shall inform SC-1 of any issues or concerns that should be considered when evaluating the Contractor's performance in Critical Outcome 1. This is especially important in those areas where operational performance could have a significant impact on the Contractor's ability to conduct successful research for the Department. The Contractor has responsibility to compile the data necessary to document its performance against all measures.

VII. Critical Outcomes, Objectives, and Performance Measures

The Laboratory's Critical Outcomes for Fiscal Year 2003 are:

Science and Technology - *BNL will deliver innovative, forefront science and technology aligned with DOE strategic goals in a safe, environmentally sound, and efficient manner, and will conceive, design, construct, and operate world-class user facilities.*

Environmental Management - *BNL will deliver "Best-In-Class" solutions in conducting the Environmental Restoration Program. Focused upon completion, the results will be protective of the environment, cost effective, and performed in an open exchange with the community, regulators, and other stakeholders. BNL will continue to keep the commitments agreed to in the Memorandum of Understanding signed by Dr. Marburger and Mr. Holland on May 4, 2001.*

Laboratory Management and Operations - *BNL will manage and enhance operations and management processes to provide an effective and efficient work environment that enables the execution of the BNL mission in a manner responsive to customer and stakeholder expectations.*

In FY03, the relative weights of the Critical Outcomes reflect a high priority on the success of the Laboratory's science and technology mission and the need for continued improvement and focus on the Laboratory's environmental cleanup activities. At the Objective level, the FY03 priorities clearly reflect an increased emphasis on BSA's self-assessment program while maintaining a balanced perspective of institutional performance consistent with SC expectations.

The Critical Outcomes, Objectives, and Measures, and their relative weights, are:

Critical Outcomes, Objectives, and Measures	Element %	Measure %	Objective %	Outcome %
1.0 Excellence in Science & Technology				**60%**
Objective 1.1 Research Quality			35%	
Objective 1.2 Relevance to DOE Missions			10%	
Objective 1.3 Constructing & Operating Facilities			30%	
Objective 1.4 Research Program Management			25%	
2.0 Environmental Management				**8%**
Objective 2.1 Operational Excellence in Environmental Restoration			15%	
Measure 2.1.1 Project Completion and Other Key Milestones		100%		
Objective 2.2 Execution of Program Activities			80%	
Measure 2.2.1 Fiscal Year Cost Performance		25%		
Measure 2.2.2 Total Program Cost Management		35%		
Measure 2.2.3 Critical Path Schedule Performance		20%		
Measure 2.2.4 Overall Program Schedule Performance		20%		
Objective 2.3 High Flux Beam Reactor			5%	
3.0 Laboratory Management and Operations				**32%**
Objective 3.1 Management and Business Processes			55%	
Measure 3.1.1 Corporate Leadership		32%		
3.1.1.1 Establishing Partnerships	28%			
3.1.1.2 Corporate Involvement	72%			
Measure 3.1.2 Procurement		23%		
3.1.2.1 Deliver Effective Procurement Packages to DOE-BAO	30%			
3.1.2.2 Maximize Procurement Quality	70%			
Measure 3.1.3 Baseline Study of Lab Business Systems		18%		
Measure 3.1.4 Cyber Security		27%		

Critical Outcomes, Objectives, and Measures	Element %	Measure %	Objective %	Outcome %
Element 1	25%			
Element 2	25%			
Element 3	25%			
Element 4	25%			
Objective 3.2 Assessments & Improvements			15%	
Measure 3.2.1 Management Systems Assessment Program		100%		
3.2.1.1 Management System Objectives & Assessment Activities	20%			
3.2.1.2 Consensus-based User/Peer Reviewer Maturity Determinations	30%			
3.2.1.3 Third Party Evaluation of the Management System Assessment Program	50%			
Objective 3.3 Environment, Safety, and Health			10%	
Measure 3.3.1 Legacy ES&H Risk Management		38%		
3.3.1.1 Site Hazard Footprint Management	100%			
Measure 3.3.2 Ongoing ES&H Risk Management		62%		
3.3.2.1 Pollution Prevention	50%			
3.3.2.2 OSHA Reportable Injury Management	0%			
3.3.2.3 Radiological Source Inventory Database	50%			
Objective 3.4 Site Infrastructure, Facilities & Operations			10%	
Measure 3.4.1 Pursue Alternative Financing (AF) for Infrastructure Projects		25%		
3.4.1.1 BNL Housing Reconstruction	67%			
3.4.1.2. Energy Science Building	33%			
Measure 3.4.2 Project Management		50%		
Measure 3.4.3 Facilities/Infrastructure Maintenance		25%		
3.4.3.1 Infrastructure Reliability Index (RI)	100%			
Objective 3.5 Communications and Trust			10%	

Critical Outcomes, Objectives, and Measures	Element %	Measure %	Objective %	Outcome %
Measure 3.5.1 Building National Recognition		40%		
Measure 3.5.2 Stakeholder Involvement & Understanding		40%		
Measure 3.5.3. Employee Communications Program		20%		

Combined, the Critical Outcomes, Objectives, and Measures define the scope of planned institutional level self-assessment activities. This approach ensures that priorities and resources associated with institutional assessment activities supporting Critical Outcomes and Objectives are considered and balanced with the development of the specific measures and metrics contained in the Critical Outcome Trees.

The Critical Outcomes, Objectives, and Performance Measures agreed to for FY03 through the DOE/BSA Critical Outcome process are fully defined in Attachment 1 to this Appendix.

(2)

VIII. Schedule

In order to clearly define the path forward, the following generic schedule is presented as a guide. BSA and DOE acknowledge that the nature of the processes involved demands flexibility in the schedules.

FY 2003 Performance Measures Schedule

October:

- October 1 - BSA initiates the Self-Evaluation process for the **Completed Fiscal Year**.
- Third week in October - Conduct the Fourth Quarter status review for the **Completed Fiscal Year.**

November:

- November 15 - BSA submits its Annual Self-Evaluation Report to DOE for the **Completed Fiscal Year.**

January:

- January 15 - DOE transmits its draft Annual Evaluation Report for the **Completed Fiscal Year** to BSA for comment.
- Conduct the First Quarter status review for the **Current Fiscal Year**.

February:

- February 1 - BSA submits its comments on DOE's draft Annual Evaluation Report for the **Completed Fiscal Year** to DOE.
- Second week in February - BAO transmits the final DOE Annual Evaluation Report for the **Completed Fiscal Year** to BSA.

March:

- BAO and BSA begin drafting the Critical Outcomes, Objectives, and Performance Measures for the **Succeeding Fiscal Year**.

April:

- DOE/BSA Management Retreat to assess customer strategic needs, and refine the Critical Outcomes, Objectives, and Performance Measures for the **Succeeding Fiscal Year**.
- Conduct the Mid-year (Second Quarter) status review for the **Current Fiscal Year**.

June:

- June 30 - BAO and BSA will have developed a workable draft on the Critical Outcomes, Objectives, and Performance Measures for the **Succeeding Fiscal Year**.

July:

- Conduct the Third Quarter status review for the **Current Fiscal Year**.

September:

- September 30 - The Critical Outcomes, supporting Objectives, and related Performance Measures for the **Succeeding Fiscal Year** will be ready to be incorporated into DOE's Prime Contract with BSA.

(3)

IX. Definitions and Acronyms

Activity/Functional Area - The strategic areas of mission accomplishment outlined in the Director of the Office of Science expectations for Science Laboratory's program performance in the areas of Science, Leadership, Environment, Safety & Health, Infrastructure, Business Operations, or Stakeholder Relations. These form the basis for the Laboratory's Critical Outcomes, Objectives, and Measures.

Critical Outcome - Performance end state having the highest level of strategic value or impact to DOE, BSA, or affected stakeholders; represent a sustainable target over a minimum of 3 to 5 years.

Critical Outcome Trees - The complete set of Critical Outcomes, Objectives, and Measures for a given fiscal year; synonymous with Attachment 1 to this Appendix.

Objective - A statement of desired outcomes for an organization or activity. Objectives are intended to be sustainable targets over a 1-3 year timeframe and form a complete, non-redundant set of results for evaluating progress toward achievement of the Critical Outcomes.

Measure - A quantitative or qualitative method for characterizing performance. Performance Measures are specific to the performance period, i.e., the fiscal year, and require the development of metrics (expectations) to facilitate adjectival ratings.

Metric (a.k.a. Expectation) - The desired condition or target level of performance for each measure.

Result - The actual condition or performance level for each measure.

Benchmark - A standard or point of reference for measurement, usually derived from values found in other institutions or organizations.

Outstanding - Significantly exceeds the standard of performance; achieves noteworthy results.

Excellent - Exceeds the standard of performance, although there may be room for improvement in some elements. Better performance in all other elements more than offsets this.

Good - Meets the standard of performance. Deficiencies do not substantively affect performance.

Marginal - Below the standard of performance; deficiencies are serious and may affect overall results; management attention and corrective action are required.

Unsatisfactory - Significantly below the standard of performance; deficiencies are serious, may affect overall results, and urgently require senior management attention.

X. Critical Outcome

1.0 Basic Science & Technology

BNL WILL DELIVER INNOVATIVE, FOREFRONT SCIENCE AND TECHNOLOGY ALIGNED WITH DOE STRATEGIC GOALS IN A SAFE, ENVIRONMENTALLY SOUND, AND EFFICIENT MANNER AND WILL CONCEIVE, DESIGN, CONSTRUCT, AND OPERATE WORLD-CLASS USER FACILITIES.

The weight of this Outcome is 60% of total.

Cognizant DOE Assistant Secretaries and Office Directors have primary responsibility for evaluating the performance of Laboratory Science and Technology programs. In carrying out this responsibility, the Assistant Secretaries and Office Directors are likely to request assistance from the Program Managers under whose jurisdiction the various individual Laboratory programs fall.

In performing this evaluation, the Assistant Secretaries and Office Directors have available input from the following sources:

1. DOE Program Managers who carry out periodic reviews of the programs they fund. These reviews usually include use of independent technical experts. The Program Managers may use written reviews as a basis for evaluating the quality of the science and technology performed by the Laboratory and its relevance to their programmatic goals.

2. The Science and Technology Advisory Committee of the BSA Board that oversees the internal reviews of science and technical programs at Brookhaven. Independent review committees whose membership is drawn from the external scientific and engineering communities review each major Laboratory program on an 18-month cycle. The committees evaluate Laboratory divisions and programs with respect to the quality and performance of the staff, the quality and timeliness of the work, and the relevance of the programs to the goals of the Laboratory and sponsoring agencies. Reviews include consideration of the Performance Measures described below. The Committees' written reports and the Laboratory's responses are made available to the BSA Board for Brookhaven, DOE Contracting Officers, and to relevant DOE Program Managers.

In addition, input from Advisory Committees reporting to the cognizant DOE Assistant Secretary or Office Director that are appointed formally through the Federal Advisory Committee Act, from reviews of relevant Laboratory activities requested for the Secretary of Energy, or from cognizant Assistant Secretaries and Office Directors may be used.

3. BNL Self-Assessments, which include Department Self-Assessments, Independent Peer Review, and Department and Lab-level Annual Self-Evaluations.

Objective 1.1 Quality of Research

The weight of this Objective is 35%.

Reviewers will evaluate the overall quality of the research performed. Depending on the nature of the program, reviewers will consider the following:

Science: Success in producing original, creative scientific output that advances fundamental science and opens important new areas of inquiry; success in achieving sustained progress and impact on the field; and recognition from the scientific community, including awards, peer-reviewed publications, citations, and invited talks.

Technology: Whether there is a solid technical base for the work; the intrinsic technical novelty of the research; the importance of technical contributions made to the scientific and engineering knowledge base underpinning the technology program; and recognition from the technical community.

Objective 1.2 Relevance to DOE Missions and National Needs

The weight of this Objective is 10%.

Reviewers will consider whether the research fits within and advances the missions of DOE; contributes to U. S. leadership in the international scientific and technical communities; contributes to the goals and objectives of the Strategic plans of DOE and other national programs; and the extent of productive interaction with other Science and Technology programs. Depending on the nature of the program, reviewers will consider the following:

Science: The program's track record of success in making scientific discoveries of technological importance to DOE missions and U.S. industry; the degree of industrial interest in follow-on development of current research results; and the effective use of national research facilities that serve the needs of a wide variety of scientific users from industry, academia, and government laboratories.

Technology: The value of successfully developing pre-commercial technology to DOE, other federal agencies, and the national economy; the program's risks and costs; and, where appropriate, the degree of industrial interest, participation, and support.

Objective 1.3 Success in Constructing and Operating Research Facilities

The weight of this Objective is 30%.

Reviewers will consider whether the construction and commissioning of new facilities is on time and within budget; whether facility performance specifications and objectives are achieved; the reliability and safety of operations; adherence to planned schedules; and the cost-effectiveness of maintenance and facility improvements.

Reviewers will also assess the quality, innovation and achievements in designing and developing new facilities that will provide the next generation of research tools.

Reviewers of user facilities will also consider whether the user access program is effective, efficient, and user-friendly; the quality of the proposal evaluation process; the strength and diversity of user participation; the productivity of the research supported, both in science and technology; and the level of satisfaction among user groups.

Reviewers will consider the extent to which BNL provides effective and efficient leadership in the development of the Spallation Neutron Source (SNS) Project. In this project, the Laboratory will perform assigned tasks and produce scheduled deliverables for the Spallation Neutron Source in accordance with the Inter-Lab Memorandum of Agreement (MOA) and the approved annual work plans. Expectations for BNL performance in this area are reflected in the following Table.

Rating	*Criteria*
Outstanding	Deliver annual work plan elements below cost and ahead of schedule.
Excellent	Deliver annual work plan elements on cost and schedule, including up to 50% of contingency.
Good	Deliver annual work plan elements within BNL project cost and/or schedule, including greater than 50% but less than or equal to 100% of contingency.
Marginal	Delivery of annual work plan elements exceeding cost and/or schedule, including contingency, such that BNL project critical path is impacted.
Unsatisfactory	Delivery of annual work plan elements exceeding cost and/or schedule, including contingency, such that overall SNS project critical path is impacted.

Objective 1.4 Effectiveness and Efficiency of Research Program Management

The weight of this Objective is 25%.

Reviewers will consider the quality of research plans; whether technical risks are adequately considered; whether use of personnel, facilities, and equipment is optimized; success in meeting budget projections and milestones; the effectiveness of decision-making in managing and redirecting projects; success in identifying and in avoiding or overcoming technical problems; the effectiveness with which technical results are communicated to maximize the value of the research results and to gain appropriate recognition for DOE and the Laboratory; effectiveness in developing, managing, and

transferring to industry intellectual property and technical know-how associated with research discoveries; and the degree to which customer and stakeholder expectations are consistently met.