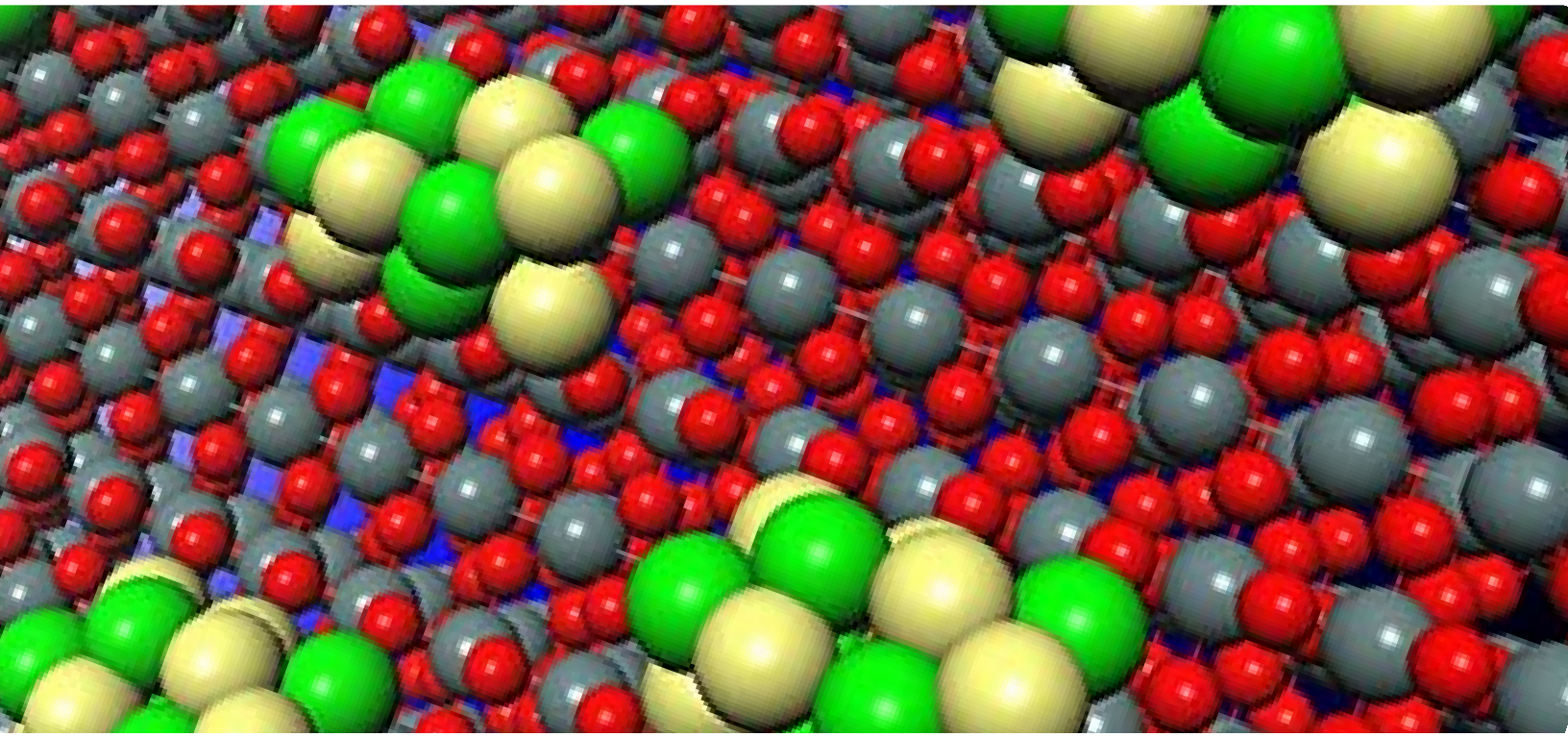


Light Sources Directorate Strategic Plan

December 2009

U.S. DEPARTMENT OF ENERGY | Office of Science

BROOKHAVEN NATIONAL LABORATORY

Light Sources Directorate Strategic Plan

December 2009

The VISION of the Light Sources Directorate is:

to be a provider of choice for world-class photon science and facilities that deliver outstanding scientific productivity and impact, and to be recognized as a leader in developing innovative techniques and applications of photon science

Our MISSION is defined by the set of activities that are required to realize this vision:

to advance scientific knowledge and to solve critical problems through the design, construction, operation, and use of premier photon science facilities

ALS Advanced Light Source
APS Advanced Photon Source

BAT Beamline Advisory Team
BER Biological and Environmental Research
BES Basic Energy Sciences
BHSO Brookhaven Site Office
BNL Brookhaven National Laboratory

CFN Center for Functional Nanomaterials

DOE U.S. Department of Energy

ES&H Environment, Safety, and Health
ESS&H Environment, Safety, Security and Health

F&O Facilities and Operations
FTE full-time equivalent
FY fiscal year

HPI Human Performance Improvement

IR infrared
ISM Integrated Safety Management

JPSI Joint Photon Sciences Institute

LOB Laboratory Office Building

M million
meV milli-electron volt
MIE Major Item of Equipment

NIH National Institutes of Health
nm nanometer
NPP Nuclear and Particle Physics
NSLS National Synchrotron Light Source
NSLS-II National Synchrotron Light Source II
NYB New York Blue

QCD quantum chromodynamics

R2A2 roles, responsibilities, authorities, and accountabilities
R&D research and development
RPV replacement plant value

SC Office of Science
SFP Scientific Facilities Plan
SFA Strategic Focus Area
SSRL Stanford Synchrotron Radiation Laboratory

WFP workforce planning
WO work observation

1. INTRODUCTION

1.1 Overview

This Strategic Plan for the Light Sources Directorate at Brookhaven National Laboratory (BNL) describes the path that we will pursue over the next decade to achieve our vision of being a provider of choice for world-class photon science and facilities. This document also serves as the primary guiding basis for other planning activities, such as the Directorate Scientific Facilities Plan, the Directorate Infrastructure Management Plan, the Annual Directorate Business Plan, and other planning documents.

Many of the goals, objectives, and strategies described here have guided the Light Sources Directorate for some time, while others are new. This is the first time these are all being assembled together in a single document. It is a living document, evolving over time, and will be updated and revised annually to reflect changing plans and events.

Steve Dierker
Associate Laboratory Director for Light Sources

The Light Sources Directorate is the focus for BNL's activities in photon sciences. We are a large, multifaceted, multidisciplinary, mission-oriented organization employing hundreds of research professionals and commensurate numbers of support staff. Our work spans a broad range of activities from fundamental science to technology development. We employ project management practices to conduct a diverse portfolio of activities for multiple sponsors. We operate a large physical plant that includes complex accelerator systems and experimental facilities that present unique challenges and hazards. We have strong research programs and connections to the research community, maintaining extensive research collaborations, providing extensive training and workshop programs, and hosting thousands of national and international users of our facilities.

This is currently a very exciting period for photon sciences at BNL. The NSLS-II Project has progressed rapidly and smoothly through the various stages of design, and construction has now begun, driven by our goal of being

the brightest synchrotron light source in the world. At the same time, the NSLS facility continues a nearly three-decade-long tradition of outstanding service to a substantial and productive user community. The broad range of capabilities supported by NSLS sustains a rich variety of scientific programs, and the new capabilities enabled by NSLS-II promise even greater scientific discoveries and impact.

This is a time of unprecedented growth for the Directorate. Comparing the periods before the start, and after the completion, of the NSLS-II Project:

- Total annual funding is expected to increase by a factor of five, from $40M/yr to $200M/yr
- Directorate staff is expected to increase by a factor of three, from 175 to more than 500
- The size of the Directorate facilities is expected to increase by a factor of four, from 195,000 square feet to 812,000 square feet
- Number of users is expected to increase by 50%, from 2200/year to 3500/year
- X-ray brightness at NSLS-II will increase by nearly a factor of 10,000 compared to the brightness of the insertion devices at NSLS, and by nearly a factor of 10,000,000 compared to the brightness of the bending magnet sources that most NSLS users use

There is no shortage of work to be done. However, given the scale of these changes, it is clear that the nature of our work will change over time as the projects in our portfolio progress through their natural life cycles. We must be nimble and adaptive at all levels, from the individual level to the organizational level. Managing our resources to efficiently and effectively address this changing workload presents a number of complex challenges and opportunities. Overcoming these challenges and capitalizing on these opportunities requires careful planning and coordination with a Directorate-wide focus on achieving our objectives.

1.1 Overarching Goals

Our overarching goals in order to achieve our vision of being a provider of choice for world-class photon science and facilities are:

1. Deliver **science and technology** of the highest possible strategic value to our sponsors through high-quality, timely results that address their most critical challenges
2. Develop the **leading-edge capabilities** necessary to meet the current and future needs of our sponsors
3. Provide the maximum **return on investment** through effective management of our resources while meeting all environmental, safety, and other requirements
4. Have an outstanding **reputation** with our sponsors and our stakeholders, including the research community, the Laboratory, and the public

1.2 Critical Outcomes

The most strategically important objectives, or critical outcomes, for us to achieve in the coming years in support of these goals are:

1. Effective and efficient operation of the NSLS facility
2. On-time, on-budget delivery of the NSLS-II facility
3. A compelling and productive scientific program and the most powerful suite of scientific facilities possible at NSLS and NSLS-II

1.3 Fundamental Strategy

Our **fundamental strategy** to achieve these critical outcomes is to enhance our effectiveness through **integrated planning**. We must efficiently direct our efforts to meet our sponsor's most critical needs, while at the same time building capabilities to meet their future requirements. These often-competing demands are inevitably confounded by resource constraints and pose both strategic and tactical challenges. These challenges make effective planning at both the strategic and tactical levels essential.

We employ an integrated, strategy-driven approach to planning, budgeting, tracking results, and managing performance that is designed to produce three specific outcomes:

1. A compelling vision and clear strategic agenda that are strongly aligned with the current and likely future mission needs of our sponsors and that are understood and "owned" by our staff
2. Business plans and budgets that translate strategy into implementation, containing specific actions and expected outcomes for all major elements of our strategy
3. An effective performance management process that provides credible performance evaluation and ensures organizational and individual accountability

It is through our integrated planning process that we define the outcomes we seek, assign responsibility for the actions required to deliver those outcomes, allocate resources for their accomplishment, and establish individual accountability for the results. By achieving these

outcomes, we will achieve explicit connections from strategy to implementing actions to individual goals, improved consistency in planning, improved efficiency, and improved decision making, and we will be recognized by our stakeholders for our ability to address and solve their most strategic and critical challenges.

1.4 Strategic Focus Area Framework

A Strategic Focus Area (SFA) framework was adopted in preparing this plan. The SFAs provide the basis for planning and monitoring directorate performance and facilitate decisions on allocating resources. The SFAs are:

- Advancing the Frontiers of Science and Technology
- Attracting and Sustaining Top Talent
- Modernizing the Infrastructure
- Operational Excellence
- Achieving Excellence in ESS&H
- Fostering Stakeholder Relations

These are the same SFAs used by BNL in overall Laboratory strategic planning. Following the same approach helps to ensure alignment of this Directorate Strategic Plan with that of the Laboratory as a whole.

The SFA "Advancing the Frontiers of Science and Technology" succinctly describes the Directorate's high-level scientific goals and objectives, based on its vision and mission, the prevailing business climate, emerging scientific opportunities, and the challenges that must be overcome to ensure success. Based on this, our plans for maintaining, upgrading, and developing new scientific facilities will be described separately in the Directorate Scientific Facilities Plan.

The other five SFAs are vital for building, operating, managing, and staffing the Directorate to accomplish its scientific mission. They are precisely the elements of outstanding performance and being vital to various local, national, and international communities that are articulated in our vision and that sustain the vitality of the Directorate. Accordingly, this plan addresses human resources, infrastructure, operations, ESSH, and stakeholder relations.

For each SFA, we give an introduction that summarizes the background and context, our assessment of these, and the beliefs that our goals are based on. Then we list our high-level goals, describe the objectives that we will pursue to realize these goals together with key measures that will allow us to evaluate our performance toward achieving our objectives, and describe the strategies that we will follow to achieve our objectives. Our goals state the purpose, or intent, of our actions; our objectives state the outcomes we strive to achieve; and our strategies describe the approaches we will take. Put more simply, our goals, objectives, and strategies are the why, what, and how behind our efforts.

1.5 Strategic Agenda

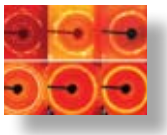
Taken together, our overarching goals, critical outcomes, and the six SFAs define our "strategic agenda." The implementation of this agenda will be described in our Annual Directorate Business Plan, the Directorate Scientific Facilities Plan, the Directorate Infrastructure Management Plan, the Directorate Communications Plan, and other planning documents. For example, the Annual Directorate Business Plan will define near-term, fully-resourced timelines and tactical targets for these strategic objectives, balanced with targets to sustain on-going performance levels. Organizational- and individual-level goals will be aligned with this plan through organizational plans, and individual R2A2s and performance goals. Our year-round planning and assurance activities provide a framework for continuously monitoring, analyzing, and managing performance against these plans at directorate, organizational, and individua levels, and for adjusting our plans according to new opportunities and risks as they develop.

As noted earlier, planning is a continuous process. Sponsors are engaged, business projections are updated, and performance is tracked throughout the year. Plans and budgets may need to be adjusted at any time in response to any of a wide variety of scientific, technological, or business events. Our planning process provides regular opportunities to revisit issues as required on the basis of current events, and we maintain the flexibility to respond on an ad hoc basis when necessary.

Finally, critical to our executing this plan is the dialogue that we must have with and among all key stakeholders, including the other parts of BNL; Brookhaven Science Associates (BSA); the Department of Energy, including the Brookhaven Site Office (BHSO) and the Office of Science and its program offices; other DOE laboratories; other sponsors; our user communities; state and local communities; and elected officials. We must all share in a common vision in order to be successful. This Strategic Plan will be instrumental in communicating the steps that we will take, working with all of our stakeholders, to achieve that shared vision.

2. PHILOSOPHY AND VALUES

Our philosophy and values encompass our immutable core beliefs. Our plans and actions are guided by a fundamental adherence to a set of seven core values:

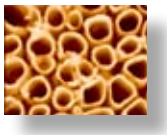


2.1 Integrity

- Demonstrating honesty and sincerity and being open and transparent
- Upholding the highest ethical principles and standards

2.2 Excellence

- Being accountable for our actions and delivering in an outstanding manner
- Taking initiative and striving for continuous improvement based on critical self-assessment



2.3 Innovation

- Pioneering new directions and achieving revolutionary breakthroughs
- Creativity focused on identifying and being open to novel solutions

2.4 Leadership

- Developing a vision, strategies to achieve it, aligning people, and translating it into action
- Communicating in words and deeds to motivate and inspire others

2.5 Teamwork

- Working cooperatively and supportively to achieve common goals

2.6 Respect

- Showing consideration and regard for the individuals and institutions we live and work with
- Judging people on their merits and being accepting and appreciative of their differences

2.7 Safety and Environmental Stewardship

- Ensuring the health and welfare of all of our staff and users
- Protecting and sustaining our environment

Our management approach is designed to translate our philosophy and values into action. By adherence to these, we seek to establish a culture that blends:

- a passion for discovery and innovation
- a powerful "on-time, on-budget, as promised" work ethic
- excellence in health, safety, environment, and security operations
- a belief that our efforts to advance science and technology benefit humanity

To the maximum extent practical, we operate open decision processes based on facts and data, and we encourage open, frank debate on substantial issues. We provide and regularly reinforce clear guidance on our expectations in such areas as business ethics, conflict of interest, and professional and personal integrity; recognize and reward exemplary behavior; and foster continuous improvement by responding vigorously and constructively to shortcomings in these areas. We value and safeguard the health and well-being of all our staff, users, guests, and the public.

We strive for all individuals participating in any activity to have a clear understanding of the desired outcome. We work to empower all staff with the appropriate authority and freedom of action to meet their responsibilities, we hold them accountable for results, and we reward them accordingly. We push responsibility and accountability for outcomes to the lowest appropriate level in the organization, and we assign the authority and allocate the resources necessary to deliver those outcomes to the responsible individuals.

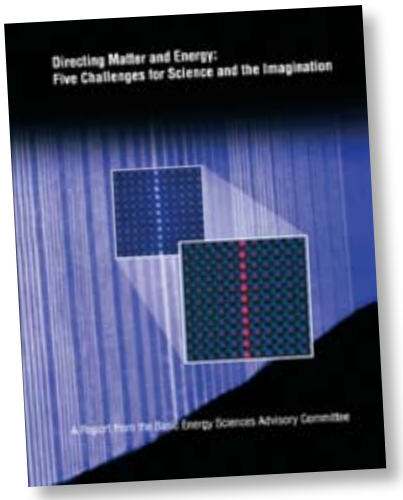
We expect all staff to adhere to the highest professional and ethical standards and demonstrate integrity in both their work and their individual behavior, to exemplify outstanding leadership, to take ownership for their own work and to work effectively with others, and to treat their colleagues with courtesy and respect. We expect managers to set an example for staff by modeling our standards of professionalism and personal conduct and to respond positively when staff raises concerns and issues.

The expected outcomes from following this philosophy and these values include: a reputation for objectivity, fairness, and trustworthiness; improved decision making through frank and open debate; highly motivated and successful staff; and attraction and retention of outstanding people.

3. ADVANCING THE FRONTIERS OF SCIENCE & TECHNOLOGY

3.1 Overview

We are at the beginning of a new era of science where we need to progress from observation and understanding to new discoveries that allow us to control both physical, electronic, and magnetic structure, thereby yielding new knowledge that can contribute to technology breakthroughs. In recent years, a series of workshops and reports have identified a set of "grand challenges" that must be addressed in order to make progress towards this goal. These grand-challenge questions illustrate where our photon science programs can have the greatest impact and guide our experimental facilities program in providing the necessary tools. The following is a list of grand challenges in science based on three recent such reports:



Department of Energy Report (2007):
"Directing Matter and Energy: Five Challenges for Science and the Imagination"

- How do we control materials and processes at the level of electrons?
- How do we design and perfect atom- and energy-efficient synthesis of new forms of matter with tailored properties?
- How do remarkable properties of matter emerge from complex correlations of atomic and electronic constituents and how can we control these properties?
- Can we master energy and information on the nanoscale to create new technologies with capabilities rivaling those of living systems?
- How do we characterize and control matter away—especially very far away—from equilibrium?

National Academies of Science Report (2007):
"Condensed-Matter and Materials Physics: The Science of the World Around Us"

- How do complex phenomena emerge from simple ingredients?
- How will the energy demands of future generations be met?
- What is the physics of life?

- What happens far from equilibrium and why?
- What new discoveries await us in the nanoworld?
- How will the information technology revolution be extended?

Grand Challenges in Biology, in *Molecular Plant* (July 2008) – Perspective: *"2020 Vision for Biology - The Role of Plants in Addressing Grand Challenges in Biology"*

- How do cells work and how do they interface with the environment?
- How do single cells develop into multi-cellular organisms?
- How do genomes generate organismal robustness and diversity?
- What is the molecular basis of evolution?
- How are biological systems integrated from molecules to ecosystems?
- How can the environment be made sustainable for future generations?

Among many other pressing societal problems, a consensus has emerged that the most critical global challenges of this century are energy and climate. Addressing grand challenge questions such as those listed above will lead to the breakthroughs necessary to address the energy and climate problems. The dual challenges posed by the world's increasing energy appetite in the face of our finite non-renewable energy resources and the potentially devastating consequences of global climate change combine to make the need for progress especially urgent. In the DOE Basic Energy Sciences research portfolio, energy research has long been a core mission and is now the highest national priority in science and technology.

The importance of science and technology in society can be expected to increase even more as the world's natural resources decline. New industries need to be developed, such as those based on environmentally friendly, fossil-fuel-based power generation or on renewable energy technologies, such as solar. As a result, science and technology is playing an increasing role in policy making. This means we have a responsibility to provide tools and support for both basic and applied research that addresses national needs. We must also actively and widely disseminate the results

of that research to the public and policy makers as well as to the scientific community. Going further, we have an obligation to provide leadership in helping to define the future funding initiatives to address national needs. This places a premium on our ability to effectively engage all of our stakeholders and communicate our plans and results in order to hasten scientific discovery and to inform public policy discussions.

The capabilities and programs of the Directorate must respond to current, and anticipate future, national priorities and user interests. Accordingly, in addition to other important scientific and community objectives, we must ensure that our present and future programs address the fundamental scientific and technological questions that will enable major advances in energy technology. In particular, this requires scientific breakthroughs in developing new materials with advanced properties. Achieving this requires new tools for characterizing the structure and properties of materials with nanoscale resolution. We believe it is necessary to invest in high-risk science and technology that has the potential to be transformative. The goals of NSLS-II are in keeping with this, aiming to fill the current capability gap by enabling the study of materials at a level of detail and precision never before possible.

In addition to being well-aligned with national priorities, the activities of the Light Sources Directorate are also well-aligned with BNL priorities. BNL's major activities for the coming decade will focus on two principal missions: the application of photon sciences and nanomaterials research to energy sciences, and the advancement of fundamental research in nuclear and particle physics to gain a deeper understanding of matter, energy, space, and time. A third mission area, which involves drawing together components of BNL's life and environmental sciences programs to focus on global climate solutions, is just beginning.

The five major activities that will extend and evolve BNL's current core capabilities to support the DOE Strategic Themes in Energy Security, Nuclear Security, Scientific Discovery and Innovation, and Environmental Responsibility and build on core strengths and capabilities of the Laboratory, are shown in Figure 1. These are areas in which BNL will

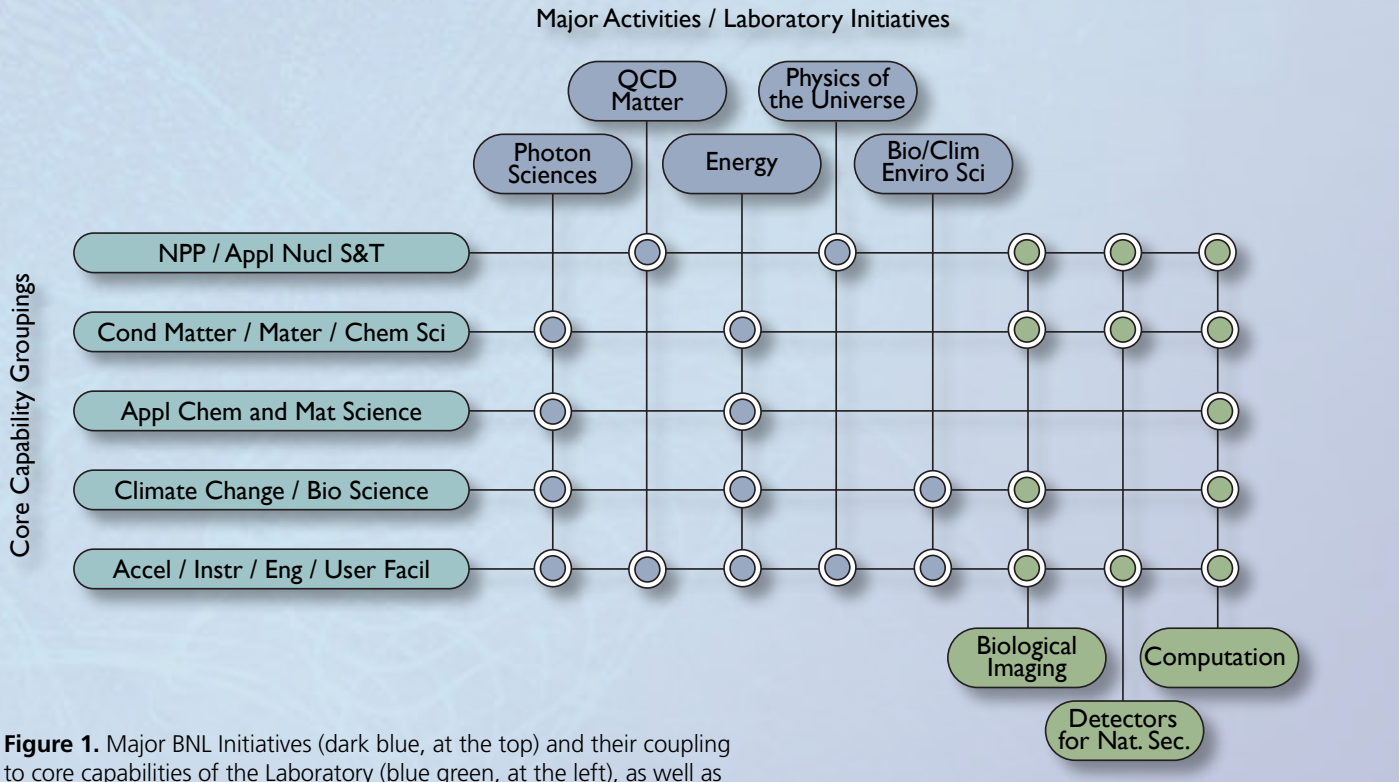


Figure 1. Major BNL Initiatives (dark blue, at the top) and their coupling to core capabilities of the Laboratory (blue green, at the left), as well as related opportunities (dark green, bottom right).

distinguish itself by offering new capabilities. The activities of the Light Sources Directorate are the focus for BNL's initiative in photon sciences. As the top priority of the Laboratory, we benefit from strong support. At the same time, the expectations for exceptional performance are very high and underscore our responsibility to be as productive as possible and to make the best use of available resources.
BNL's leadership in photon sciences amplifies the impact of BNL programs in nanoscience, energy science and technology, and life science. Together with the newly completed Center for Functional Nanomaterials (CFN), NSLS-II will transform Brookhaven's research in energy sciences. For example, the design of nanomaterials fabricated at the CFN will be refined by the advanced characterization carried out at NSLS-II. The programs of the Joint Photon Sciences Institute (JPSI) will supplement those of NSLS and NSLS-II. BNL's core competency in high-performance scientific computing, centered around New York Blue (NYB) will provide the expertise to develop sophisticated data analysis, mining, and visualization software, and the infrastructure to handle the multi-terabyte data sets expected from nanobeam imaging experiments. NSLS today, and in the future NSLS-II, together with CFN, JPSI, and NYB, form an outstanding set of complementary tools that distinguish BNL's capabilities from other laboratories.

The activities of the Light Sources Directorate must also be viewed in the context of the world-wide synchrotron community. Countries have been motivated to invest in synchrotrons because of the clear and direct link between the research carried out at them and growth of the science- and technology-based industries that increasingly fuel the world's economy. As a result, there has been an explosion in the number of synchrotrons, with about thirty facilities in operation world-wide. Many facilities are in the process of being upgraded and new facilities are under construction. This has resulted in increasing competition for both users and the highly qualified staff to develop and operate the facilities. These facilities have a range of capabilities that can support a very large and diverse set of scientific applications, and they often tailor their programs to emphasize service to their regional sponsors and users. This creates opportunities for cross-fertilization between facilities by scientific exchange, collaboration, and other means, and it benefits our programs to be a vigorous participant in the world-wide synchrotron community.

The NSLS facility has served the user community since it began operations 27 years ago, in 1982. In its first decade of operation, NSLS saw strong growth in the number of users as beamlines were built and brought into service. By the early 1990s, the NSLS was fully built out, with about 75 beamlines. Since then, the number of users of NSLS has been relatively constant. Some of the less productive beamlines have been taken out of service to maximize the resources available for the more productive beamlines. Today, there are 64 operating beamlines at NSLS.

NSLS continues to be one of the most productive user facilities in the world, serving a large and diverse scientific user community numbering about 2,200 users/year from 400 academic, industrial, and government institutions. About 1,000 papers are published annually based on research performed at NSLS. An important laboratory, national, and international research resource, NSLS plays a particularly critical role for the research community in the Northeastern United States.

Over the years, the performance of NSLS has been steadily upgraded, ultimately achieving an increase in brightness of some five orders of magnitude, and it is now at the limits of its performance. Nonetheless, the capabilities of NSLS have been far surpassed by other synchrotrons and its restricted capabilities limit the productivity of its user community. A dramatic improvement in BNL's photon science capabilities is needed in order for the scientific productivity of the large and distinguished Northeast research community to continue and increase, to tackle the "grand challenge" questions, and to address the critical societal problems of energy and climate change.

The discovery potential of photon sciences at BNL will be greatly expanded by replacing NSLS with NSLS-II. NSLS-II will be a highly optimized synchrotron that will provide world-leading brightness and flux and very small beams, over a very broad energy range, extending from the far IR to the very hard x-ray region. When fully built out, NSLS-II will be able to accommodate more than 58 beamlines for scientific programs, with additional beamlines possible through canted insertion devices and multiple branches. NSLS-II will be 10,000 times brighter than the brightest sources at NSLS and 10,000,000 times brighter than the bending magnet sources at NSLS that serve most users. NSLS-II will provide a world-leading research user facility to advance fundamental science. Its scientific focus is in line with national research needs and priorities, and it will be available to researchers from BNL, universities, industries, and other laboratories, both from the U.S. and from foreign countries.

The combination of brightness, flux, and stability of NSLS-II will provide the world's finest capabilities for x-ray imaging, spectroscopy, and scattering. NSLS-II will enable the study of materials with 1 nanometer (nm) spatial resolution and with 0.1 milli-electron volt (meV) energy resolution, and it will be possible to perform spectroscopy on a single nanoparticle. If there is any doubt that this is needed for our future energy security, one only need remember that all the elementary steps of energy conversion (charge transfer, molecular rearrangement, and chemical reactions), both for fossil fuels and for critical renewable energy sources, take place on the nanoscale, and many of these steps involve a combination of complex physical, chemical, and often biological transformations.

The unique characteristics of NSLS-II will advance many fields, but will be especially important for enabling exploration of the scientific challenges faced in developing new materials with advanced properties. These challenges include:

- exploring the correlation between nanoscale structure and function— investigating the profound effects of . confinement, finite size, and proximity;
- the mechanisms of molecular self-assembly, which produces exquisite molecular structures in both the living and materials worlds; and
- the science of emergent behavior, one of the grand scientific challenges.

The nation's science community will have access to a world-leading research facility and U.S. industry will gain a competitive advantage for the development of new materials and technologies.

The user communities served by the facilities of the Light Sources Directorate will continue to evolve as the scientific interests of those communities evolve and as the vastly superior capabilities of NSLS-II come online. The scientific user community of the future is also expected to be substantially larger, numbering about 3500 users/yr. Although the future user community will differ in important ways from the present one, it is nevertheless instructive to consider the demographics of the current user community as one indicator of the future.

2009 Nobel Prize in Chemistry, NLSL users' Venkatraman Ramakrishnan, formerly with BNL's Biology Department, and Thomas Steitz, Yale University

2003 Nobel Prize in Chemistry, NSLS user Roderick MacKinnon, Rockefeller University

The present user community consists of researchers from about 400 different institutions, including about 65 companies. It is largely academic, with 2 out of 3 (69%) coming from academia, 1 in 10 (10%) from BNL, and 1 in 16 (6%) from industry, with the remaining 15% having various other affiliations. Of the 10% of users from BNL, 3% are Light Sources Directorate scientists and the remaining 7% are from other BNL organizations, such as the Condensed Matter Physics and Materials Science Department, the Chemistry Department, and the Biology Department. About one-third (36%) of the users are in the life sciences, one-third (32%) are in materials and chemical sciences, one-eighth (12%) are in applied science and engineering, one-tenth (10%) in geosciences and ecology, and one-tenth (10%) in other fields.

The present user community is an international one, with 1 in 7 users (14%) coming from overseas. It also has a strong regional character, with 2 out of 3 (69%) of the users affiliated with institutions in the Northeast U.S. and 1 out of 3 (35%) coming from New York alone. A similar regional character exists for each of the other three DOE synchrotron facilities. Almost all users from California use either ALS or SSRL and users from California constitute the largest fraction of ALS and SSRL users. Similarly, almost all users from Illinois use the APS and users from Illinois constitute the largest fraction of APS users.

We will work with the world-wide research community, but especially the large Northeast community, to encourage even greater usage of synchrotron radiation. At NSLS, approximately one third of the users are new to the facility every year. In the future, we expect that an even larger number of users will be experts in their area of science but not experts in the techniques of synchrotron radiation. A greater number of facility scientific staff will be necessary to provide the higher level of support required by these users.

The pace of technological development is increasingly rapid, becoming more capable, faster, and cheaper. New control systems, advanced detectors, robotics, automation, and other technological developments can dramatically increase the scientific productivity of a facility. This increases the return on the investment in building and operating the facility. Therefore, we must continually strive to update our facilities to remain at the cutting edge and to achieve maximum productivity.

Continuous improvement of the scientific facilities of the Light Sources Directorate, including the accelerator complexes, the experimental beamlines, and related instrumentation (including detectors) is necessary in order to provide notably enhanced scientific capability and to maximize scientific output in a cost-effective way. Notable trends in the synchrotron community include increasing demand for high throughput measurements, increasing demand for remote access, and increasing need for applied and industrial research and experimental data in functional environments under real-world conditions. It is challenging to find the optimum mix of priorities and effort to support our long-term development needs while still meeting the needs of our on-going scientific programs. The construction of a new accelerator facility, transitioning from NSLS to NSLS-II, and the continuing development, installation, and testing of the new and upgraded beamlines and instruments could adversely affect the quality and continuity of our excellent user service and therefore impact scientific output. Thorough planning and careful execution are required in order to ensure uninterrupted operations and maximum scientific output.

Our circumstances offer many opportunities. We are fortunate that the growth of the Light Sources Directorate programs is occurring during a period of growing federal investment in science, presenting new opportunities for increased support. The unprecedented brightness of NSLS-II allows the development of new experimental techniques with enhanced capabilities. The tools to enable many of these new capabilities, such as advanced optics and new insertion devices, are being developed as part of the NSLS-II project. The existing NSLS facility offers a cost effective and convenient means of exploring and testing some of these tools.

Some examples of risks we face in achieving our goals include inadequate funding, targeting the wrong performance envelope for facility operations, and misalignment of scientific priorities from those of our stakeholders. We plan to mitigate these potential risks by developing a diversified portfolio of funding sources, by developing a strong scientific facilities plan, and by involving our stakeholders in development of our plans.

3.2 Goals

Our goals in this SFA are the following:

3.2.1 Meet the photon science needs of our sponsors and users by providing world-leading facilities and expertise

3.2.2 Benefit society by contributing to the solution of critical science and technology challenges through the development and application of photon sciences

3.3 Objectives

The key objectives, or outcomes, that we wish to achieve in pursuit of our goals, and their associated key measures, are the following:

Objectives	Key Measures
3.3.1 Successfully complete the NSLS-II Project	• Cost and schedule performance • Delivery of key performance parameters • Peer assessments
3.3.2 Effectively operate NSLS and NSLS-II	• Reliability metrics • Cost metrics • Customer feedback • Peer assessments
3.3.3 Maximize scientific usage, productivity, and impact of NSLS and NSLS-II	• Number of users, experiments, publications • High-impact publications and invited presentations • Number of operational beamlines • Accelerator and photon beam parameters • Recognition through prizes and awards • Peer assessments • User satisfaction
3.3.4 Deliver new technologies to user community to enhance their capabilities	• Comparison to existing technologies • Components placed in scientific use • User satisfaction • Peer assessments • Patents
3.3.5 Deliver high-impact research results in select scientific focus areas	• Sponsor satisfaction • Publications and invited talks • Recognition through prizes and awards • Peer assessments

3.4 Strategies

Our key strategies for achieving these outcomes are the following:

3.4.1 Coordinate Plans for the Evolution of the Scientific Facilities of NSLS and NSLS-II

This strategy seeks to coordinate the evolution of the experimental facilities at NSLS and NSLS-II. Through such coordinated planning we seek to provide the greatest continuity of service to the user community and minimize disruption due to the transition from NSLS to NSLS-II. Additional benefits include optimizing the allocation of finite resources such as photon sources and experimental floor space, prioritizing among competing demands, optimizing the physical placement of beamlines to create "science villages," and taking advantage of synergies in techniques and beamlines across communities. Our plans will be documented in a Scientific Facilities Plan, which will also incor-

porate extensive input from the scientific community. It will be a living document that will be revised as needed.

The expected outcomes from this strategy include achieving maximum, continuous, and sustained scientific productivity in the areas of greatest scientific impact in the most cost effective way.

3.4.2 NSLS-II Beamline Acquisition

This strategy seeks to acquire the best and most complete possible set of beamlines at NSLS-II at the earliest possible date through a four part approach: (1) complete the design and construction of the six project beamlines, (2) design and construct additional NSLS-II beamlines to serve DOE-BES mission needs using funding provided by DOE-BES, (3) design and construct additional NSLS-II beamlines to serve the needs of other sponsors using funding provided by these sponsors (e.g., NIH, DOE-BER, NSF, and others), and (4) transfer selected beamlines and instruments from NSLS for re-use at NSLS-II using funding provided by DOE-BES. In all cases, beamlines to be built will be selected based on evaluation of proposals submitted to the Light Sources Directorate after peer review and review by our advisory committees.

The expected outcome from this strategy is the delivery of increased experimental capability at NSLS-II at the earliest possible date and in the most cost effective way.

3.4.3 Engage Scientific Community via Beamline Advisory Teams (BATs)

This strategy seeks to ensure the engagement of the scientific community in the development of experimental facilities and to encourage novel ideas through the concept of Beamline Advisory Teams (BATs). A BAT is a group of scientists representing a particular community who work closely with directorate staff to develop the scientific mission and the technical requirements for a specific beamline. They meet biannually and actively advise management and staff during beamline design, construction, and commissioning.
The expected outcomes from this strategy include the development of compelling scientific programs and innovative, state-of-the-art facilities to support them.

3.4.4 Enhance the User Program at NSLS and NSLS-II

This strategy seeks to increase the quality, quantity, and impact of user science by fostering and supporting a world-class user science program. We seek to provide the strongest possible support for carrying out user science experiments by providing: sufficient beamline staffing; a comprehensive suite of sample preparation, characterization, and environment equipment; a comprehensive suite of detectors; and a comprehensive and powerful suite of data acquisition and analysis hardware and software tools. We seek to maintain substantive, mutually beneficial relationships with the scientific community and to coordinate our programs with other programs that use synchrotron radiation. We seek to ensure that beamline and research opportunities are communicated effectively and attract external researchers in diverse scientific areas. We seek to cultivate new user communities through education and training programs and to provide an environment that encourages the growth of under-served areas, such as industrial research. Specific tools to implement this strategy include encouraging, supporting, recognizing, and rewarding staff accomplishments in delivering and supporting science-capable beamlines, in contributing to developing science programs, and in engaging with the user community via outreach efforts and productive collaborations.

The expected outcomes are expanded usage, greater scientific impact and productivity, and increased stakeholder support.

3.4.5 Establish an Environment of Innovation and Interdisciplinary Teamwork

We seek to establish an environment that supports innovation and interdisciplinary teamwork in the development of high-value science and technology in the areas for which we are supported. Many of the most exciting areas of science are intrinsically interdisciplinary. The rate of scientific advancement and technological progress is accelerating, and science has become increasingly complex. Major R&D challenges are often of a scale that exceeds the capacity of individuals or small groups. Larger interdisciplinary teams can be required for success. We seek to establish an

NSLS users' meeting, 2008

environment of innovation that facilitates formation of interdisciplinary teams to maximize our scientific productivity, benefit our sponsors, provide rewards to our staff, enhance our reputation as a cutting-edge research institution, and increase our attractiveness as an employer preferred by top talent in the scientific community. Such an environment is central to the sustained delivery of high quality science. We emphasize the importance of innovative research as a fundamental expectation of our scientific staff, provide them the time and resources to carry out R&D to the maximum extent possible, and emphasize R&D in our recognition and rewards programs.

The outcomes expected from this strategy include firmly establishing a culture of innovative and entrepreneurial research and development that increases mission impact.

3.4.6 Establish and Enhance Programs in Select Areas of Science

This strategy seeks to establish and enhance, within the Light Sources Directorate, leadership, expertise, critical mass, and distinctive programs in select scientific focus areas where we can be world-leading. We seek to maintain a flexible approach that can respond to emerging needs and opportunities. Emphasis will be given to efforts that have the potential to achieve some or all of the following objectives: develop seminal research results and/or methods that exploit our unique capabilities; transform existing science and applications and extend them into new fields of discovery; develop strategic alliances with external organizations to build new research partnerships. We strive to achieve this by assembling teams of researchers and properly supporting them to achieve research outcomes that have high impact and are valued by our sponsors.

The expected outcome is to establish and sustain strong scientific programs that are productive, world-leading, and have high impact.

3.4.7 Establish and Enhance Core Capabilities in Select Areas of Technology

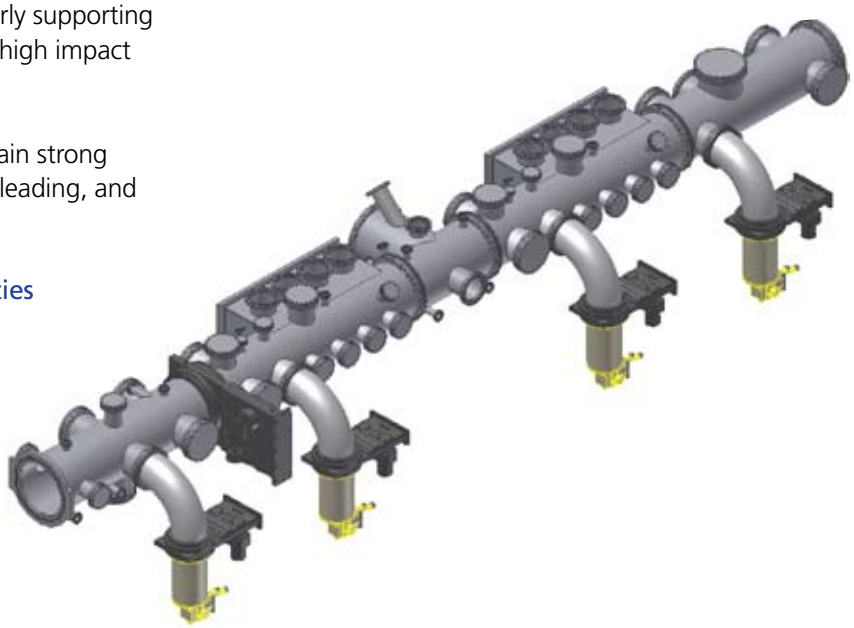
This strategy seeks to establish and enhance the expertise and supporting facilities to develop novel technologies in critical areas that can have the maximum impact on enhancing the scientific productivity of our programs. Example areas include accelerators, insertion devices, experimental methodology, beamlines, optics, detectors, robotics, and scientific computing.

The expected outcomes are to increase scientific productivity and impact, to make more efficient use of beam time, and to enable more challenging experiments to be performed.

3.4.8 Increase the Synergy and Impact of Photon Sciences on BNL Scientific Programs

In this strategy, we seek to increase the synergy and impact of photon sciences at BNL by encouraging research collaborations that combine the scientific expertise and technical capabilities from multiple organizations at BNL. We will participate in and/or drive BNL initiatives for internal or external collaborations and funding solicitations where Light Sources Directorate science capabilities add a unique competitive edge and strengthen core research programs, provide unique opportunities to win and lead new programs at BNL, or attract external user teams to partner strategically across BNL. Specific tools to implement this strategy include: encouraging, rewarding, and promoting Light Sources Directorate staff participation in, and leadership of, Lab-wide research teams; encouraging, rewarding, and promoting collaborative, interdisciplinary science; and building and rewarding team culture and philosophy.

The expected outcomes of this strategy are increased utilization of NSLS and NSLS-II, added value to core-funded programs at BNL, and creation of new opportunities for partnership and investment.



4. ATTRACTING AND SUSTAINING TOP TALENT

4.1 Overview

To become a provider of choice for world-class photon science, the Light Sources Directorate must have programs and processes that enable us to recruit the best talent for the entire spectrum of our activities, to retain our existing experienced and dedicated staff, and to motivate and enable staff to achieve at the highest possible level. Forecasting the needs of future directorate activities and preparing employees for positions of greater or different responsibilities is essential. Our programs and processes must also reinforce our values and instill a culture consistent with those values.

At present, the Light Sources Directorate has two major activities – operation of NSLS and construction of NSLS-II. In the coming years, the scope of activities will continue to increase, as anticipated new funding is received for construction of additional beamlines, for transfer of beamlines from NSLS to NSLS-II, for operations of NSLS-II, for decommissioning the accelerators of NSLS, and other projects and programs. This is a very dynamic environment, with significant projects and programs ramping up, others concluding, and still others continuing indefinitely. It is essential that both the workforce and the specific work assignments of people in that workforce change over time to meet the changing demands of these various projects and programs. The workforce and the way it is organized must easily adapt to the different requirements for these evolving endeavors.

Career Open House, March 2008

At present, a staff of 145 FTEs (full-time equivalents) is engaged in operating the NSLS facility, consisting of 17% scientists, 12% engineers, 40% technicians/designers, and 31% other staff. An additional 21 FTEs support various other R&D activities, including the NSLS-II project, LDRD, the Source Development Lab, and other funded work. At present, about 180 FTEs are engaged in the design and construction of NSLS-II. They are made up of 22% scientists, 25% engineers, 20% technicians/designers, and 33% other staff. A peak workforce of over 250 FTEs is expected to be required for NSLS-II-related work in the coming years. Development of additional beamlines for NSLS-II (beyond those in the base project scope), transferring beamlines from NSLS to NSLS-II, and decommissioning of the NSLS accelerators will each require substantial numbers of staff.

At full operations, it is expected that about 500 staff will be required to operate NSLS-II.

We need to provide staff for a dynamic mix of complex tasks, many of which are interdependent and have significant overlap in staffing requirements. It is clearly not sufficient to consider workforce planning for one activity, such as operation of NSLS, in isolation of the needs of another activity, such as construction of NSLS-II or any of the other substantial activities indicated above that are expected to commence in the coming years. We need a coherent and unified approach to workforce planning to efficiently and effectively service all of the needs of the Directorate. We must also create an environment that offers clear career paths for our staff and provides opportunities for them to grow and develop to their fullest potential. We cannot let organizational "stovepipes" interfere with this.

In the global, highly competitive R&D climate, recruiting and retaining high-quality staff depends on several factors, including the vitality of key scientific and technical programs, our support for new ideas and research directions, and a safe and modern research infrastructure. Accordingly, attracting and sustaining top talent hinges upon our ability to execute the objectives of all of the SFAs that are part of this strategic plan.

We face a number of challenges in achieving our goals in this SFA. The rapid pace of change in the Directorate and the sheer scope of our ambitious agenda results in staff anxiety. Staff members are working very hard and in some cases are overcommitted. Like employers everywhere, we struggle with the difficult task of recruiting and retaining the most qualified individuals because of the scarcity of highly qualified people. This is exacerbated by the steep and rapid ramp-up in staffing level we require. At the same time, we must also replace staff lost through attrition, which is exacerbated by the aging distribution of our staff. While some activities are ramping up, others are ramping down, and we must retrain, reassign, or downsize staff working on those activities. Meeting the Directorate staffing needs is a never-ending and highly dynamic undertaking.

While our circumstances are challenging, they also hold many opportunities. The dramatic increase in size and complexity of the staffing requirements of the Light Sources Directorate gives us opportunities to increase the diversity of the workforce; introduce new talent, skills, and energy; increase opportunities for career advancement; and to further incorporate multiple generations, where less experienced but high-potential workers provide balance to the existing aging workforce.

There is much at stake if we are not successful in this SFA. Some of the risks we face include: staff shortages, inadequately skilled staff, lower productivity, reduced quality of work, attrition, errors and accidents, higher cost, and poor morale.

We must all take responsibility for achieving the goals of this SFA – these are not just for the Human Resources (HR) group. Meeting all of these challenges requires leadership, management, and effort at all levels of our organization.

In addition to our core values listed in Section 2, our efforts in this SFA are also based on the following beliefs:

- Staff engagement, defined as personal enthusiasm and commitment to the goals of the organization and one's own job, is necessary for organizational success.
- The highest levels of staff engagement are achieved by most effectively matching the talents, skills, knowledge, and experience of each individual with his/her work assignments.
- Investing in continual staff development is essential, and requires an active partnership between staff and supervisor, who acts as the coach and facilitator for worker development.
- Personnel management decisions must be based on facts and delivery of results, not perceptions, and so it is important to accurately assess, document, and communicate these.
- Leadership, a core value, defined as translating vision into action and aligning people to achieve our missions, is especially important for this SFA.

4.2 Goals

Our goals in this SFA are the following:

4.2.1 Attract and retain outstanding people, and motivate and enable them to achieve at the highest possible level, productively and safely

4.2.2 Create a culture of individual responsibility, with a focus on results and clear accountability, and of individual commitment to the highest standards of personal and professional conduct

4.3 Objectives

The key objectives, or outcomes, that we wish to achieve in pursuit of our goals, and their associated key measures, are the following:

Objectives	Key Measures
4.3.1 Attracting and retaining outstanding staff in sufficient number to accomplish our work	• Staff sufficient to most effectively carry out our programs • Peer assessments of work quality • Success in recruiting outstanding staff • Voluntary turnover rate for high performers, leaders, and first-year hires • Performance ratings for first and second year of new hires • Time to fill positions
4.3.2 Enabling and encouraging our staff to fully develop their talents	• Training and development program metrics • Staff assessment of development programs and opportunities • Staff recognition through credentials and awards • Caliber of external positions for which staff are recruited • Depth of talent pipeline
4.3.3 Create strong engagement of staff members, in the form of passionate commitment to our missions, their own work, and the success of their colleagues	• Staff assessment of engagement and commitment • Productivity metrics
4.3.4 Develop highly valued and prepared leaders who both deliver organizational results and enable the success of their assigned staff	• Percentage of leadership and management positions filled by succession candidates • Customer feedback • Staff evaluations • Depth of leadership pipeline
4.3.5 Create a robust organizational culture that motivates innovation and organizational effectiveness, welcomes and embraces diversity in the broadest sense, and ensures that each individual is treated fairly and with respect	• Peer review and comparative analysis • Productivity and reputation • Staff assessments of health of the organization • Staff assessments of fairness and inclusivity • Diversity metrics

4.4 Strategies

Our key strategies for achieving these outcomes are the following:

4.4.1 Workforce Planning

In order to be successful, we must sustain critical competencies, build competencies in new or emerging fields, and meet changing staffing needs. The intrinsically international and multicultural nature of much of our work complicates this task. In addition, because outstanding employees often develop over many years, we must build capability in anticipation of need.

Workforce planning (WFP) can be defined as the analytic, forecasting, and planning process that connects and directs talent management activities to ensure an organization has the right people in the right places at the right time and at the right price to execute its business strategies. Our workforce planning and management process starts with a comprehensive needs assessment based on our strategies and business plans. The methods of WFP enable us to conduct systematic assessments of our workforce content and composition issues and to determine what actions must be taken to respond to current and anticipated needs. These actions may depend on both external factors, such as availability of skills, and internal factors, such as the age of the workforce. These factors may determine whether future skills are best met by recruiting, training, subcontracting, outsourcing, or other methods.

The expected outcome from this strategy is to have a staffing plan that enables us to have the right people in the right places at the right time and at the right price to accomplish our work.

4.4.2 Matching Strengths and Talents with Work Assignments

Individuals are most engaged, and most successful in building their careers, when they are in roles that allow them to use and develop their strongest talents. This strategy seeks to identify employee strengths, assign staff to roles that best fit those strengths, and team employees with managers who help them develop those strengths. As tasks become

Light Sources Directorate, September 2009

larger and more complex, the set of talents necessary to deliver those tasks can expand far beyond the set that any single individual can contribute. Success requires the formation of teams of individuals with complementary talents. Developing a workforce that is diverse in terms of its experiences and skills, as well as in its demographic makeup, is therefore a key component of this strategy, in order to ensure that we have the broad array of strengths and talents necessary to accomplish our work and achieve success.

The expected outcome from this strategy is staff with the talents and skills necessary for individual and organizational success, placed in the jobs that best match and strengthen their talents.

4.4.3 Comprehensive Approach to Leadership and Staff Development

We seek to develop and offer a suite of leadership development programs and staff development plans that are tailored to each individual. These should reinforce organizational goals and values, build foundational knowledge, teach new skills and tools, and assist in their practical application on the job. We expect our managers to explore strengths with each staff member and to prepare development plans that encourage individuals to explore and test their strengths. We strongly encourage regular discussions between managers and staff regarding progress against these plans.

The expected outcomes from this strategy include well qualified candidates for key positions, career ownership by all staff, and development plans tailored to individual talents and career directions.

4.4.4 Succession Planning

We seek to ensure that well-prepared candidates are available for key positions through succession planning. Succession planning is based on an understanding of the strengths and competencies required for each position and on our assessment of the strengths and talents of particular candidates. We need to identify candidates with different levels of preparation (ready now, ready in the near term, ready in the long term), estimate the long-term potential of all identified candidates, and prepare development plans that support preparation of likely near-term and long-term assignments.

The expected outcomes from this strategy include having multiple strong candidates for all key positions and early recognition and cultivation of outstanding talent.

4.4.5 Performance Management Programs That Enable Our Goals and Reinforce Our Values

We seek to ensure that our performance management programs motivate accomplishment of our goals and encourage desired behaviors. They need to implement our core principle of accountability for results through alignment of total compensation with accomplishment, serve to attract and retain outstanding talent, and reinforce our values. An essential component of this strategy involves pay for performance against assigned goals. Performance management should be a collaborative and ongoing process in which the manager and staff member agree on specific goals, performance expectations, and competencies important to the success of the organization and the staff member. This process includes goal setting, assessment, continuous feedback, one-on-one development discussions, measuring progress, and holding staff accountable for performance. Sustained teamwork at both management and individual levels and across disciplinary, functional, and organizational boundaries is essential to our success, and so compensation programs need to recognize both individual and team performance.

The expected outcomes from this strategy include a clear understanding throughout the organization of desired results and behaviors, and managers and staff being rewarded for accomplishing organizational objectives.

4.4.6 Continual Assessment of the Health of Our Organization

We seek to regularly assess the health of our organization and to act promptly and decisively on the results. Engaged employees tend to be more productive, have a genuine connection to the organization, and drive innovation. We will employ a variety of social research tools and approaches to understand from the perspective of our staff what is needed to build workplace engagement and to become an employer preferred by top talent. Some of the tools we will use include surveys of workplace engagement and 360-degree appraisals. These are vital elements of our self-assessment practices. Critical self-assessment loses meaning without action on the results. Actionable data will be provided to all managers and they will be required to engage their staff around the results and to develop plans for responding to identified issues and strengthening workplace engagement.

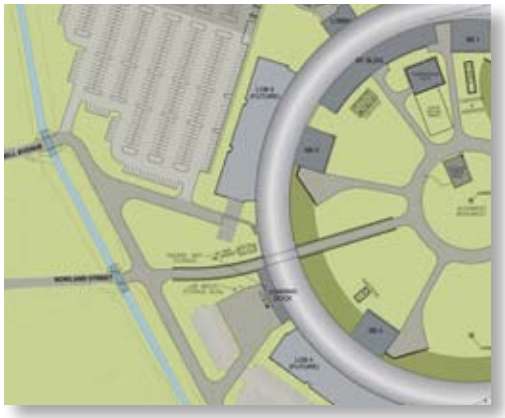
The expected outcomes from this strategy include having actionable data on the strengths and improvement needs of our organization that serve as the basis of workforce enhancement efforts.

5. MODERNIZING THE INFRASTRUCTURE

5.1 Overview

The Light Sources Directorate must ensure that the physical infrastructure exists to enable it to carry out its mission. By infrastructure, we mean all of the physical plant that is necessary to support our programs, including: office space; laboratories; high-performance computing and communications services; utilities plants and distribution systems (e.g., electricity, water, sewer, and gas); roads; fire, security, and emergency response services; and waste disposal facilities.

Some of these, such as the construction and operation of the buildings for NSLS-II, are the direct responsibility of the Directorate. Others, such as the provision and maintenance of sufficient and adequate housing for users, guests, and visitors, are the direct responsibility of BNL. Still others, such as utilities, computing, networking, and communications, represent a shared responsibility. We work in partnership with the Laboratory to ensure that our facilities are mission ready and that they are maintained to provide an environment conducive to the most innovative research well into the future.



The present directorate complex is made up of 15 occupied buildings and trailers that total 247,500 square feet. Many of these existing buildings will continue to be used in the future, providing office space, R&D laboratories, warehousing, and public areas.

Building 745, which will house the NSLS-II accelerators and experimental floor area, is currently under construction and the Building 745 Laboratory Office Buildings (LOBs), which will provide office and laboratory space for beamline staff and users, are expected to be under construction in FY10. When completed in FY12, these will add 390,000 and 175,000 square feet, respectively. If all of the current buildings continue to be occupied, Directorate activities will occupy a total of 812,500 square feet.

Building	Description	Square Footage
535	User offices and storage	16,300
703	R&D laboratories and offices	9,900
725	NSLS accelerators & experimental floor and staff offices & labs	156,300
726	Mechanical tech shop	3,300
727	Mechanical tech shop	3,900
728	Offices for guests, students and post docs	2,500
729	Source Development Laboratory	7,100
745	NSLS-II accelerators & experimental floor	390,000
745 LOBs	NSLS-II Laboratory Office Buildings	175,000
749	Construction field trailers	2,000
751	Warehouse	700
817	Project Offices	11,600
820	Warehouse and offices	7,700
830M	Project offices	4,100
832	Pulsed magnet, RF, and insertion devices laboratory and setup area	6,900
902/905	Technical, setup, and office areas for accelerator systems activities	11,300
945	Vacuum cleaning facility	3,900
	TOTAL	**812,500**

These buildings are spread throughout the BNL complex but are concentrated in the central campus region. A list of these buildings, a brief description of their usage, and their gross square footage is given above.

We must meet the specialized, demanding, and often rapidly changing requirements imposed by our state-of-the-art science programs; accommodate high-technology equipment, computing and networking needs; provide appropriate space for our staff; and provide the Laboratory and support space required to carry out our dynamically changing mix of projects and programs. It is vital that these systems provide the modern capabilities that today's and tomorrow's research programs require, such as adequate cleanliness, fume removal, climate control (i.e. temperature and humidity), vibration control, and others. Our work environments should co-locate equipment, staff, and workflow to the maximum extent possible to enhance organizational efficiency and to promote the exchange of ideas, with resulting improvements in innovation. Use of unsatisfactory space not only reduces productivity and increases costs but can also require reliance on administrative controls to ensure that safety standards and environmental compliance requirements are maintained. We must provide for the safe conduct of our work and protection of the environment while optimizing the functionality and serviceability of our infrastructure throughout its life cycle.

These demands, coupled with constantly aging infrastructure, growing operational legacies, expanding regulatory requirements, and escalating costs, combine to make infrastructure management an enormous challenge. We must properly maintain our infrastructure to effectively support our mission, including preventive maintenance, repairs, replacement of parts and structural components, and other activities. Deferring maintenance can lead to an inability to support the mission, safety hazards, and increased costs. Capital investment may be required to expand the capacity of our infrastructure or otherwise upgrade it to serve changing needs or to replace it when it reaches the end of its service life.

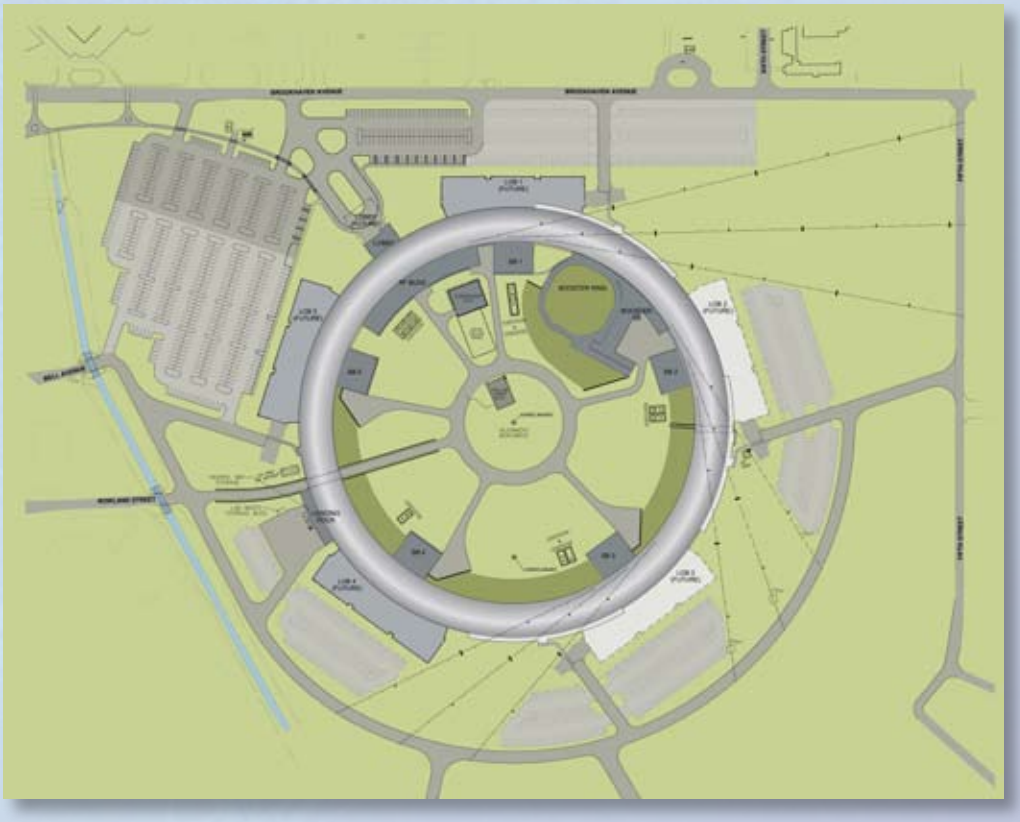
We also face a number of other challenges in achieving the goals of this SFA. The rapid pace and the scale of change underway within the Directorate make it more difficult to accurately anticipate future infrastructure requirements. Teams of staff work best together when they are co-located, but the size of our staff and our operations makes it difficult to achieve this. Some of our existing infrastructure is deteriorated and in need of either refurbishment or replacement. A substantial infrastructure for computing will be required to support the needs of the NSLS-II experimental program. We need to develop plans for providing the necessary computing infrastructure and to identify the resources with which to implement them. At present, there

is not a sufficient amount of appropriate housing for the many users and guests that use the NSLS, and yet when NSLS-II goes into operations, we expect the number of users and guests to increase by 50%.

While there is much yet to be done, we are in the midst of a very exciting period that is literally transforming much of our infrastructure into world-class, mission ready facilities. This will enable us to develop new and unique capabilities that are ready to support our science mission. Furthermore, by working closely with the other organizations in the laboratory, we can help to develop and implement plans to achieve mission ready status for the overall laboratory complex.

The consequences of failing to achieve our infrastructure goals would be serious and costly: scientific mission failure; insufficient office and laboratory space and inadequate working conditions for staff and users; difficulty in attracting and retaining the best qualified staff; work disruptions from leaking roofs and burst pipes; computer and equipment breakdowns; occupational health, safety, and environmental risks; lost productivity; dissatisfied users; communication issues, low morale, and lack of team spirit among staff; increased cost for maintenance and repairs; and vulnerability to enforcement actions by DOE and other regulatory agencies.

Management of our infrastructure must be linked with and directly supportive of our overall strategies and business plans. It must be based on a comprehensive, Directorate-wide assessment of current and future needs, without regard to organizational stove-piping. Our infrastructure management program must encompass infrastructure planning and forecasting; workplace planning and management; infrastructure acquisition and disposal; security services; and operations, maintenance, and repair.



5.2 Goals

Our high-level goal in this SFA is:

5.2.1 Provide safe, modern, and efficient infrastructure that enables us to fully achieve our mission in the most cost-effective manner

5.3 Objectives

The key objectives that we wish to achieve in pursuit of our goals, and their associated key measures, are the following:

Objectives	Key Measures
5.3.1 Infrastructure that meets mission needs	• Staff, user, and sponsor satisfaction • Space and services sufficient to most effectively carry out our programs • Meeting special requirements, such as isolation from vibration, power, space conditioning, hazard isolation, etc • Time to meet changes in requirements
5.3.2 Infrastructure that is properly maintained	• Reliability indicators • Facility condition • Maintenance investments required compared to replacement plant value (RPV) • Deferred maintenance backlog • Average age of infrastructure
5.3.3 Infrastructure that is operated at the lowest possible cost	• Capital, operations, maintenance, and utilities cost per square foot, per staff member, and as a fraction of total costs of doing business
5.3.4 Infrastructure complies with all related policies and regulations	• Compliance measures (e.g., notices of violations, fines, etc.)

5.4 Strategies

Our key strategies for achieving these outcomes are the following:

5.4.1 Lifecycle Infrastructure Planning and Management

This strategy seeks to ensure that all infrastructure necessary for accomplishing the mission exists, that it achieves its optimal life cycle, and that it is replaced in a timely manner when mission needs require a different functionality or location. Our lifecycle infrastructure planning and management process starts with a needs assessment based on our strategies and business plans. We use reliability data and decision support tools to formulate plans to build new infrastructure and to reduce the cost of maintenance, repair, or renewal of existing facilities, while providing timely service with limited disruption to our programs. Some of the tools we employ include asset management decision support tools (maintenance forecasting; maintenance backlog; scenario planning), computerized maintenance management systems (master equipment list; planning and scheduling of maintenance, reporting, and analysis), and facility information systems (tracking of space use and inventories of available space; configuration control of space footprint).

The expected outcomes from this strategy are an Infrastructure Management Plan tied to strategic objectives, improved decision making regarding resource allocations for capital and maintenance investments, and elimination of unnecessary or outdated infrastructure.

5.4.2 Expert Infrastructure Management and Support Staff

This strategy seeks to provide outstanding infrastructure support by deploying expert infrastructure management and support staff. These staff should be the most cost effective and efficient mix of Directorate staff and BNL Facilities & Operations (F&O) staff. We will provide a high level of personalized, responsive, and expert service to all staff and users. Our expert infrastructure management and support staff will establish relationships with facility staff, building trust and encouraging open communication. We will have trained infrastructure experts manage our infrastructure, rather than expecting program or project managers to also manage infrastructure. Some of the tools we will employ in implementing this strategy are also used in implementing our strategy of using lifecycle asset management principles, including: computerized maintenance management systems, facility information systems. Other tools we will use include: Facility User Agreements (define facility operating envelope, and facility management responsibilities for Directorate staff and F&O staff) and electronic service requests.

The expected outcomes from this strategy are improved cost efficiency, expert management of facilities, expert support of directorate staff, and expert understanding of the risks and hazards associated with our activities.

5.4.3 Sustainable Design and Operations

This strategy seeks to use "green" building and operating principles to reduce the cost and impact on the environment due to construction and operation of our infrastructure while at the same time improving performance in support of our mission.

The expected outcomes from this strategy include economic benefits (lower capital costs, lower annual energy and water costs, lower maintenance and repair costs, better productivity), social benefits (health, comfort, and well-being of workers, building safety and security), and environmental benefits (lower air pollution, reduced solid waste generation, decreased use of natural resources, lower ecosystem impacts).

6. OPERATIONAL EXCELLENCE

6.1 Overview

In order to accomplish its mission, the Light Sources Directorate must have a full range of effective and efficient business operations functions, including both strategic and day-to-day decision support, project performance tracking, risk management, configuration management, document control, records management, financial analysis, financial management, accounting, contracting, and other functions.

These business operations functions play a critical role in ensuring "on budget, on schedule, as promised" project performance by providing timely, accurate, and complete financial and other information, timely and focused reporting, appropriate project management tools and systems, and expert analysis. Efficient procurement and contracting services specialized for our technical environment are essential. We are responsible for stewardship of the government's tangible and financial assets, so we must maintain an outstanding record of financial integrity, asset stewardship, and compliance with applicable financial and accounting laws, standards, and regulations, as well as other business management standards and requirements.

Our philosophy of operational excellence is the basis of our efforts to achieve continuous and sustained improvements in the productivity of our research and support functions, our project schedules, and our budget performance. Our approach utilizes analysis, benchmarking against the performance of "best in class" organizations, development and execution of productivity improvement efforts, and timely progress reporting.

Our business systems and processes must be focused on enabling our mission. Developing sophisticated systems and processes is not an end in itself but a means for delivering results to our sponsors. We continually and systematically strive to deliver systems and processes that are user friendly, responsive, efficient, and compliant. We also search out and import best practices from other organiza-

tions, and we openly share our own practices. We instill a culture, and make significant decisions, based on value to our sponsors and return on investment, both financial and nonfinancial.

An important principle of our approach is that project and line managers must "own the numbers." Budgets and business projections are viewed as "belonging to" the performing organization, rather than to the business office or support staff. This ensures management accountability and improves the quality of business projections and plans. At the same time, we work to optimize results through partnering and teaming. Business support staff are co-located with the teams of staff they support to the maximum extent practical and operate as integral members of those teams. We expect our business support staff to be well versed in their area of technical expertise, yet also be able to communicate to the staff they support in clear, nontechnical language.

We face a number of challenges in achieving the goals in this SFA. Business systems must meet both project management and organizational management needs in an environment where projects have widely varying characteristics and support requirements. Procurement and subcontracting must efficiently provide highly specialized, often one-of-a-kind equipment or services to demanding specifications. Resource planning and allocation decisions involve complex trade-offs and must be made under conditions of considerable uncertainty, and the rapid pace of change in the directorate makes this even more challenging. In meeting all of these complex requirements, efficiency and productivity are crucial.

Other organizations at BNL are also working to achieve operational excellence. We seek opportunities to improve processes by more effectively working with our colleagues elsewhere in the laboratory.

Some of the potential negative impacts if we are not successful in this SFA include lower productivity, inefficient and costly operations, failing to meet milestones, lower staff morale, damage to our reputation, and reductions in funding.

6.2 Goals

Our high-level goals in this SFA are:

6.2.1 Enable our mission through effective and efficient portfolio management and project planning and execution

6.2.2 Provide reliable decision support based on facts, data, and accurate projections

6.2.3 Provide effective financial controls, protect our assets, and ensure compliance

6.2.4 Establish and maintain consistency of design basis and operational information for systems, structures, and components throughout their lifecycle

6.3 Objectives

The key objectives that we wish to achieve in pursuit of our goals, and their associated key measures, are the following:

Objectives	Key Measures
6.3.1 Effective and efficient business support	• Stakeholder satisfaction • Project performance
6.3.2 Maximum outcome per invested dollar	• Net returns on investment • Cost of services • Business process cycle times
6.3.3 Effective and efficient decision support	• Availability of current, accurate, and complete financial data and analysis • Management satisfaction with decision support • Directorate business and financial results
6.3.4 Fiduciary responsibilities accomplished with distinction and in a highly transparent way	• Results and findings of internal and external audits • Absence of penalties
6.3.5 Effective configuration and document management	• Timely and complete capture, approval, and notification of requirements, design, and configuration changes • Complete and current documentation

6.4 Strategies

6.4.1 Demonstrated Performance Leadership Is Practiced by All Managers and Staff

Organizations that achieve operational excellence do so through the active leadership of management and staff, who are committed to excellence. Managers and staff must be dedicated to the behaviors necessary to create a culture that underpins and fosters an outstanding level of performance. Some of the tools we will use to achieve this include the concepts of Human Performance Improvement (HPI). HPI knowledge and training is a key resource for understanding the dynamics of human performance in the workplace. All managers and staff are expected to understand and apply the concepts of HPI.

The expected outcomes of this strategy are efficiency improvements, reduced costs, and reduced error rate.

6.4.2 Use of Portfolio Management to Balance Competing Needs

In this strategy, we seek to employ an integrated portfolio approach to planning and resource allocation. Managers within the directorate are constantly faced with significant financial decisions. They have responsibility for allocation of resources for support functions, control over funds for exploring new directions, or for investments in equipment and facilities. By using a risk- and strategy-driven approach for balanced management of resources, we allow strategy to drive budgeting, rather than vice versa. We apply this

approach hierarchically at all levels. At the directorate level, strategic priorities are established and provide direction to managers responsible for detailed planning of activities within each element of the portfolio. Activities are then managed as projects, with project managers handling detailed planning and budgeting. The portfolio approach provides a disciplined process to focus management on high-level resource allocation decisions. It connects the cost of our activities with investment of our resources. The portfolio approach encourages shared accountability for management of our resources and enables effective communication across the directorate.

The expected outcomes from this strategy include ensuring that resource allocation is aligned with organizational strategy, ensuring balanced consideration of needs in allocating resources, and basing decisions on explicit trade-offs of risks and potential returns.

6.4.3 Manage All Major Activities as Projects

In this strategy, we seek to manage everything we do as a project, with a clearly defined scope, schedule, budget, and expected outcomes. In keeping with this, our planning and budgeting process must be organized around projects, rather than organizational units. Projects are led by project managers, who are held accountable for delivering project outcomes on time, within budget, and as promised. Consistent with that accountability, the project manager has authority to allocate the resources budgeted for that project, and to make needed outcome, schedule, and budget trade-offs in a manner consistent with our change control process. Since tasks vary greatly in complexity and risk, we seek to take a graded approach to project management, employing project management tools and providing review and management oversight at a level of formality and discipline commensurate with the nature and demands of the project. We design and operate our business systems and processes to facilitate project execution and to serve the needs of our project managers by promoting simplicity for project planning and costing, providing short cycle times on financial processes and cost reports to facilitate timely project cost reporting, and providing user-friendly cost estimating and reporting tools.

The expected outcomes of this strategy include delivery of defined outcomes on schedule and at expected cost.

6.4.4 Employ Robust Configuration Management and Change Control Processes

In this strategy, we seek to employ robust configuration management and change control processes as vehicles for maintaining the technical, cost, and schedule baselines for the projects we do and for documenting and controlling the configurations of the facilities we operate. These processes also ensure that the complex technical interfaces between various projects and systems are managed and maintained properly. By this strategy, we seek to ensure that changes are documented within the structure of technical, cost, and schedule baselines, to provide managers at all levels with sufficient information for making appropriate and timely decisions, and to ensure that the evaluation of proposed configuration changes is timely and includes a thorough consideration of the change's total impact on technical, cost, and schedule baselines; operational capability; safety and environmental impacts; and support documentation.

The expected outcomes of this strategy include full consideration of the impact of changes, better decision making, and better communication of changes.

6.4.5 Performance Measures and Targets Are Established and Communicated

Alignment of resources, such as staff time, expertise, and funding, with strategic objectives is critical to effectively and efficiently accomplishing them. Our objectives are documented and communicated through our strategic agenda and associated critical outcomes, underlying objectives, and associated performance measures, targets, and metrics. Managers establish corresponding and supporting measures and targets for their respective organizations and projects. This approach enables performance targets at all levels to be based on our strategy.

The expected outcomes from this strategy include ensuring support of our mission and strategic agenda at all levels in the organization and promoting sustained performance excellence.

6.4.6 Employ Critical Self-Assessment to Track Our Performance

In this strategy, we seek to employ timely, comprehensive, objective, and critical self-assessment of all of our activities to learn what is strategically and tactically important to know about our performance. A robust, fully integrated self-assessment program provides clear understanding of progress against major elements of our strategy; identifies organizational strengths, weaknesses, and opportunities for improvement; and provides the information necessary for continuous improvement and performance manage-

ment. We seek to design our self-assessment programs to not only inform us of our performance, but also to include analysis and interpretation to help us understand why our performance is at the level observed. Where weaknesses in performance and opportunities for improvement are identified, we seek to establish, implement, and track appropriate corrective actions. A variety of approaches and mechanisms are used to perform self-assessments, including measuring performance against the measures set forth in this plan, monitoring progress toward critical milestones, assessments focused on specific areas, and monitoring results and system processes. Peer reviews are used as an integral part of our self-assessment process.

The expected outcomes from this strategy include efficiency improvements, a reduction in the number of unanticipated incidents, and fewer external findings that are not self-identified.

6.4.7 "Project Pays" for Specialized Services and "All Pay" for General Services

In any large scale organization, some portions of the organization supply services to the other parts of the organization. Some of these services only benefit a specific project (e.g., engineering and design, etc.), while all or part of other services are used universally by all projects (general management, human resources, quality services, finance, communications, ESSH, information technology, etc.). Our projects are supported by multiple sponsors in order to achieve specific outcomes of interest to those sponsors with agreed scope, schedule, and budget. In this strategy, the project that is the recipient of specialized services pays the true cost for those services actually received. Recipients of universally used services share the cost of those efforts.

The expected outcome from this strategy is fair apportionment of costs for services among our multiple sponsors.

6.4.8 Expert Business Management and Support Staff

This strategy seeks to provide outstanding business support by deploying expert business management and support staff to deliver the full suite of financial, project management, contracting, procurement, and other business services. These staff should be the most cost effective and efficient mix of Directorate staff and BNL staff. We will provide a high level of personalized, responsive, and expert service to all staff and users. Our expert business management and support staff will establish relationships with technical staff, building trust and encouraging open communication to better understand their needs. We will have trained business experts manage our business systems, rather than expecting program or project managers to also manage business systems. By making it possible for technical staff to focus on their technical areas without having to become experts in accounting, finance, contracting, and administration, it gets "the right people working on the right things."

The expected outcomes from this strategy are improved costs efficiency, expert management of business systems, expert support of directorate staff, and improved regulatory compliance and stewardship of our assets.

7. ACHIEVING EXCELLENCE IN ESS&H

7.1 Overview

Every staff member, contractor, user, and guest has the right to go home at the end of the day without suffering injury or illness due to his or her work environment. We must provide a secure environment that protects people, the environment, property, information, and computing systems. Failure to maintain a safe and secure workplace with acceptable environmental impacts can result in the unacceptable consequences of personal injury, illness, or death; property or information loss or damage; and fiscal penalties and criminal enforcement actions. Any of these can quickly and severely erode our ability to pursue and achieve our mission, while meeting these expectations brings a level of trust and support from our stakeholders that cannot be earned otherwise.

Risks of accidents or environmental contamination are proportional to the nature, scale, and complexity of activities, supporting infrastructure, and the condition of physical facilities. Staff in the directorate currently engage in complex activities spread out over a complex of 15 buildings totaling nearly 250,000 square feet. When NSLS-II is complete, this will increase to more than 800,000 square feet. In addition, we host thousands of users each year who engage in complex and difficult experiments at our facilities, often under time pressure.

NSLS-II construction site, July 2009

Success in ESS&H necessitates safety and environmental leadership, whereby all management and staff constantly look out for the well-being of their coworkers. In addition, managers and staff must understand the consequences and cost of failing to perform their work in an acceptable manner. Research and operations personnel must develop, own, and execute work in a manner that fully addresses compliance, safety, security, and environmental protection. Systems, processes, and tools for supporting work accomplishment must be designed to integrate the users' needs with clearly established ESS&H expectations.

In addition to our core values listed in Section 2, our efforts in this SFA are also based on the following beliefs:

- It's not about the numbers, it's about people. Concern for the individual motivates our actions.
- Humans will make errors. Humans are fallible; there-

fore, we must anticipate human error and work to reduce or mitigate the consequences of human error.

- All accidents are preventable. While we understand that humans will make mistakes, these mistakes and their consequences can be mitigated to the point where accidents or operational events are prevented.
- Excessive waste generation is a by-product of inadequate planning. Proper planning can minimize waste generated as a result of routine operations and R&D activities.
- People must own their work processes. The approach to meeting requirements for doing work should be developed by those responsible for the work to ensure that systems and work processes are not cumbersome and discouraging to those trying to perform the work.
- Partnership with our stakeholders, including regulators, is essential to success. Openness and routine communication are essential to developing the trust necessary to effectively tackle the difficult challenges that we face. We must operate by inclusion rather than seclusion. Engagement must be consistent and earnest and not precipitated by the latest crises; rather, we should engage in forward-looking actions and seek input on decisions before they are made.

We face a number of challenges in achieving the goals of this SFA, including: design, construction, and operation of large and complex facilities; ever changing experiments, each with their own hazards; changing regulations and requirements; working in a shared environment; and a constant in-flux of new users, often from very different safety cultures.

The consequences of failure could be severe, including: personal injury or loss of life; a major safety or environmental event resulting in a shutdown, loss of funding, users, and/or jobs; inefficient procedures resulting in loss of productivity; loss, vandalism, theft, or damage of government property; and loss of reputation and credibility with stakeholders.

7.2 Goals

Our high-level goals in this SFA are:

7.2.1 Ensure a safe and secure work environment for all staff, users, and guests, and protect the public from hazards associated with our construction and operations activities

7.2.2 Perform all work in a manner that preserves the quality of the environment and prevents property damage or loss

7.3 Objectives

The key objectives, or outcomes, that we wish to achieve in pursuit of our goals, and their associated key measures, are the following:

Objectives	Key Measures
7.3.1 Zero injuries and safety or environmental incidents	• DART, TRC, and first-aid cases • Occurrence reports and BNL SC reports • Spill reports • Near misses • Traffic violations
7.3.2 Pollution prevention and waste minimization	• Waste and emission metrics
7.3.3 Zero theft, loss, or damage of government property	• Incident rate • Value of loss or damage
7.3.4 A culture of excellence in safety, security, and protection of the environment	• Staff and management assessment of attitudes • Tier 1 inspection findings • NTS reports • Workplace observation metrics
7.3.5 Meeting stakeholder expectations in ESS&H	• Customer feedback • Peer review • Comparative analysis • Audit findings • Violation notices
7.3.6 Efficient systems, practices, and tools that enable mission accomplishment and address the needs of workers while ensuring compliance and safety	• Staff assessment of working conditions and procedures • Lessons learned • Process cycle time

7.4 Strategies

Our key strategies for achieving these outcomes are the following:

7.4.1 Demonstrated Safety Leadership Is Practiced by All Managers and Staff

Organizations that achieve world-class levels of safety and environmental performance do so through the active leadership of management and staff, who are committed to looking out for one another. Managers and staff must be dedicated to the behaviors necessary to create a culture that underpins and fosters an outstanding level of safety performance. Some of the tools we will use to achieve this include the concepts of Human Performance Improvement (HPI) and work observations (WO). HPI knowledge and training is a key resource for understanding the dynamics of human performance in the workplace. All managers and

staff are expected to understand and apply the concepts of HPI. WO is a structured approach for getting managers into the field to observe real work. Managers must be familiar with the attendant risks being reviewed, they must understand the actions that can be taken to mitigate the hazards, and they must be capable of providing feedback in a constructive manner to staff.

The expected outcomes from this strategy are efficiency improvements, increased safety performance, and reduced error rate.

7.4.2 ESS&H Competence Is Embedded within the Organization

The principle that "People must own their work process" assigns accountability for ESS&H performance to the individual and not to ESS&H support staff. To effectively discharge their responsibility, staff must have sufficient competence in the disciplines of safety, security, and environmental management so that they can achieve the desired results. Management must have a thorough understanding of the type of work conducted by their staff, with a particular emphasis on understanding the risks associated with the work being conducted. They are aided by ESS&H subject-matter experts who provide accurate interpretation of ESS&H regulations and guidance and support implementation of ESS&H requirements and systems.

The expected outcomes from this strategy are effective understanding by staff, users, and guests of the risks and hazards associated with our activities; assistance and guidance by ESS&H subject matter experts; and improved safety performance.

7.4.3 We Actively Create and Manage Safe, Secure, and Environmentally Friendly Work Environments

Our work environment presents numerous hazards to our staff. This strategy seeks to mitigate those hazards by actively creating and managing our work spaces to ensure that they are safe and secure. We work to ensure that laboratory space is safe, fully compliant with applicable requirements, secure, and maintained in an organized manner. Some of the tools we use to achieve this include the concepts of Integrated Safety management (ISM) and work planning and control. ISM principles provide the framework for assuring adequate work planning and control of ESS&H risks. The hazards presented by the work are analyzed and the workers are made knowledgeable of the steps necessary to mitigate those hazards. They are responsible for ensuring that work is done in full compliance with applicable requirements and using appropriate laboratory techniques. The facility Building Manager is responsible for maintaining all non-R&D space and managing it with these same objectives. Considerable effort is applied to minimize the hazardous footprint of recognized hazardous areas. Radiological areas, chemical storage areas, laser laboratories, and numerous other laboratory spaces are all clearly identified to highlight to workers the increased risk of hazards. Our pollution prevention and waste minimization programs seek to enhance environmental stewardship and laboratory operations by reducing material use and waste generation and encouraging the purchase of environmentally preferable products. Our work planning and control programs seek to identify the scope of work, hazards and risks associated with the work, and necessary risk mitigation methods to enable the work to be done safely.

The expected outcomes from this strategy are safe work conditions and processes and improved safety performance.

7.4.4 Open and Proactive Relationships with Regulators

By this strategy, we seek to establish and maintain excellent relationships with our regulators on a federal, state, and local level. We must demonstrate an absolute commitment to full compliance with applicable laws and regulations and we must proactively identify and promptly disclose all regulatory noncompliance issues. Throughout all interactions with regulators, it is imperative to demonstrate a thorough knowledge of and respect for the regulations. Finally, if a problem does arise, the regulators should hear about it from us first; otherwise, the relationship will never develop to the level of trust necessary to be successful.

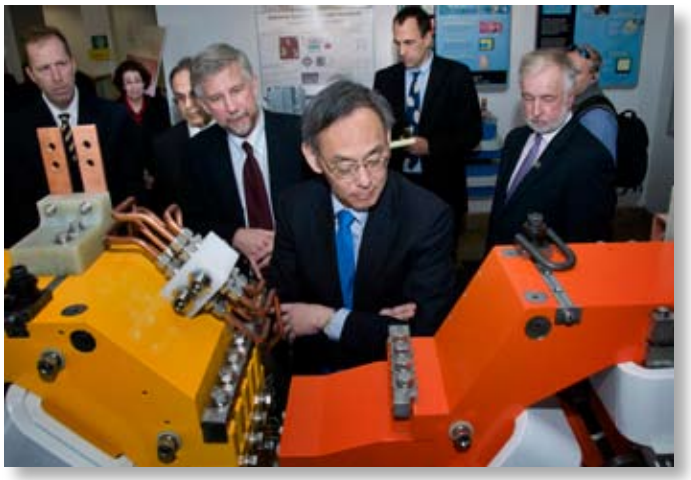
The expected outcomes from this strategy include ESS&H requirements commensurate with the actual hazards and risks encountered in our workplace, mutual trust and respect with regulators, reduced lag time in approval processes, and advance knowledge of emerging requirements.

8. FOSTERING STAKEHOLDER RELATIONS

8.1 Overview

In order to realize our vision of being a provider of choice for photon science and facilities, it is imperative that we identify and communicate with all stakeholders who are likely to be interested in, or affected by, our decisions, and who can affect or influence our activities and future plans. Developing, maintaining, and strengthening mutually beneficial relationships with these stakeholders is a critical element for our success.

Large scientific user facilities such as NSLS and NSLS-II have a large number of stakeholders with differing interests and involvement. Our stakeholders are far ranging, including tax-payers; funding agencies; world-wide user communities from academic, industrial, and governmental institutions; elected officials; regulators; the interested and neighboring communities; Brookhaven Science Associates; BNL management; employees; and the general public.



Energy Secretary Steven Chu (center) looks at NSLS-II prototype magnets, March 2009

We seek to create and maintain open and strong relationships with all of these stakeholders by establishing common bonds based on the principles of honesty, trust, and respect that are inherent in all aspects of this plan. We do this by engaging them as partners in strategic planning, defining shared expectations of performance excellence, working cooperatively, and consulting with them whenever events or opportunities drive changes in our strategic or tactical objectives.

The enormous success of light source facilities around the world over the past three decades has resulted in the substantial growth of very productive user communities from all disciplines. A large and productive user community has grown up around the NSLS over the nearly three decades it has been in operation. As a new state-of-the-art light source with world-leading brightness and flux, NSLS-II will provide capabilities that surpass those offered by NSLS or any other current light source. The research enabled by NSLS-II will span an exceptionally broad array of scientific and engineering disciplines. It is important that we effec-

tively communicate to our user communities to articulate our plans, priorities, and planning processes so that we can successfully engage them for full participation in facility planning.

We have enjoyed an excellent relationship with our primary sponsor, the Basic Energy Sciences program within the DOE Office of Science, and it has strongly supported us. We have also received strong support from the user community and from BNL management. These important relationships need to be nurtured. We need to inform and educate our current and potential sponsors about our plans and opportunities and partner with them to secure the funding and support necessary to meet our goals. We need to fully utilize peer review mechanisms, such as our advisory committees, to ensure we establish a set of challenging, yet achievable, goals and associated metrics for determining our success in achieving them.

We face a number of challenges in developing and maintaining stakeholder relationships, including the high pace of change and rapid growth of the Directorate, expansion of synchrotron radiation into new scientific disciplines, and an ever broadening user community. Maintaining a sufficient level of communication to adequately inform all of these groups about ongoing and planned events and issues is a significant undertaking. A further challenge stems from a lack of a sufficiently strong unifying identity within the Directorate.

While our circumstances are challenging, they also hold many opportunities. The projected growth of our programs represents an opportunity to promote our world-class facilities as a key asset for the nation's scientific community, as a significant contributor in carrying out the mission of the DOE Office of Science, and as an enabler of research programs that can create economic engines for the nation.

Opportunities exist to expand and broaden the user community. With aggressive outreach, education, and training programs, we can increase usage by groups that are currently underserved, such as industrial users, and by new and inexperienced users. A balanced portfolio of academic and industrial research is essential to the intellectual environment and there is a unique opportunity for partnership between industries, national laboratories, and academic institutions.

Failure to develop, maintain, and strengthen our relationships with our stakeholders could jeopardize our success in a variety of ways. If we do not provide existing or potential sponsors with adequate information on our plans, priorities, and goals, our ability to secure the funding and support necessary to carry them out may be significantly reduced. If we do not clearly communicate how we plan to serve the user community during the transition from NSLS to NSLS-II operations, we will create unnecessary anxiety in the user community and risk losing their support and engagement. Lack of outreach programs could reduce our ability to attract new users or to expand the user base in under-served areas, such as industrial use. Insufficient communication on plans for future work, or lack of recognition for accomplishments, could result in a loss of essential staff and an inability to attract and retain a quality workforce.

Our efforts in this SFA are based on the belief that stakeholders are most supportive when they are well informed and when they are engaged in the development of goals and plans.

8.2 Goals

Our goals in this SFA are the following:

8.2.1 Ensure strong support for our programs from our stakeholders

8.2.2 Create an awareness of our scientific and societal impact

8.2.3 Create a strong sense of pride and community among our stakeholders

8.3 Objectives

The key objectives, or outcomes, that we wish to achieve in pursuit of our goal, and their associated key measures, are the following:

Objectives	Key Measures
8.3.1 Stakeholders are well informed about our goals, plans, and actions	• Print, web, electronic, and oral communications • Informational and promotional events • Media coverage • Peer assessment, self assessments, and stakeholder surveys of quality and quantity of communications
8.3.2 Stakeholders are actively engaged in the development of our goals, plans, and actions	• Stakeholder assessment of engagement • Stakeholder acceptance and support of Laboratory and Directorate initiatives • Number of workshops, visitors, and white papers • Peer review, advisory committee meetings, and comparative analysis
8.3.3 Staff and users identify with, and are committed to, the Laboratory and the Directorate	• Staff and user assessment
8.3.4 Our capabilities and accomplishments are promoted and recognized	• Media coverage • Print, web, electronic, and oral communications • Promotional events • Assessments of awareness and reputation • Staff and organization awards

8.4 Strategies

Our key strategies for achieving these outcomes are the following:

8.4.1 Media and Communications Programs

In this strategy, we seek to have a comprehensive and multifaceted media and communications program that reaches out to all stakeholders and is well-integrated with the Laboratory's communications programs. Our approach includes developing and sustaining excellent relationships with targeted writers and editors at key science and general-interest publications. These relationships provide multiple opportunities to showcase newsworthy Directorate science, researchers, and activities in media outlets across the country and throughout the world. Appropriate communications products will be developed for local, regional, national, and international audiences and media outlets. These will include press releases, e-news, e-mails, web-based channels, brochures, multimedia, all-hands meetings, participation in community meetings such as the Community Advisory Council and the Brookhaven Executive Roundtable, and other written and verbal communications. These will be used to inform both internal and external stakeholders about plans and developments and to build excitement and enthusiasm among these audiences.

The expected outcome from this strategy is stakeholders who are well informed of Directorate research, activities, developments, and plans.

8.4.2 Clear, Comprehensive, and Inclusive Planning

In this strategy, we seek to engage our stakeholders in the development of our plans and to communicate those plans clearly and comprehensively via documents such as this Strategic Plan, our Communications Plan, our Scientific Facilities Plan, our Infrastructure Management Plan, and other planning documents. We will obtain peer assessment of our plans from our advisory committees and user committees. We will engage the user community via workshops and joint white papers, and we will engage the staff via working groups and task forces.
The expected outcomes from this strategy are better planning through inclusion of a diversity of ideas and strong engagement and support from stakeholders.

8.4.3 Recognition of Staff, User, and Sponsor Accomplishments

In this strategy, we seek to recognize and promote the accomplishments of our staff, users, and sponsors through our media and communications programs. We also seek to create a sense of pride and community among our staff, users, and sponsors through celebrations of their accomplishments and by holding events that bring them together, increase personal interaction, and increase identification with the Directorate, the Laboratory, and our sponsors. Examples include weekly coffees, annual meetings and picnics, tours of our programs and facilities, and participating in the Laboratory's Summer Sundays program.

The expected outcomes from this strategy are enhanced awareness of our accomplishments and pride and sense of community among staff, users, and sponsors.

8.4.4 Continual Assessment of the Health of Our Stakeholder Relationships

We seek to regularly assess the health of our stakeholder relationships and to act promptly and decisively on the results. We will employ a variety of social research tools and approaches to understand from the perspective of our stakeholders what is needed to build understanding and support for our programs. Actionable data will be provided through surveys and other feedback mechanisms and we will develop plans for responding to identified issues and strengthening stakeholder relations wherever needed.

The expected outcomes from this strategy include having actionable data on the strengths and improvement needs of our stakeholder relations efforts.

DOE Office of Science AMERICAN RECOVERY & REINVESTMENT ACT NEWSLETTER

Construction Begins on World-Class Light Source at Brookhaven National Laboratory

Groundbreaking for the NSLS-II Project at BNL June 15, 2009.

With an infusion of $150 million in Recovery Act funding, construction began in June on the National Synchrotron Light Source II (NSLS-II) at Brookhaven National Laboratory (BNL) in Upton, NY--a project that will advance energy research for the nation and create hundreds of jobs for Long Island over the next several years. Energy Secretary Steven Chu visited the laboratory earlier this year and announced $150 million from the American Recovery and Reinvestment Act for the facility, some of which went towards accelerating the construction of NSLS-II.

"The NSLS-II will allow the scientific community to focus on some of our most important scientific challenges while creating jobs and promoting a clean, affordable energy economy," said Secretary Chu. Continued on page 2...

INSIDE THIS ISSUE

Issue 1, July 2009

U.S. DEPARTMENT OF ENERGY | Office of Science