Ten-Year Site Plan

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Content of the TYSP

Table of Contents

	Page
A. Executive Summary	1
B. Overview of Site Facilities and Infrastructure (F&I)	4
C. Current and Future Mission for the Site	8
D. Facilities and Infrastructure	14
1. Vision, Goals, and Strategy (VGS)	14
2. Process for Identifying F&I Needs and Development of Plans to Meet the VGS	16
3. Land Use Plans	20
4. Excess Real Property	22
5. Long Term Stewardship	22
6. Replacement Plant Value (RPV) Estimates	22
7. Maintenance	23
8. Deferred Maintenance Reduction (DMR)	24
9. Recapitalization and Modernization	26
a. IGPP	27
b. Line Items	27
c. GPP	27
10. Space Bank Analysis	28
11. Site's Alternate Investment Plan for GPP and SLI Line Items and Excess Facilities Disposition (EFD)	29
12. Performance Indicators and Measures	32
13. Energy Management	33
14. Leasing & Third Party / Non-Federal Funded Construction of New Buildings	34
E. Attachments	
Attachment 1 Inventory of Buildings, Conditions, Square Feet and Utilization	
Attachment 2 Site Map of C and D-Site Buildings	
Attachment 3 Integrated Facilities and Infrastructure (IFI) Crosscut Budget	
Attachment 4 Acronyms	
Attachment 5 List from FIMS of All SC Excess Facilities (All are Non-Operational)	

A. Executive Summary

This Ten-Year Site Plan (TYSP) describes the DOE facilities at the Princeton Plasma Physics Laboratory (PPPL) in terms of how they support current programs and the changes needed to support programs that are planned for the future. This plan covers the fiscal years 2008 through 2017 and includes data for FY 2006 and 2007.

This comprehensive plan addresses how PPPL's real property assets will support and implement the objectives of the Department of Energy Strategic Plan, the Office Of Science Laboratory Business Plans, the Energy Policy Act, the American Competitiveness Initiative, and the DOE Office of Science report "Facilities for the Future: A Twenty-Year Outlook". This Plan is developed in accordance with the Real Property Asset Management (RPAM) Order, DOE 0 430.1B and DOE-SC guidance. It is consistent with the Integrated Facilities and Infrastructure (IFI) crosscut budget and the annual budget submission. The plan integrates components of land use, facilities and infrastructure acquisition, maintenance, recapitalization, safety and security, and disposition plans into a comprehensive site-wide management plan. Development of this plan included assessment of past performance and projected future outcomes, and has strengthened communication and accountability among projects, infrastructure support and technical infrastructure.

The American Competitiveness Initiative (ACI) doubles funding for innovation-enabling research at key Federal agencies over ten years to support high-leverage fields of physical science and engineering, which include the Department of Energy's Office of Science. In particular the ACI provides increased funding to support the domestic fusion facilities underpinning the future ITER nuclear fusion project. One of the goals of the ACI is to improve the capacity, maintenance and operations of DOE labs.[1]

The Energy Policy Act requires the development and implementation of a strategy for Facilities & Infrastructure at the DOE Laboratories. The strategy must provide cost-effective means for:

- maintaining existing facilities,
- closing unneeded facilities,
- making facility modifications, and
- building new facilities.

This TYSP provides the Princeton Plasma Physics Laboratory's strategic map to address these objectives of the Energy Policy Act and to attain the goal of the American Competitiveness Initiative by pointing out where adequate planning and funding is anticipated and where high leverage improvements can be attained with relatively low amounts of additional funding. The projects that would require additional funding are described in the "Site Alternative Investment Plan" section of this TYSP.

In support of the PPPL mission, important improvements and maintenance activities are planned and underway to buildings, shops, storage areas and offices. The Office of Science and PPPL goal of reducing deferred maintenance is being accomplished by efficiently planning

[1] p. 2, American Competitiveness Initiative, Domestic Policy Council, Office of Science and Technology Policy, February 2006

maintenance activities, increasing the percentage of funds spent on maintenance, and dedicating funds specifically to reducing the maintenance backlog.

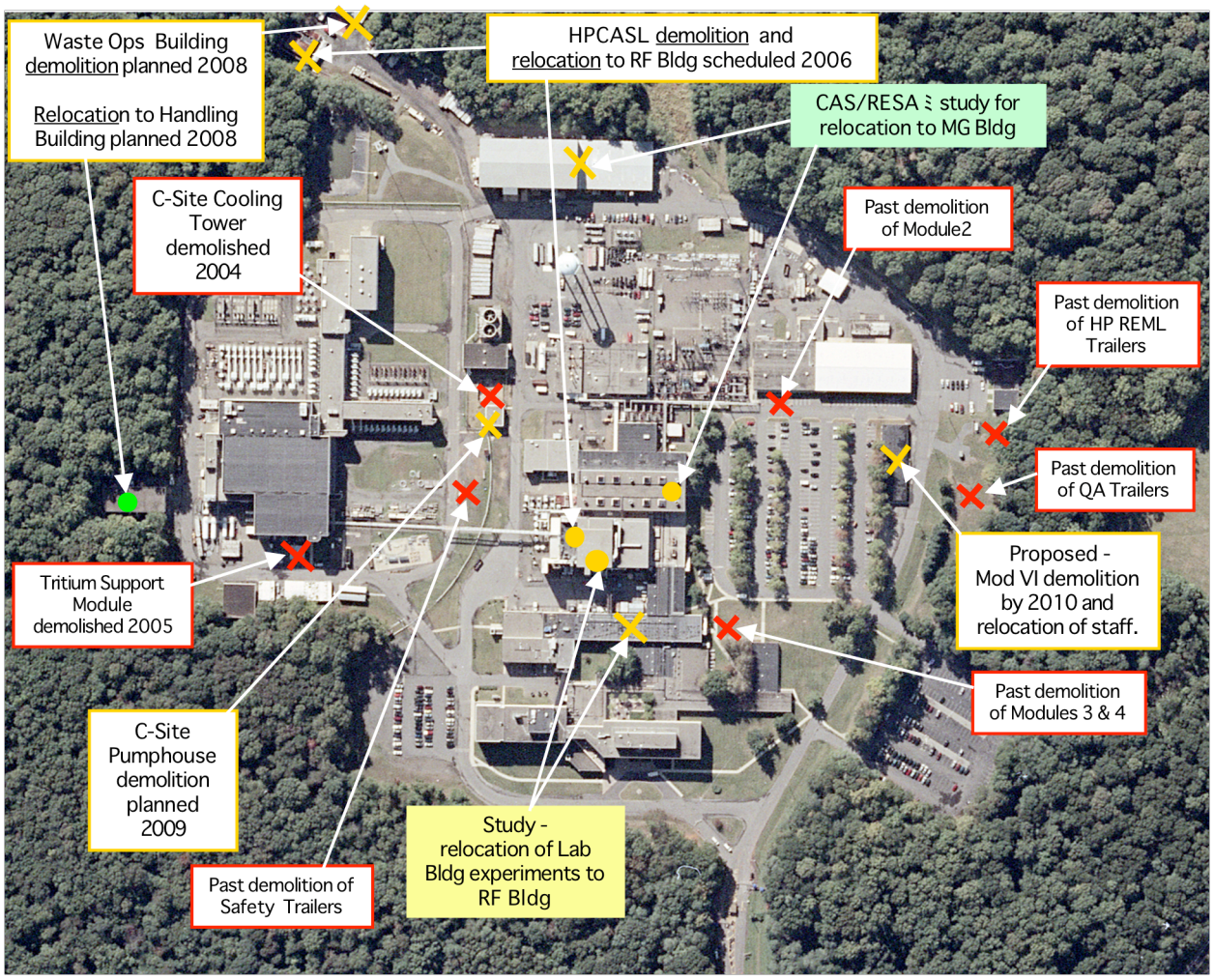
The size of the PPPL site and the number of facilities provide adequate room to meet short term and long-term goals, and the staff size will remain relatively constant in the near term. The major need, and therefore the focus of the PPPL facilities plan is to steadily achieve the conversion, refurbishment, and modernization of several existing areas and buildings so that we provide the appropriate types of facilities to suit current and planned R&D activities. The goal being to provide first class facilities to enable first class science. A phased and steady pursuit of this goal is necessary in order prepare our facilities and do it within realistic budget scenarios.

While progress is being made in reducing maintenance backlogs, flat GPP funding or decreased programmatic funding will not allow necessary modernization, maintenance backlog reductions, and keeping up with repairs of aging facilities. Continuing to meet the goal of expending 2% of RPV for maintenance costs will be difficult without increases in funding. PPPL has implemented cost reductions and efficiencies and we are planning others. These efforts need to be combined with the restoration of Science Laboratory Infrastructure (SLI) funding or alternative sources of funding for PPPL to fully meet infrastructure goals. Should budgets be limited over the next several years, the minimal infrastructure goal will be to keep up with repairs and critical maintenance for the existing facilities.

PPPL has submitted two proposed projects for SLI funding of critical electrical and heating, ventilation and air conditioning system upgrades. Funding of these projects (approximately $13.5M total) is critical to fully meet infrastructure goals. Details of the proposed projects are discussed in Section D.11.

Over recent years, the Laboratory has realized efficiency gains by consolidating staff and functions and disposing of older outlying buildings. This trend has enabled a reduction in expenditures and we will continue to pursue this strategy. A decrease in DOE programmatic funds (or without adequate GPP, SLI or Deferred Maintenance Reduction funds) will require PPPL to aggressively remove buildings from service. The priority focus would be on infrastructure safety at the expense of capability. Maintaining a dynamic infrastructure requires a flexible plan that can respond to changing needs -- we anticipate that additional capital projects may crop up causing the forecast of needs beyond a few years to change. We will review the budgets allocated by DOE and make prudent stewardship decisions based on carefully balancing priorities between safety, stewardship, and mission accomplishment. The Infrastructure goal will be to keep up with repairs and critical maintenance for the existing facilities.

Improving Efficiency by Reducing our Footprint



The U.S. project office for ITER, a major international fusion experiment, has relocated from Princeton Plasma Physics Laboratory (PPPL) to Oak Ridge National Laboratory (ORNL) to optimize the roles of the two Department of Energy (DOE) national laboratories. PPPL efforts will be shifted to renovate and modernize existing offices in preparation for NCSX and to provide adequate high quality space for PPPL collaborations. The buildings, shops, storage areas and offices in proximity to the NCSX Test Cell are being improved to support the project's construction and operation. Several GPP projects are planned and underway to ready these facilities for NCSX.

B. Overview of Site Facilities & Infrastructure

The U.S. Department of Energy's Princeton Plasma Physics Laboratory (PPPL) is a Collaborative National Center for plasma and fusion science. Its primary mission is to develop scientific understanding and key innovations leading to an attractive fusion energy source. Associated missions include conducting world-class research along the broad frontier of plasma science and technology, and providing the highest quality of scientific education.

The Princeton Plasma Physics Laboratory has engaged in fusion energy research since 1951. The reaction occurring in our sun as well as in other stars is fusion. In a fusion reaction, the nuclei of hydrogen atoms, in a plasma state, fuse or join to form helium atoms, causing a release of neutrons and energy. Unlike the sun, PPPL's fusion reactions are magnetically confined within a vessel or reactor under vacuum conditions. The long-range goal of the U.S. Magnetic Fusion Energy Research Program is to develop and demonstrate the practical application of fusion power as a safe, alternative energy source. In the early 1950's, Dr. Lyman Spitzer's vision for plasma physics culminated in Project Matterhorn, which gained approval of the U.S. Atomic Energy Commission. Its mission was to contain and harness the nuclear burning of hydrogen at temperatures exceeding those found in the sun. Named for, Dr. Spitzer's A, B and C stellarators, PPPL was first located on the James Forrestal Campus and in 1959, PPPL moved to its present location at C-site. In the late 1970's, D-site became the home of the Tokamak Fusion Test Reactor (TFTR), which has been dismantled, and is now the home of the National Spherical Torus Experiment (NSTX).

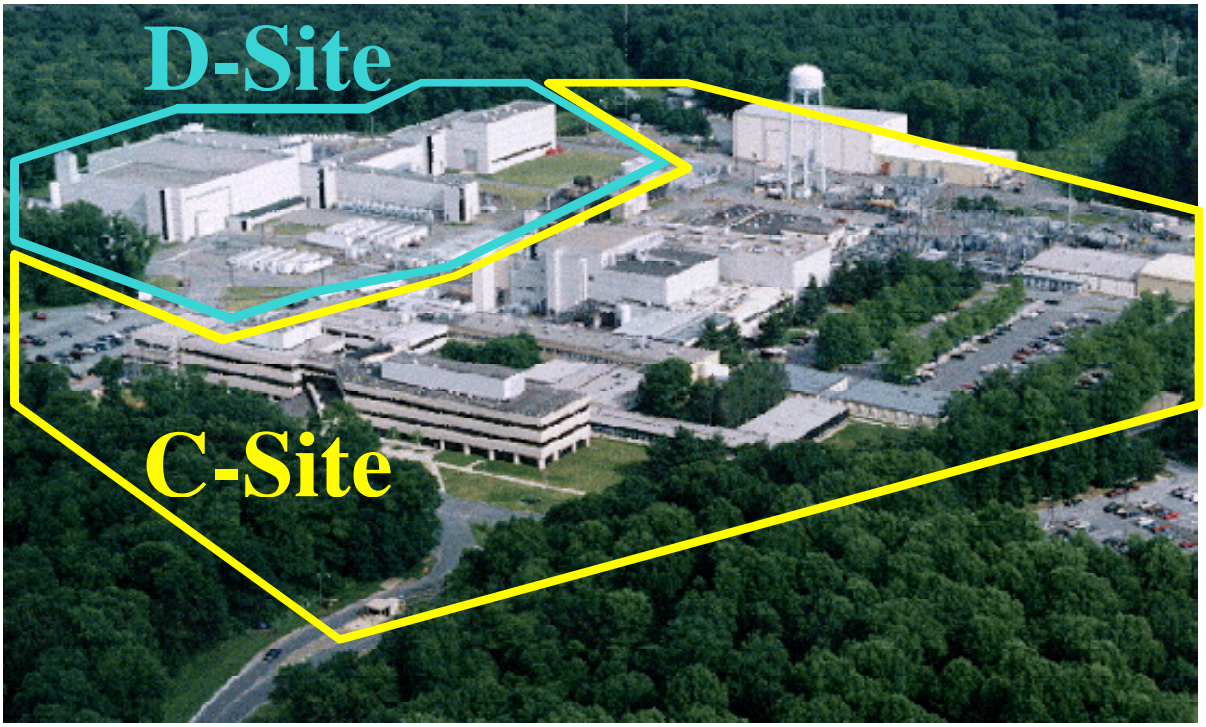
The Princeton Plasma Physics Laboratory (PPPL) is operated by Princeton University for the Department of Energy under contract DE-AC02-76CH03073 and funded by the DOE Office of Science as a Program Directed (single mission) Laboratory. The PPPL FY 2006 total funding is $76.6M; the FY 2007 current total funding is estimated a $78.7M and the PPPL estimated funding for FY 2008 is $81.2M. The current laboratory population consists of approximately 400 employees, and approximately 125 visiting collaborators, subcontractors, students, temporary employees and guests on site on a given day. The Laboratory is located on 88.5 acres within the Princeton University Forrestal Campus approximately mid-way between Philadelphia and New York City. Princeton Forrestal Campus is one of the nation's premier university-associated office/research parks. The center provides an outstanding work environment with businesses, research institutions, and hotel/conference facilities in reasonable proximity to very desirable residential communities. The 1,750-acre Campus is punctuated by dense woods, brooks and nearby streams; almost 500 acres remain in their natural state in order to protect and enhance the character of the Center. It is in this idyllic setting that the Plasma Physics Laboratory is centered. Over the last several years, the area surrounding the Laboratory has continued to develop with the construction of additional office and research buildings, emphasizing the importance of maintaining good community and external relations.

The Laboratory utilizes 724,166 square feet of space in Government-owned buildings located on "C" and "D" sites [see Figure 1]. The Total Replacement Value (RPV) of all PPPL facilities and infrastructure is $400,687,252. Non-Programmatic RPV, used for calculating Indices, is approximately $275M. The Programmatic (OSF 3000) RPV is $125,740.928 and includes TFTR and NSTX equipment. There are twenty-seven buildings on C-Site, seven buildings on D-Site

and one off-site. The Asset Utilization Index (AUI) is .978. Facility maintenance funding is based on a calculation of 2% of the Replacement Value – referred to as the Maintenance Investment Index (MII). The PPPL MII for FY2006 is $5,045,000.

The existing contract between the DOE and Princeton University also provides for an ultimate build-out potential of approximately 900,000 square feet, allowing for the possibility of moderate expansion, although no expansion of the Lab's footprint is planned at this time. The overall condition of the Laboratory's facilities is considered adequate. Presently, there are no known conditions that could seriously impact establishing new or expanding current missions.

Figure 1. PPPL C- and D-Sites



The Department of Energy adopted the Facility Condition Index (FCI) as a tool for measuring the condition of its facilities. DOE Order 430.1B defines the FCI as the ratio of the cost of deferred maintenance to the facility's replacement plant value. The FCI for all PPPL non-programmatic facilities is 4.02[2] and considered "Good". Where FCI values are rated as follows:

Excellent: FCI <2%
Good: FCI is from 2% to <5%

[2] Based on DOE-SC Ten Year Site Plan Guidance, - 2006, the ratio of PPPL's Deferred Maintenance (excluding trailers) $11,535,423 to the RPV (non-programmatic) $274,483,768 = 4.02%.

Adequate:	FCI is from 5% to 10%
Fair:	FCI is from 10% to <25%
Poor:	FCI is from 25% to <60%
Fail:	FCI is 60% or greater and replacement is required.

Space and building information is displayed in Figures 2 through 4.

Figure 2. Condition of Laboratory Buildings

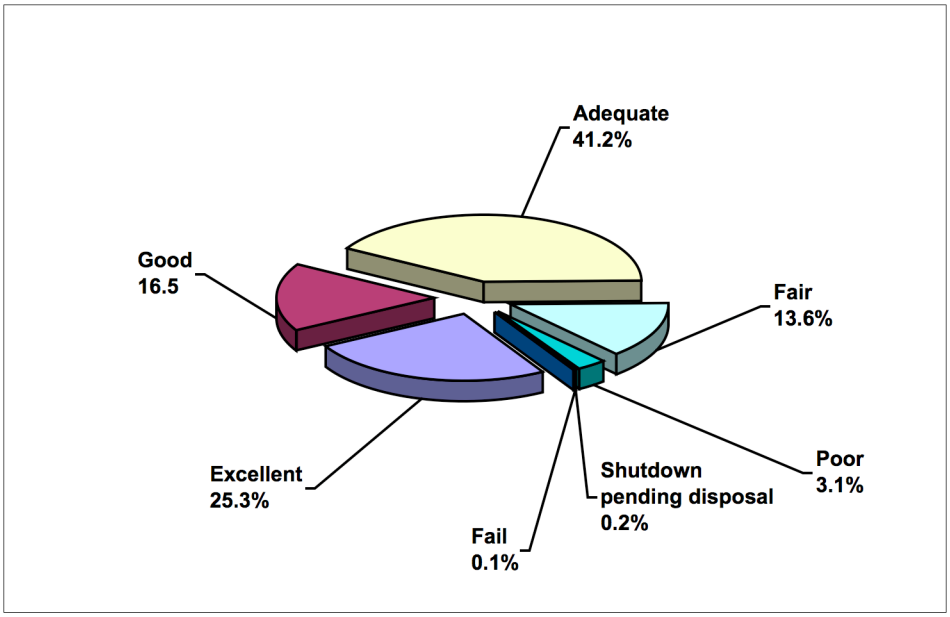
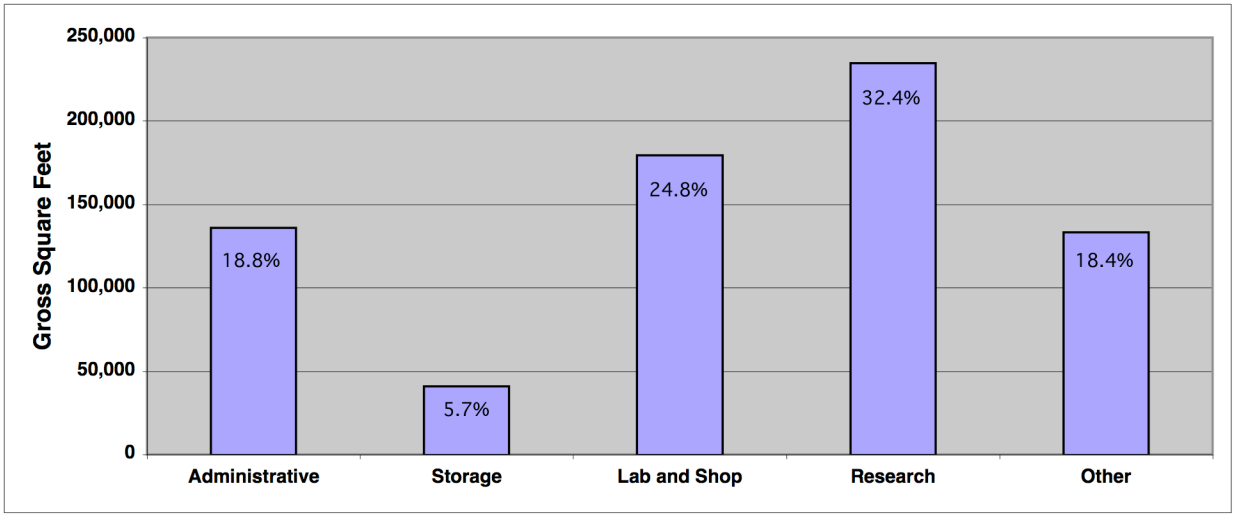


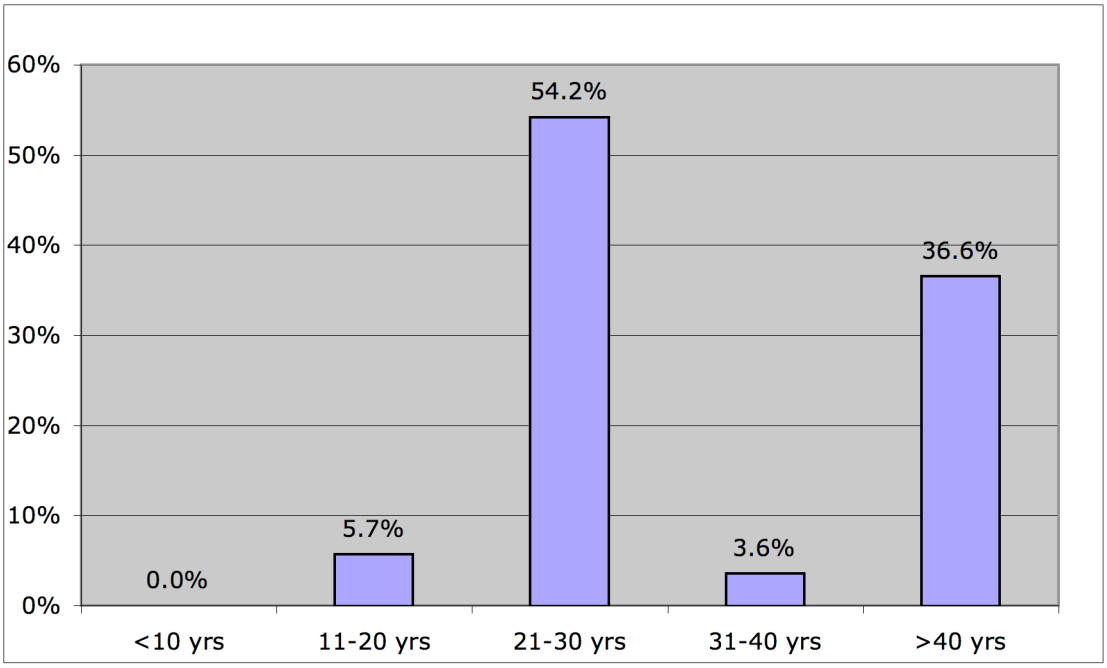
Figure 2 displays the condition of PPPL Buildings indicated as a percentage of total gross sq. ft. The .1% considered to be "failing" is due to the off-site Canal Pump house that will be repaired as necessary or replaced. The 3.1% considered top be "poor" includes the Material Storage Building, CAS Building and Theory Building. The Material Storage Building, used for temporary storage of hazardous materials, will eventually be removed. Consideration is being given to consolidating hazardous material storage in the Radiological Waste Storage Building, which will allow removal of the Material Storage Building. The CAS Building will be repaired over the next several years, which will include a new roof and HVAC system improvements. Repairs to the Theory Building have begun and include new roofing, painting and carpeting.

Figure 3. Use of Laboratory Space



Indicated as a percentage of total gross sq. ft.

Figure 4. Age of Laboratory Buildings



Indicated as a percentage of total gross sq. ft.

C. Current and Future Mission for the Site

The Ten Year Site Plan and the PPPL mission are consistent with the DOE Strategic Plan (DOE/ME-0030), the Office of Science Strategic Plan, and the Office of Science Publication "Facilities for the Future of Science: A Twenty Year Outlook." The Princeton Plasma Physics Laboratory (PPPL) is the only Department of Energy Lab devoted primarily to plasma and fusion science and is the leading U.S. institution investigating the physics of magnetic fusion energy. PPPL is the Collaborative National Center for plasma and fusion science. PPPL's mission focus is to make the scientific discoveries and develop the key innovations that will lead to an attractive new energy source; conduct world-class research along the broad frontier of plasma science and technology; and provide the highest quality of scientific education.

The majority of PPPL funding comes from the DOE Office of Science Fusion Energy Sciences program, with additional funding from the DOE-SC's program in Advanced Scientific Computing Research (PPPL participates in several SciDAC projects) and in High Energy Physics (for which PPPL has a theoretical research effort that uses unique capabilities of the laboratory in the area of advanced accelerator R&D). The DOE-SC Science Laboratories Infrastructure program provides funding of line item construction to maintain the general purpose infrastructure and the cleanup and removal of excess facilities. The Safeguards and Security program provides for protection of nuclear materials, government property, and other vital assets from unauthorized access, theft, diversion, sabotage, or other hostile acts. These activities result in reduced risk to national security and the health and safety of DOE and contractor employees, the public, and the environment. The PPPL S&S program consists of protective forces, security systems, cyber security, and program management.

In support of the increasingly collaborative nature of PPPL's research, office space, areas for small experiments, and shop areas are being modernized with an eye towards suitability and versatility. Available office spaces are being prepared and "pooled" for use among the various collaborative projects. This allows dedication of a smaller amount of space and reduces the total amount of resources dedicated to preparing and maintaining office space. Similarly, shop space is being refurbished and used cooperatively among projects. An example of this is the new machine shop that was recently relocated into room S109. The shop now accommodates the needs of NCSX, several Plasma Science & Technology Department projects and graduate student research. Lab areas are also being refurbished to be more modern and flexible to be reconfigured quickly and efficiently to meet the needs of new and changing small projects.

The projected funding profile for PPPL is displayed in the following table.

PPPL Funding / Staffing Profile
FY2006- FY2017
($ in Millions)

Fiscal Year	Total OFES	Other DOE	WFO	Total Funding	Total FTE's
FY2006	$71.0	$3.4	$2.2	$76.6	413
FY2007	72.8	3.7	2.2	78.7	422
FY2008	75.0	3.9	2.3	81.2	423
FY2009	82.0	4.0	2.5	88.5	423
FY2010	84.6	4.0	2.5	91.1	423
FY2011	87.8	4.0	2.5	94.3	423
FY2012	90.2	4.0	2.5	96.7	423
FY2013	93.7	4.0	2.5	100.2	423
FY2014	96.8	4.0	2.5	103.3	423
FY2015	99.5	4.0	2.5	106.0	423
FY2016	103.5	4.0	2.5	110.0	423
FY2017	107.5	4.0	2.5	114.0	423

Several specific facilities changes that are needed to support the major PPPL activities are discussed further under each activity's narrative below.

Fusion Energy Sciences

The laboratory hosts experimental facilities used by multi-institutional research teams and also sends researchers and specialized equipment to other fusion facilities in the United States and abroad. PPPL is the host for the NSTX, which is an innovative toroidal confinement device, closely related to the tokamak, and has started construction of another innovative toroidal concept, the NCSX, a compact stellarator. PPPL scientists and engineers have significant involvement in the DIII-D and Alcator C-Mod tokamaks and the NSF Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas in the U.S. and several large tokamak facilities abroad, including JET (Europe), JT-60U (Japan), and KSTAR (Korea). This research is focused on developing the scientific understanding and innovations required for an attractive fusion energy source. PPPL scientists are also involved in several basic plasma science experiments, ranging from magnetic reconnection to plasma processing. PPPL also has a large theory group that does research in the areas of turbulence and transport, equilibrium and stability, wave plasma interaction, and heavy ion accelerator physics. PPPL, LBNL, and LLNL currently work together in advancing the physics of heavy ion drivers through the heavy ion beams Fusion Virtual National Laboratory. PPPL, in partnership with ORNL, manages the U.S. ITER Project Office. Through its association with Princeton University, PPPL provides high quality education in fusion-related sciences, having produced more than 200 Ph.D. graduates since its founding in 1951.

Major Activities
Following are the major activities that PPPL will pursue to support aspects of the DOE mission and build on core strengths and capabilities of the laboratory.

The major activities are:
1. ITER
2. National Spherical Torus Experiment (NSTX)
3. National Compact Stellarator Experiment (NCSX)
4. Collaborative Computing

• U.S. participation in the ITER Burning Plasma Physics Experiment
Oak Ridge National Lab (ORNL) in partnership with PPPL will host the U.S. ITER Project Office. PPPL is participating in the U.S. efforts on this collaborative international science endeavor based around a fusion tokamak experiment operating at over 100 million °C and producing 500 MW of fusion power for over 400 seconds. Targeted at producing the first fusion experiment capable of sustained production of fusion energy, ITER is a necessary step toward the ultimate realization of fusion power as a viable alternative to current sources. ITER will be located in Cadarache, France. PPPL's efforts on the ITER project are not expected to require increased staffing or the development of new facilities. More likely are the needs to renovate existing laboratory, shop and office space to support the ITER activities. These renovations will be phased-in, as needed, over the next several years.

• The National Spherical Torus Experiment (NSTX)
Having begun operations in FY 1999, research on NSTX is considerably broadening the scientific scope of high temperature plasma physics. The innovative spherically shaped plasma configuration of NSTX may have several advantages, a major one being the ability to confine a higher plasma pressure for a given magnetic field strength. This has been demonstrated both experimentally and theoretically and will provide unique scientific input to the ITER Project. Since the amount of fusion power produced is proportional to the square of the plasma pressure, the use of spherically shaped plasmas could allow the development of smaller, more economical fusion reactors, as well as cost effective Component Test Facility. By utilizing over $170M of PPPL site credits, a world-class, low cost device was constructed as a joint project that includes PPPL, Oak Ridge National Laboratory (ORNL), the University of Washington, and Columbia University. The NSTX Facility is being operated by PPPL as a national facility with collaborators from universities, industry, and national laboratories.

NSTX is an operating experiment that is not expected to require additional buildings, staffing or utility capacity in the next few years, although future project upgrades that are being considered could result in the need for facility upgrades and added utility capacity.

• The National Compact Stellarator Experiment (NCSX)
The NCSX is a new experimental facility being fabricated and constructed by PPPL (lead) and

ORNL is the centerpiece of the U.S. effort to develop the physics and determine the attractiveness of the compact stellarator as the basis for a fusion power reactor. Being constructed at PPPL, operation is planned beginning in FY 2009. This innovative magnetic confinement experiment is the product of years of theoretical analysis and computer modeling. It is predicted that by confining the plasma within a highly optimized set of external coils, a very robust, stable plasma will result that is naturally capable of continuous operation at high temperatures and densities. The results of the experiment will greatly enhance our understanding of toroidal confinement for devices such as ITER and its successors.

NCSX takes advantage of many existing PPPL site credits and will not require a significant increase of facilities. The NCSX test cell is cited in the renovated area where the former PBX/PLT test cells were located. With the approval of CD-3, the project began fabricating the production components for the facility, including the vacuum vessel sub-assemblies and modular coil winding forms. Project operations are scheduled to commence in 2009.

A new machine shop is being mobilized in the PPPL Shop Building, which is in close proximity to the NCSX test cell. This new machine shop will be available for the Plasma Science & Technology Department's project use as well. The machine shop eliminates the need for the old machine shop in room T260 of the Engineering building, which can be renovated and converted into lab space for small experiments.

Extensive facility electrical utility and HVAC upgrades are required to support NCSX, smaller projects and modernize the Laboratory for future work. Two Science Laboratories Infrastructure (SLI) projects have been proposed by PPPL to accomplish these electrical and HVAC upgrades. These projects are key to enabling PPPL to meet the goals of the American Competitiveness Initiative by providing first class facilities. Renovation of Labs and offices in proximity of the NCSX test cell are anticipated for the next few years. Relocations of certain staff will also be required. Major mitigation of the transite (asbestos containing cementitious material) walls of the COB, CS, and RF buildings is required and is expected to be performed in phases as GPP funded projects. Staffing is expected to increase slightly over the next three years as NCSX fabrication and construction accelerates. Once NCSX is fully operational, NCSX and NSTX alternate operating 24 weeks every other year. Each facility will be serviced and modified, as appropriate, during the periods when the other facility is in operation. This plan for alternate periods of operations and upgrades permits the most cost-effective use of shared components and subsystems as well as the joint team of scientists, engineers, and technicians – avoiding significant increases in staffing or expansion of facilities.

• Collaborative Computing and Theory

PPPL's collaborative computing efforts are intended to maximize potential from ongoing experiments, while assisting in daily research and development of innovations, through collaborations among the U.S. fusion science community in the development of computer codes and sharing computational resources. Advanced computing has already proven useful in optimizing the design of devices used in fusion research, such as NCSX, and the communication of research data among the fusion research community is a practical and necessary aspect of achieving the overall goal of affordable fusion energy. The Computational Plasma Physics

Group (CPPG) currently plays a key role in this Fusion Collaboratory. As an example, PPPL's TRANSP code is currently being used worldwide for data interpretation via the Fusion GRID. PPPL has had great success maintaining this large code on a single architecture and making it available through the GRID.

Significant staffing increases for collaborative computing are not anticipated, nor are additional buildings. Electrical utility and HVAC upgrades and capacity increases will be needed for the computing activities – underscoring the need for funding of the two SLI projects proposed by PPPL to accomplish these electrical and HVAC upgrades. Reconfiguration of existing computing facilities (i.e., the PPLCC and FCC) should provide adequate space over the next five years to support on-site hardware for Collaborative Computing.

• Off-Site Research

Members of the PPPL research staff are participating in experiments at leading national and international facilities, thereby contributing important skills to the host teams, while strengthening the PPPL scientific program. National and international facilities provide opportunities for cutting-edge scientific research. While contributing to the programs at these facilities, PPPL scientists are taking advantage of resources at the Laboratory in the areas of theoretical support, diagnostic and radio frequency (RF) development, and integrative data analysis. This provides an excellent platform to address a wide range of key issues of fusion plasma science. Key interests of PPPL collaborators include advanced confinement regimes, magneto-hydrodynamic (MHD) stability, RF physics, supra-thermal particle effects, and divertor physics.

In addition to scientific personnel, experienced engineers are contributing to the operations teams at DIII-D (located at General Atomics) and C-Mod (located at the Massachusetts Institute of Technology), and are helping with the design and construction of upgrades and modifications to these devices.

• Plasma Science and Technology

Small-scale experiments are undertaken at PPPL in the areas of basic plasma physics, innovative fusion concepts, and applied plasma technology. This research diversifies the Laboratory's program, strengthens our connections with other fields of science, such as high energy physics and space physics, and plays an important role in the training of graduate students and postdoctoral associates. The Laboratory also encourages technology transfer from fusion research to address the near-term needs of the nation, such as plasma processing technology, and improved plasma thrusters for communications satellites.

Experimental upgrades in the Lab-wing and Lab Building will proceed at a rate of 1 or 2 per year. Given the expected growth rate of PS&T projects, these areas will be adequate for approximately the next five years. After that time, renovations of the RF building will be required to accommodate further growth.

• The Graduate Program in Plasma Physics and Science Education

The Laboratory places great importance on the continuation of its close relationship with the Princeton University Program in Plasma Physics. The Program, with over 200 Ph.D. graduates since its inception, provides training in plasma physics relevant to magnetic fusion, as well as in the broader field of plasma science. The scientific diversity of PPPL, as well as its outstanding capabilities in magnetic-confinement fusion, continues to attract the highest quality students to the Program. Within the School of Engineering, the Program in Plasma Science and Technology brings together students from a broad range of departments involved in plasma studies, building ties to fusion plasma science. The Science Education program serves undergraduates and students and teachers in grades K-12. Programs include scientific research experiences, partnerships with school districts, teacher staff development, and curriculum development with an emphasis on Internet-based science investigations for students.

Office refurbishments and lab upgrades in the Lab-wing and RF Building will be required to support new graduate program experimentation, primarily as part of the planned growth of the projects and PS&T activities discussed above.

• Future Large Experimental Devices

A successful outcome of the NSTX program would be to establish the foundation for an innovative national spherical torus experiment at the Performance Extension scale. An example of such an experiment could be a next step spherical torus (NSST) designed to achieve 5 - 10 MA in plasma current and, if performance projections are realized, to operate with deuterium-tritium fuel, thereby taking full advantage of the facility that is now available as a result of the decommissioning and decontamination of the Tokamak Fusion Test Reactor (TFTR). Based on the encouraging high performance H-mode high-beta discharges on NSTX, it is envisioned that the NSTX may be able to supply the physics base needed for the physics validation of NSST in the next five years. This would enable the design and construction of NSST to proceed during the following five-year period. FESAC has recently been asked to review the fusion program. As part of that review, the community and the Laboratory will propose new fusion facilities. The TFTR Test Cell is very well suited for a new major facility, which could be constructed during the second half of the ten-year period under discussion. Such a facility would have an impact on the Laboratory funding and staffing; however, since it has not been proposed estimates have not been included in the charts.

D. Facilities and Infrastructure (F&I)

D.1. Vision, Goals, and Strategy (VGS)

The vision of the organizations that provide infrastructure support is to make the contributions to PPPL and the DOE that enable the Laboratory to reach its full potential as a world leader in fusion and plasma physics science research. Related objectives include:

- Prevention of injuries and minimization of exposure to workers, the public and the environment to radiation and hazardous materials;
- Protection of DOE and Princeton University property;
- Compliance with environmental regulations;
- Operation of facilities in a manner that is efficient and cost effective; and
- Maintenance of an attractive and fully functional facility.

A modern, effective, and efficient physical infrastructure is of critical importance to maintaining PPPL's ability to continue world-class scientific leadership and research in support of the missions of the Office of Science and the Department of Energy (DOE) into the 21st Century. When developing plans and costs for new construction and facilities modifications consideration is given to flexibility, versatility, durability, longevity, use of sustainable design principles, rate of return and reducing operating and maintenance costs.

The overall condition of the Laboratory's facilities is considered good. Presently, there are no known conditions that could seriously impact establishing new or expanding current missions. A listing of buildings, conditions, square footage, and utilization is contained in Attachment 1. A Site map showing buildings and site layout can be found in Attachment 2.

- **Mission:** The laboratory's facilities and infrastructure will be adequate to accommodate each laboratory's expected programmatic mission activities and technological changes well into the 21st century. Facilities will be "right-sized" to the type and quality of space and equipment needed to meet mission needs. Activities and organizations that need to be co-located will be. Facilities will be readily adaptable to changing research requirements and technologies. Off-site leased space will be reduced where economically appropriate.

- **Working Environment:** The laboratory will achieve a quality of facilities, which provides a "preferred" working environment for our researchers that helps attract and retain high quality staff. The laboratory will employ the latest advances in information technology to enhance worker productivity, interactions with other scientists, and the advancement of science. Quality training and conferencing facilities will be available. Visiting scientists will have access to quality accommodations and to research support facilities.

- **Environment, Safety, Health and Security:** The laboratory's F&I will provide a safe, healthy, and secure working environment for laboratory employees and visitors. Retired facilities will be removed and environmental cleanup will be completed. The Laboratory will be viewed as a good community neighbor.

- **Operations and Maintenance:** F&I will be efficient to operate and maintain.

Facility and Infrastructure Issues

With the exception of the TFTR-related construction, most of the PPPL buildings and facilities are at least 30 years old, and, although structurally sound, will eventually require renovations to extend their use or to adapt them to house new programs.

Adequate space exists for PPPL's fusion devices, as well as for current and future non-fusion plasma science and technology projects. The pressing issue is the need to refurbish existing areas in order to support current and future work. The prime example is the National Compact Stellarator Experiment (NCSX), which is beginning construction. Improvements to the buildings, shops, storage areas and offices in proximity to the NCSX Test Cell are planned to support the project during construction and operation and eventually to provide office space for new scientific collaborators. Space will be more efficiently utilized to make room for the displaced operations. Several renovations and GPP projects are planned for the next two to three years to ready these facilities for NCSX.

Increasing demand for smaller laboratory areas where Principal Investigators and students can conduct research heightens the need to refurbish underutilized space. The same holds true for offices that are not currently occupied, but must be refurbished before they can be used. Good quality office space is nearly fully utilized and during peak periods in the summer, when there is an influx of students, office space is at a premium. The need for office space will increase in the vicinity of the NCSX test cell over the next few years as construction progresses and operations nears.

Over recent years, the Laboratory has consolidated staff into the main buildings and disposed of older outlying buildings. This trend has enabled a reduction in expenditures and we will continue to pursue this strategy. The Director's Office, the DOE Office, research and engineering groups and most administrative support activities are now centrally located at C-Site while NSTX is the primary experimental facility at D-Site. Requests for office space are, at times, difficult to accommodate within a reasonable proximity. On the other hand, there are areas of experimental, shop and lab space not being used because the activities they supported are no longer funded. These areas are generally within older, underutilized facilities. However, we have taken advantage of these facilities by renovating some underutilized shop and lab space. For example, the RF building is undergoing staged renovations. Outdated laser lab areas have been renovated for use as a Science Education Laboratory and learning facility. Other outdated labs in the RF building are currently being renovated for the new location for the Health Physics Calibration and Service Laboratory (CASL). Another example of consolidations is the recent reclamation of a former machine shop area for use by the new NCSX project and experimental projects. This project also consolidated a smaller machine shop from the second floor of the Lab Building. The area vacated by the small machine shop will be converted for use by small experiments.

The long-term plan to consolidate personnel and functions, and reduce reliance on high maintenance, temporary and facilities in poor condition continues. The D-Site Tritium Module was demolished in FY05 and the Health Physics Calibration and Service Laboratory (CASL) module is scheduled to be demolished in FY06. Studies into consolidating operations from the Hazardous Waste Storage Building into the relatively new Radioactive Waste Building are also being investigated. This would allow the demolition of the Hazardous Waste Storage Building

and more efficient and centralized services, which are all provided by the Materiel and Environmental Services Division.

Much needed roadway re-paving is planned for FY 06 and FY07. Parking space is adequate at this time. Area for storage space is adequate, although, storage is sometimes more remote than desired and several storage areas need to be cleaned of outdated equipment and organized to make more efficient use of the space. Fabrication and construction activities for NCSX have made consolidation of storage and shop space a more pressing issue, especially in the vicinity of the NCSX Test Cell. Renovation of the 3rd and 4th floors of the RF building for use as short-term and medium-term storage of experimental equipment has begun. Two rooms on the 3rd floor of the RF Building have been cleared and made available to the Plasma Science & Technology Department (PS&T) for their storage needs. Inventory controls are being established to ensure control of these areas. This extra storage space allows PS&T to alleviate hazards in the Lab wing that were caused by cramped storage areas and also frees valuable room in the Lab wing to perform experimental activities.

D.2 Process for Identifying F&I Needs and Development of Plans to Meet the Vision, Goals, and Strategy (VGS)

Prioritization Process

This TYSP covers a planning horizon of ten years (FY 2008 through FY 2017) and also includes data for FY 2006 and 2007. The TYSP describes the existing site and infrastructure of the Princeton Plasma Physics Laboratory (PPPL) in terms of how it supports current programs and what is needed to support programs planned for the future.

PPPL uses Procedure GEN-009 "GPP Prioritization" for assessing and prioritizing proposed GPP Projects. The Technical Resources Committee (TRC) is the final authority for establishing GPP Priorities and annual work plans and is composed of senior management representatives from technical, scientific, and administrative organizations within the Laboratory. The Maintenance & Operations Division serves as the focal point for collecting proposed projects. Proposed projects result from input from various organizations working at PPPL, but also as a result of facility assessments routinely performed by Maintenance & Operations. To facilitate the decision-making process, the TRC has formed a subcommittee, which is composed of subject matter experts from across the Laboratory to evaluate the merits of individual projects. This subcommittee uses criteria developed by the DOE for the Capital Asset Management Process (CAMP) to evaluate the proposed projects. It is important to note that the CAMP criteria is intended to be a tool for management to rank projects, but it is not intended to replace sound management judgment in reaching final decisions on project priorities. Prioritization results are shared with the DOE Princeton Site Office, which provides concurrence prior to authorizing work on any Project.

The CAMP prioritization process is a systematic, structured, and consistent method for determining the preferred order for allocating limited resources to solve problems. The process reflects the values of the Department of Energy and it includes two elements of risk -- consequence and probability. The process is universal encompassing four major categories: (1)

health and safety, (2) environment/waste management, (3) safeguards and security, and (4) programmatic. These rating criteria were developed and positioned based upon Departmental intentions and public expectations, appropriate standard industrial practices and they represent the desired level of operational conduct. As mentioned previously, this process is used for the General Plant Project Program, but it has also been adapted and extended for use on a selected few operating expense projects, as well.

Maintenance priorities are established on a fundamental basis that relies heavily on the knowledge and experience of in-house engineers and technicians. Typically, 3000 to 3500 work orders are completed in a given fiscal year. Priorities are established to address work tasks that: (a) affect environment, safety, health or security issues; (b) are directly related to facility operations; (c) require immediate action to restore equipment to operable status; and (d) provide preventive maintenance to operate the facilities in an efficient manner.

Facility Information Management System (FIMS)

The Facility Information Management System (FIMS) is a web-based database designed to track real property information for the Department of Energy (DOE). PPPL has responsibility to maintain the data in the database pertaining to PPPL buildings and other structures as accurately and reliably as possible.

The responsibility for FIMS at PPPL resides jointly in the Maintenance & Operations Division (M&O) and Accounting Division. The M&O Division has primary responsibility for physical inspection of real property and determines specifications, present condition and utilization status. In addition, the M&O Division determines real property values (RPV) and maintenance costs (deferred, actual and required) and enters these values in FIMS. Staff of the Accounting Division perform actual data entry of other information. Employees responsible for data collection and data input in both the Accounting and M&O divisions participate in DOE sponsored FIMS training as deemed appropriate.

PPPL staff make every effort to accurately measure, assess or otherwise determine the information required in FIMS. The Accounting and Maintenance & Operations Divisions work together to ensure that data is accurate and up-to-date. Accounting will automatically update records based on information contained in final cost reports approved by the DOE Princeton Site Office for projects which: a) have modified a facility or structure contained in the database; or b) should be added to the database. The DOE-PSO approval indicates which FIMS record to update. Once per year, a representative sample of approximately 10% of the buildings and structures in the database is randomly audited by Accounting and the DOE site office.

Designated staff of the Maintenance & Operations Division collect FIMS data through physical inspection of the property or from other reliable sources. Information regarding the condition of facilities and structures observed during routine inspections and in the performance of maintenance and repairs to real property is documented. Approximately 20% of PPPL real property is inspected annually by personnel from the Maintenance & Operations Division and the Power Engineering Branch, and the results are documented in a detailed listing of deferred maintenance tasks by building and OSF. The Division Heads for Accounting and M&O are responsible to report any major changes in the data reported in FIMS to the DOE-Princeton Site

Office. They must also report any change to the overall site's real property value that is greater than 5% and provide an explanation.

The sitewide Conventional Replacement Plant Value (RPV) at PPPL in October 2005 for Buildings and OSFs totaled $274,946,325. Conventional RPV is total RPV minus Category 3000. Two structures at PPPL are 'Shutdown Pending Disposal.' The first of these is the C-Site Cooling Tower/Pumphouse (FIMS Record #C60), and the second is the HP Calibration Lab (FIMS Record #C94). The C-Site Cooling Tower was removed in 2004, and only the Pumphouse remains. The HP Calibration Lab is now approved for removal, and demolition is scheduled for the summer 2006. Last year the Tritium Support Facility was removed, and this record has been deleted from FIMS.

Facilities Management, Space Management & Utilization

The Maintenance and Operations Division of the ES&H and Infrastructure Department has the lead responsibility for the majority of infrastructure maintenance performed at the Laboratory. In addition, the AC Power Group of the Engineering and Technical Infrastructure Department provides supplemental infrastructure maintenance on high voltage electrical infrastructure systems. The Heads of the ES&H and Infrastructure Department and the Engineering and Technical Infrastructure Department report to the Director of the Laboratory.

The Maintenance and Operations Division is responsible for the following:

- Designing and constructing new structures, modifying existing structures, and coordinating significant site improvements.
- Engineering and planning of maintenance and operations for existing conventional facilities.
- Maintaining, operating, inspecting, and repairing existing conventional facility systems and experimental support systems.
- Managing the site-wide efficient use of energy (electric/gas) and utility (water/sewer) services.
- Coordinating work space planning efforts.
- Providing housekeeping, grounds maintenance (snow removal and landscaping), trash removal, recycling, and material handling services to the Laboratory staff.
- Maintaining, operating, repairing and modifying security and fire detection, suppression and reporting systems.
- Providing support and service for telecommunications systems, local and long distance equipment and lines, voice mail, billing, calling cards, cellular phones, pagers, 2-way radio systems, and home data lines.

The AC Power Branch of the Electrical Engineering Division is responsible for the following:

- Designing and constructing new structures, modifying existing structures, and coordinating significant high voltage electrical system improvements.
- Engineering and planning of maintenance and operations for existing high voltage electrical system infrastructure.
- Maintaining, operating, inspecting, and repairing existing high voltage electrical system infrastructure.

PPPL Departments and Projects are not charged for space utilization. The Maintenance and Operations Division, line managers and Facility Managers throughout the organization are responsible for facilities management, space management and utilization. The overall PPPL Asset Utilization Index (AUI) is .977. The AUI for each of the PPPL facilities is listed in Attachment 2.

Condition Assessment Process

The Condition Assessment Process at PPPL is comprehensive and meets requirements established in DOE Order 430.1B, Real Property Asset Management. The Maintenance and Operations Division and the Power Engineering Branch of the Laboratory perform annual building and facility inspections as part of the Building Inspection Program. Each year, approximately twenty percent of the Laboratory space, based on square footage of buildings, is inspected. The Maintenance and Operations Division establishes which Buildings will be inspected in order to meet the twenty percent per year guidance set forth by DOE. Each building is scheduled for inspection within a five-year time frame.

Each building is inspected by lead craftsmen, who are experts in their field and Engineers using guidelines published by R.S. Means. All building systems are inspected including HVAC, electrical distribution, plumbing, roofing, walls and finishes, floors and finishes, building exterior, superstructure, doors and partitions, foundations, basements, elevators and cranes. Results of the inspections are reviewed by an Architectural Engineer using software from R.S. Means to tabulate and calculate costs of repairs, maintenance and improvements per system. The grand total of deferred maintenance for the current fiscal year and the projected maintenance requirements for the next ten years are then calculated. The dollar amounts per building are then entered into the FIMS database and into the Ten-Year Plan.

The square footage total of PPPL buildings is 724,166 square feet. The following buildings were inspected in FY2005:

Guardbooth (164 sq.ft.)
Admin Building, Library, and PPLCC (25,743 sq.ft.)
Theory (5,267 sq.ft.)
Mod 6 (8,164 sq.ft.)
Facilities Building (22,730 sq.ft.)
Warehouse Receiving 1 (13,083 sq.ft.)
Warehouse Receiving 3 (20,000 sq.ft.)
ESU Building (7,694 sq.ft.)
Material Control Support Building (2,351 sq.ft.)
RESA Building (20,750 sq.ft.)
CAS Building (15,000 sq.ft.)

The total area inspected in FY05 was 140,946 sq. ft. or 19.5% of the PPPL total building area of the total 724,166 sq. ft.

The next annual inspections will be completed in the summer of 2006. The resulting data will be entered into FIMS at that time. The buildings proposed to be inspected in the summer 2006 are:

RF Building (44,404 sq.ft.)
Admin Wing Cafeteria (9,721 sq.ft.)
Shop Building (17,390 sq.ft.)
CS Building (27,025 sq.ft.)
COB building (9,223 sq.ft.)
PLT Power Building (6,884 sq.ft.)
FCPC (33,997 sq.ft.)

D.3 Land Use Plans

The Department of Energy and The Trustees of Princeton University have entered into a Lease Agreement covering the PPPL "C" and "D" Sites. The contract provides for an ultimate build-out potential of approximately 900,000 square feet – roughly 170,000 square feet more than currently exists. The lease contains certain restrictions such as building height, facility uses and site design criteria, and requires PPPL to comply with applicable DOE directives contained in Appendix I of the prime contract. The lease has recently been amended to incorporate a section of the access roadway serving PPPL. The added land provides a security buffer that ensures that all vehicles, and passengers, pedestrians, bicyclists, and others entering the access roadway are employees, contractors, subcontractors, agents, licensees, invitees, authorized personnel, representatives, scheduled deliveries, or necessary equipment for PPPL or DOE. The lease also includes an easement provision to DOE for access and maintenance of the canal water line that crosses Forrestal Campus from the Delaware and Raritan Canal.

Land-Use issues at PPPL are addressed through the National Environmental Protection Act (NEPA) Program as defined in Laboratory procedure ESH-014 "NEPA Review System". It is PPPL's policy to comply with the policies of the Department of Energy (DOE) and to conduct operations in compliance with the letter and spirit of applicable environmental statutes, regulations, and standards. It is also the policy of PPPL that efforts to meet environmental obligations be carried out consistently across all operations and among all organizations and programs at PPPL facilities. Protection of the environment and the public is a responsibility of paramount importance to our facilities. PPPL is committed to ensuring incorporation of all DOE Departmental and National environmental protection goals in the daily conduct of its business. PPPL has an equal commitment to advance the goals of restoring and enhancing environmental quality and ensuring public health.

Environmental Restoration Program

This activity supports the PPPL technical personnel and program management for all environmental restoration activities at PPPL. These personnel are responsible for the technical, financial, regulatory, and administrative issues related to soil and ground water remediation. In addition to the environmental restoration program outlined below, these personnel are also responsible for cleanup actions conducted in response to spills or other environmental impacts.

Under EM-40, the Environmental Restoration Program completed a comprehensive site-wide remedial investigation (RI) and remedial actions (RA) to address soil and ground water

contamination present at the facility. This aggressive remedial strategy identified sites or operable units that could be quickly and easily remediated or stabilized to meet regulatory requirements. The purpose of this strategy is to address significant remedial measures rapidly and to move a site into monitoring as quickly as feasible, thus reducing DOE's long-term environmental mortgage. All environmental restoration work is overseen by the New Jersey Department of Environmental Protection (NJDEP), as required by a Memorandum of Understanding (MOU) between NJDEP and Princeton University.

All identified Areas of Concern with soil contamination have been remediated to below the applicable NJDEP Soil Cleanup Criteria. Ground water beneath the site is contaminated with chlorinated volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE), trichloroethylene (TCE) and 1,1,1-trichloroethane (TCA) at levels above the New Jersey Ground Water Quality Standards. Contaminated ground water is contained and captured by PPPL's foundation drainage system (primarily the D-site building complex), which discharges to the on-site detention basin.

Contaminated ground water is not migrating off-site. In addition to the ground water containment and extraction system created by the foundation drains, natural processes are degrading contaminants into less toxic by-products. Based on these findings, PPPL proposed a remedy that relies on the foundation drainage system to contain and extract contaminants and natural attenuation processes to degrade contaminants over time. A Remedial Action Work Plan (RAWP), outlining the procedures that used to monitor ground water conditions and ensure continued function of the foundation drainage system, was prepared and submitted to NJDEP in May 2000 and has been approved by NJDEP.

The final regulatory submittal, application for an Aquifer Classification Exception Area (CEA) designation was made to NJDEP in January 2002. NJDEP approved the CEA application in February 2002. Between 2002 and 2004, PPPL conducted quarterly ground water monitoring as required by NJDEP regulations. Since 2004, PPPL conducts annual ground water monitoring necessary to document containment by the foundation drainage system and degradation of contaminants. Long-term groundwater monitoring is expected to continue for up to 25 years, until contaminants have degraded to below regulatory levels. Budget estimates are based upon a relatively stable program that uses FY2000 costs as a planning base.

Environmental Management System (EMS) Program

Environmental Management System (EMS) is not a new program at PPPL. Since the 1980's, PPPL has had a system to address environmental concerns and issues and a method by which to minimize impacts. An EMS is a process that ties together all elements that should be included in a facilities environmental protection program. Each year, the program is evaluated against a standard, regulation, or other measurement tool; following the evaluation, actions for improvements are recommended, and a plan is prepared and presented to senior management. The process continues as the actions are implemented and annually reviewed by a PPPL assessment team. Progress is reported to senior management, and the cycle continues as a new plan of action is implemented.

Integration of EMS principles into an organization allows the organization systematically to reduce it overall environmental impact. Adoption of an EMS often results in increased

organizational effectiveness. Executive Order 13148 requires all appropriate Federal facilities, including DOE laboratories, to develop and implement an EMS. DOE Order 450.1 requires that DOE facilities integrate their EMS programs into the existing Integrated Safety Management System (ISMS). In December 2005, PPPL submitted to DOE-Princeton Site Office its self-declaration of the EMS program

D.4 Excess Real Property

PPPL has been implementing a long-term plan to consolidate personnel and functions, and reduce reliance on high maintenance temporary facilities. This plan has been in place since the mid-1990's and is ongoing. The D-Site Tritium Module (in 2005), the C-Site Cooling Tower (2004), which were in poor condition and no longer necessary, were demolished as part of this program. The Health Physics Calibration and Service Laboratory (CASL) is being demolished in 2006 and will be relocated to the RF building, which is being renovated as part of a GPP project. The C-Site Pump House is being considered for demolition in future years, as is the Hazardous Material Storage Building.

PPPL has proposed to the Office Science that the following project be included in the excess facility disposition plan although it is not yet included in the SC plan. See section 11 "Site's Alternate Investment Plan" for a discussion of this proposed activity.

HazMat Facility (building C93)
Gross square feet: 2,100
Estimated Completion Date: FY2008
Estimated Disposal Cost: $296,000

D.5 Long Term Stewardship

Not Applicable. PPPL has no Long Term Stewardship (LTS) activities.

D.6 Replacement Plant Value (RPV) Estimates

The following table lists PPPL's estimated Replacement Plant Value (RPV) for each year through FY 17. An escalation factor of 2.3% a year has been applied.

	RPV (Based on the RPV of existing facilities for FY 05* and Escalated at 2.3% per year) (A)	Estimated Additions/ Eliminations (B)	Total Estimated RPV (A) + (B)
FY 08	$275,483,768	**	$275,483,768
FY 09	$281,819,895		$281,819,895
FY 10	$288,301,752		$288,301,752
FY 11	$294,932,693		$294,932,693
FY 12	$301,716,144		$301,716,144
FY 13	$308,655,616		$308,655,616
FY 14	$315,754,695		$315,754,695
FY 15	$323,017,053		$323,017,053
FY 16	$330,446,445		$330,446,445
FY 17	$338,046,713		$338,046,713

* The FY08 RPV of $275,483,768 is the value provided by DOE-SC's TYSP guidance.

** PPPL has proposed to the Office Science that the following project be included in the excess facility disposition plan – it is not yet included in the SC plan -- see section 11.

HazMat Facility (building C93) – 2,100 Gross Square Feet
Estimated Completion Date: FY2008
Estimated Disposal Cost: $296,000

D.7 Maintenance

The PPPL funding of maintenance is in line with the DOE-SC guidance to provide 2% of the RPV values. PPPL's planned maintenance funding, along with the major projects and repairs are provided in the attached IFI Crosscut budget.

PPPL *Site Maintenance Funding Plan*

($000's)	RPV (escalated 2.3% per year) *	SC Maintenance Funding Goal (2% of RPV)	PPPL Site Maintenance Funding Plan (per IFI crosscut)
FY 08	$275,484	$5,510	$5,499
FY 09	$281,820	$5,636	$5,636
FY 10	$288,302	$5,766	$5,777
FY 11	$294,933	$5,899	$5,922
FY 12	$301,716	$6,034	$6,070
FY 13	$308,656	$6,173	$6,173
FY 14	$315,755	$6,315	$6,315
FY 15	$323,017	$6,460	$6,460
FY 16	$330,446	$6,609	$6,609
FY 17	$338,047	$6,761	$6,761

D.8 Deferred Maintenance Reduction (DMR).

DOE Office of Science Laboratories have a deferred maintenance (DM) backlog of over $630M primarily because of past under funding of maintenance. To address this backlog, DOE-SC is requiring certain sites to implement a DM reduction effort. PPPL has been included in this DOE-SC deferred maintenance reduction program. The required minimum DM reduction funding for PPPL from FY 07 to FY 11 for DM reduction are shown in the table below. Funding beyond FY 11 is also shown, assuming that funding will be continued, using a 2.3% escalation factor, until the DM reduction goal is met.. The DM reduction funding will be provided from overhead and is in addition to maintenance investment funding discussed in section D.7.

PPPL's Minimum DM Reduction Funding by Fiscal Year (as mandated by DOE-SC)

FY 07 ($000)	FY 08 ($000)	FY 09 ($000)	FY 10 ($000)	FY 11 ($000)	FY 12 ($000)	FY 13 ($000)	FY 14 ($000)	FY 15 ($000)	FY 16 ($000)	FY 17 ($000)
$396	$720	$1,050	$1,380	$1,380	$1,412	$1,444	$1,477	$857	$0	$0

According to DOE-SC TYSP guidance, the PPPL deferred maintenance backlog decreased from FY04 to FY05 from $12,232,069 to $11,535,423 for a decrease in deferred maintenance of $696,646. PPPL's goal is to eliminate the deferred maintenance backlog by FY15.

The Asset Condition Index (ACI) is calculated as 1 minus the ratio of deferred maintenance to RPV. According to the DOE-SC TYSP guidance, the PPPL Asset Condition Index (ACI) is .96 as of FY05, which is a modest improvement from the .95 that it was in FY04. This PPPL ACI is somewhat better than the ACI for all DOE-SC facilities of 0.91. The DOE corporate ACI goal is .95. The deferred maintenance reduction funding, combined with the PPPL GPP funding, should have a substantial impact on further improving this ACI indicator. The expected deferred maintenance trend is shown in the table below.

	SC DMR Funding Goal	Site DMR Funding Plan	Estimate of DM at the end of the Fiscal Year	Estimated ACI [1-(DM / RPV)]
FY 05	NA	NA	$11,535,423	.960
FY 06	NA	GPP plus Other	$11,000,000	.960
FY 07	$396,000	GPP plus Other	$10,000,000	0.960
FY 08	$720,000	GPP plus Other	$9,000,000	0.967
FY 09	$1,050,000	Other	$7,950,000	0.972
FY 10	$1,380,000	Other	$6,570,000	0.977
FY 11	$1,380,000	Other	$5,190,000	0.982
FY 12	$1,412,000	Other	$3,778,000	0.987
FY 13	$1,444,000	Other	$2,334,000	0.992
FY 14	$1,477,000	Other	$857,000	0.997
FY 15	$857,000	Other	$0	1.000
FY 16	$0	Other	$0	1.000
FY 17	$0	Other	$0	1.000

Buildings and infrastructure are inspected thoroughly at least once each five years. Each year, maintenance needs and improvements are re-evaluated for 20% of PPPL facilities by physical inspection. The master list of deferred and future maintenance needs is updated with the new information resulting from the inspections. The other buildings, which were not inspected during the year, are also reviewed and updated without the benefit of a full inspection. Based on funding availability of 2% per year for maintenance, the most pressing maintenance is scheduled for an initial five years of the planning cycle. The Maintenance and Operations Division and the AC Power Branch use the information to update their respective in-house maintenance databases and plan for near term and long-range maintenance requirements. The planning includes prioritizing the maintenance queue using risk-based decision making that considers maintenance history, asset life cycles, ES&H impacts, programmatic impacts, costs and workforce levels and schedules. The reductions in DM are in part due to the ongoing efforts to dispose of high maintenance modular and outlying buildings, to centralize staff and activities, and to provide adequate maintenance of those centralized facilities. Also helping to decrease the DM backlog somewhat is a new computerized maintenance management system that was purchased and installed in early FY2003. The new system allows for the more efficient prioritization, assignment and scheduling of maintenance tasks. Continued decreases in the deferred maintenance backlog are expected over the next several years as the recent trend continues and as overhead funding for deferred maintenance increases in accordance with the DOE-SC DM reduction goal.

PPPL has a total of four buildings that have an ACI categorization of "Poor" or "Fail". "Poor" means that the deferred maintenance as a percentage of RPV is from 25% to less than 60%. If deferred maintenance divided by RPV is greater than 60%, the building receives a "Fail" rating. The PPPL buildings with a FIMS rating of "Poor" are as follows:

- Hazardous Material Storage Building (C93) 2,100 G.S.F.
  Studies into consolidating operations from the Hazardous Waste Storage Building into the relatively new Radioactive Waste Building are being investigated. This would allow the demolition of the Hazardous Waste Storage Building and more efficient and centralized services, which are all provided by the Materiel and Environmental Services Division. This project is proposed for FY08.

- CAS Building (C91) 15,000 G.S.F.
  The CAS Building deferred maintenance includes a new roof, HVAC replacement, piping insulation, lighting, gutters and down spouts. The HVAC upgrade will be completed in FY2006 and the roof replacement is on the PPPL list of GPP jobs to begin in FY07.

- Theory Wing (C23) 5,267 G.S.F.
  The roofing replacement, carpeting and wall unit heater replacements are all on the GPP schedule for FY06, 07 and 08.

The only building that falls into the "Fail" category is the Off-Site Canal Pump house (Building P), which is 700 G.S.F. The Canal Pump house will be repaired as necessary.

The total expected DM over the FY 2006 to FY 2017 period based on the management strategy, approach, and funding discussed above is essentially covered by the additional deferred maintenance reduction funding listed above and the GPP projects and budget listed in Attachment 3.

D.9 Recapitalization & Modernization

The *recapitalization rate* is the number of years it would take to regenerate the physical facilities, either through replacement or major renovation. The numerator of the formula is the plant replacement value of facilities that are intended for recapitalization (RPV). It represents assets that have a continuing mission (i.e., facilities that will not be disposed of and so will need to be replaced or renovated at some point). The denominator includes the annual recapitalization investment.

The Science Laboratory Infrastructure (SLI) Program represented an initiative by DOE to improve the condition of the DOE Laboratory infrastructure. During the first several years, there was emphasis on using this funding for the retirement or excessing of facilities. PPPL received approximately $1.0M of SLI funding in FY04. With the discontinuation of SLI funding, plans for modernization of the PPPL infrastructure, which originated in 2002 have been deferred indefinitely. The current capital reinvestment strategy is focused on maintaining the reliability

and availability of the existing infrastructure. Recapitalization of the existing infrastructure is accomplished solely through funding from the General Plant Project Budget. Recent examples include the renovation of inactive areas of the RF Building and CS Building in preparation for NCSX activities in that area. The "reclaiming" of areas in the RF Building have allowed the relocation of Science Education to a refurbished area and the imminent relocation of the HP CASL operations from dilapidated modular buildings that are being removed. It is important to note that the GPP program is dynamic in nature – new projects continue to be identified on a real-time basis. Attachment 3 illustrates a proposed GPP project plan, however, the actual project work plan is decided upon at the beginning of each fiscal year, depending upon priorities and resources existing at that time. Restoration of SLI funding is critical to the modernization of Laboratory facilities [see Section D.11. for further discussion.]

D.9.a IGPP (Multiprogram Labs)

PPPL is a single program lab funded primarily by the DOE Office of Science. PPPL does not receive IGPP funding.

D.9.b Line Items

PPPL has proposed two line item projects that are discussed in section D.11.

D.9.c GPP

Several projects have been added to the GPP list. The following projects are among the newest to be ranked by priority using the CAMP process and will now compete for funding. [The comprehensive list of GPP projects is contained in the Integrated Facilities and Infrastructure Crosscut Budget - Attachment 3.]

PPPL's GPP budget was $1.79 million in FY06 and is expected to be $1.81 million in FY07. Ideally, the combination of GPP and GPE funding would total approximately 1% of Replacement Plant Value. This would allow for sustainment of the existing infrastructure without an increase in project backlog. The following list provides an example of some of the projects that have been or will be completed during FY2005 and 2006:

- Upgrade CS Building High Bay Crane
- Upgrade CS Building HVAC
- C-Site Diesel Generator
- CS Building Exterior Wall Upgrade
- D-Site Fire Alarm Upgrade
- Cafeteria, Walkway and LSB Roofing Upgrade

- Narrow Band Radio System Replacement
- HVAC Upgrade to CAS/RESA Building
- Water Tower Riser Replacement

In addition, the following projects are scheduled for work during FY07:

- Upgrade CS Building Control Room HVAC
- Upgrade CS Control Room Ceiling, Lighting, and Electrical Systems
- CS Test Cell Nitrogen Exhaust Ventilation System
- CS Test Cell Fire Suppression System
- C-Site MG Building Neutral Beam Rectifier Enclosure HVAC
- Upgrade Administration/Theory Roofing

D.10 Site Space Bank Analysis

PPPL has no space banked as of the end of FY2005. PPPL has proposed the removal of the Hazardous Materials Building in FY08 – this tentative project requires DOE-SC approval before it is scheduled.

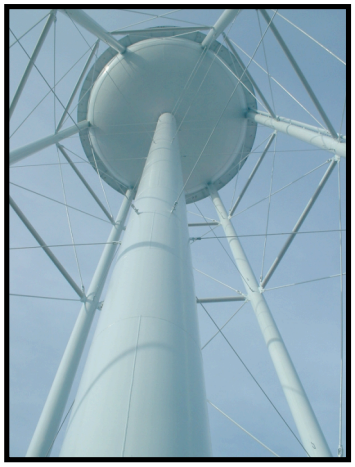
D.11 Site's Alternate Investment Plan for GPP and SLI Line Items and Excess Facilities Disposition (EFD)

Proposed SLI Line Item Projects

"Critical Facility HVAC Systems Upgrade"

Obsolete HVAC systems in many PPPL facilities are in need of upgrade in order to continue service. Reliability and availability of HVAC service systems in important experimental and office areas can jeopardize programmatic objectives. Modifications are needed to meet current standards, improve reliability, and reduce operational and maintenance costs. This project will upgrade and modernize HVAC, cooling water, control systems and windows in approximately 10 areas on PPPL's C-Site as well as key upgrades on D-Site. Major elements of the project consist of repairing and upgrading the D-Site Cooling Tower, installation of a new Cooling Tower to provide capacity, replacement of the Elevated Water Tower Riser, installation of window assemblies in the Lab and Administration Buildings, building wall upgrade / insulation upgrade, as well as the replacement of inefficient and failing stand-alone HVAC units.

The estimated cost of this project is $6,945 (Low End: $6,614, High End: $7,275).
PPPL proposes funding of this project over three years beginning in FY08 as follows:
FY08: $1,700 FY09: $3,500 FY10: $1,745



Elevated Tower Riser

Window Assembly Replacements

"Critical Infrastructure Electrical Service Upgrade"

Several obsolete components of the electrical distribution system require modernization in order to provide acceptable standards of reliability and availability for Laboratory experimental systems. This project will help in attaining the following objectives: Meet current environment, safety and health standards, Support the changed missions within the buildings, Provide high reliability and increased performance, Reduce the operational maintenance and repair costs, Realize annual cost savings of by avoiding productivity losses due to power interruptions and by reducing maintenance costs. This project will refurbish and upgrade 30-50 year old critical

components of the electrical power distribution system, and in experimental areas of the Laboratory Building. Deficiencies associated with transformers, switchyards, and circuit breakers will be corrected. The project will also upgrade the Building Automation System and tie-in several key components and facilities to this system.

The estimated cost of this project is $5,800K (Low End: $5,500, High End: $6,100).
PPPL proposes funding of this project over three years beginning in FY08 as follows:

FY08: $1,450K FY09: $2,900K FY10: $1,450K

PPPL has recently proposed to the Office Science that removal of the Hazardous Material Storage Building (building C93) be included in the excess facility disposition plan for FY08 – it is not yet included in the SC plan. PPPL proposes that this project be funded with Excess Facilities Disposition funds in FY2008. The reduction of 2,100 gross square feet could be completed for the estimated disposal cost of $296,000. The Hazardous Material Storage Building is in poor condition. In order to reduce deferred maintenance and to gain efficiency in operations, we plan to consolidate operations from the Hazardous Waste Storage Building into the relatively new Radioactive Waste Building. This will allow removal of the Hazardous Material Storage Building. This will also result in more efficient and centralized waste handling operations by the Materiel and Environmental Services Division, which provides all waste handling services at PPPL.

PPPL Hazardous Material Storage Facility

Comparison of SC's Current F&I Investment Plan to the PPPL Alternative Investment Plan for Direct Funded Needs (i.e., GPP, Line Items and EFD)

Year	SC Planned SLI Line Item Funding	Site Alternate Funding Plan for SLI Line Items	SC Planned EFD Funding	Site Alternate Funding Plan for EFD Funding
FY 05				
FY 06				
FY 07				
FY 08	$0	$3,150,000	$0	$296,000
FY 09	$0	$6,400,000		
FY 10	$0	$3,195,000		
FY 11				
FY 12				
FY 13				
FY 14				
FY 15				
FY 16				
FY 17				
Total	$0	$12,745	$0	$296,000

D.12 Performance Indicators and Measures

Performance measurement is a vital component of the PPPL management philosophy. Princeton University and the DOE have established a performance based contract for the operation of the Princeton Plasma Physics Laboratory. This contract, which is in effect through September 30, 2006, includes important facilities-related performance measures. PPPL and the DOE Princeton Site Office evaluate and re-establish the performance measures annually by mutual agreement. The current performance measures apply to fiscal year 2006 (October 2005 through September 2006) are included in Appendix B of the Prime Contract. Metrics for the performance expectations are reported on a quarterly basis.

The overall goal for Infrastructure and Maintenance as stated in the Contract is to "Sustain excellence in operating, maintaining, and renewing the facility and infrastructure portfolio to meet laboratory needs"

The current agreed upon performance measures for FY2006 are summarized below.

Objective 7.1: Manage Facilities and Infrastructure in an Efficient and Effective Manner that Optimizes Usage and Minimizes Life Cycle Costs.

Measure 7.1a: Maintenance Investment Index (MII) defined as total contractor funded maintenance for active conventional facilities divided by replacement value of these facilities.

A MII of greater than 2.0% would receive a grade of A+.

Measure 7.1b: Total building energy consumption declines consistent with planned site growth (or reduction). Reduce building energy consumption by 35% by 2010 (compared to FY85 baseline). A straight-line comparison shall be made to determine actual percent reduction achieved each year.

A reduction of greater than 32% would receive a grade of A+.

Measure 7.1c: Total system reliability for electrical and building support systems based on a calculation of the **Infrastructure Reliability Index (RI).**

A RI of greater than .995 would receive a grade of A+.

Objective 7.2: Provide Planning for and Acquire the Facilities and Infrastructure Required to Support Future Laboratory Programs.

Measure 7.2a: Projects shall be managed efficiently, completed on time, within budget, and meet baseline scope requirements. Uncosted carryovers are minimized. This is based on a calculation of Program Performance Index which is a ratio of actual expenditures to budget authority.

A Program Performance Index of greater than .90 would receive a grade of A+.

Measure 7.2b: Recapitalization Investment Index (RII) defined as total contractor budgeted GPP and Line Items for active conventional facilities divided by replacement value of these facilities.

A RII of greater than .7 would receive a grade of A+.

Measure 7.2c: The Ten Year site Plan (TYSP) will be submitted to DOE on an annual basis (the target is based upon the DOE schedule used FY05. If the DOE schedule for FY06 changes, the targets should be adjusted accordingly.

A TYSP submittal by May 22, 2006 would receive a grade of A+.

D.13 Energy Management

Performance

PPPL's Performance Contract with the Department of Energy contains a specific incentivized performance measure that corresponds directly with both the National Energy Conservation Policy Act (NECPA) goals. During FY05, PPPL achieved an adjectival rating of "Outstanding" in accordance with established contractual performance metrics. In addition the laboratory has implemented the requirements of the Energy Policy Act of 2005, and has exceeded the goals for the first half of FY06.

PPPL's FY05 In-House Energy Management Program (IHEM) resulted in a reduction of 36.7% in building energy consumption per SF during FY05 vs. the FY85 Base Year. This compares with a NECPA goal of a 20% reduction between FY85 and FY00 and the Executive Order 13123 goal of 30% by FY05. In addition, the laboratory has implemented the requirements of the Energy Policy Act of 2005, achieving a 10% reduction in energy consumption during the first half of FY06. These results demonstrate that PPPL has exceeded the DOE goals. These significant savings were chiefly attributed to prudent management of energy, computerized Building Automation System (BAS) operation, in-place energy retrofit projects and employee energy conservation initiatives.

The Maintenance & Operations Division within the ES&H and Infrastructure Support Department is chartered with managing the PPPL In-House Energy Management Program. A

Facilities Engineer is assigned to manage the various energy expense accounts and the M&O Division has established several goals and objectives directly related to efficient facility operations (including energy efficiency.) The importance of achieving the DOE targets is reflected in performance evaluations of cognizant PPPL personnel. The PPPL In-House Energy Management (IHEM) Program includes providing appropriate control, organization, planning, and administration of all PPPL's relevant utility contracts, and providing direct liaison interfaces with all utility companies.

There are multiple utility accounts that principally include variations of electric and natural gas rate schedule accounts, fuel oil, propane gas, potable water, process (i.e. canal) water, and sewage water at the Laboratory. All utility invoices are technically and financially evaluated before approval for payment. This includes verifications of utility billing(s) included utility costs vs. rate schedules, utility usage, profiles, engineering/statistical analysis, and database maintenance.

As previously noted, PPPL has met the DOE goals for energy conservation. Efforts have included surveys/audits by subcontractors. Future efforts will mainly employ the increased utilization of the Building Automation System (BAS) and in the installation of additional energy efficient lighting and building controls.

D.14 Leasing & Third Party / Non-Federal Funded Construction of New Buildings

At this time, PPPL does not lease any space and has no plans for construction of non-federal funded buildings.

E. Appendices

Attachment 1 Inventory of Buildings, Conditions, Square Feet and Utilization
Attachment 2 Site Map of C and D-Site Buildings
Attachment 3 IFI Crosscut Budget
Attachment 4 Acronyms
Attachment 5 List from FIMS of All SC Excess Facilities (All are Non-Operational)

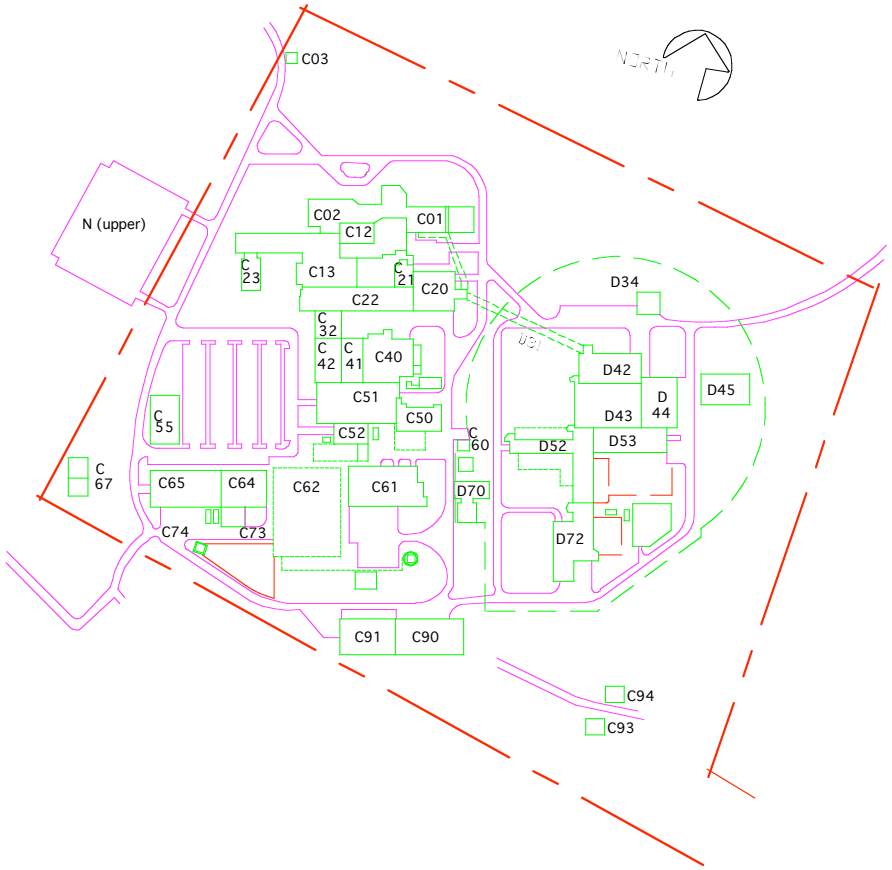
Attachment 1 Inventory of Buildings, Conditions, Square Feet and Utilization

Verified March 2006	FIMS		Building					(=1-FCI)
Bldg Name	Bldg No.	Gross Sq. Ft.	FY05 RPV as of Sept 2005	FY05 DM	FCI	RIC	AUI	ACI
LSB	C01	111,943	$16,572,922.03	$1,289,833.04	7.78%	$0	1.00	0.92
Guardbooth	C03	164	$258,531.22	$18,265.83	6.40%	$0	1.00	0.94
Admin Wing/Cafeteria	C12	9,721	$2,142,322.67	$332,061.85	15.50%	$0	1.00	0.85
Admin Bldg/Library/Computer Add.	C13	25,743	$3,985,311.72	$461,408.83	11.58%	$0	1.00	0.88
Engineering Wing	C20	19,086	$2,954,731.75	$175,038.74	5.92%	$0	1.00	0.94
L-Wing	C21	4,114	$1,550,343.17	$158,154.93	10.20%	$0	1.00	0.90
Lab Bldg	C22	31,474	$11,417,937.23	$670,766.50	5.87%	$0	1.00	0.94
Theory	C23	5,267	$815,392.02	$378,107.19	46.37%	$3,100,000	1.00	0.54
Shop Bldg	C32	17,390	$4,985,418.06	$861,672.00	17.28%	$0	1.00	0.83
RF Bldg	C40	41,404	$10,149,131.75	$769,350.00	7.58%	$0	1.00	0.92
CS Bldg	C41	27,025	$6,624,487.62	$492,384.00	7.43%	$0	1.00	0.93
COB Bldg	C42	9,223	$1,427,826.20	$326,204.40	22.85%	$0	1.00	0.77
System Test Bldg	C50	8,346	$2,045,808.46	$91,296.20	4.46%	$0	1.00	0.96
C-Site MG Bldg	C51	64,857	$15,898,034.93	$683,182.80	4.30%	$0	.80	0.96
PLT Power Bldg	C52	6,684	$610,809.71	$54,367.40	8.90%	$0	1.00	0.91
Mod 6 (ERWM)	C55	8,164	$1,263,880.85	$212,234.38	16.79%	$3,100,000	1.00	0.83
C-Site Tower/Pumphouse	C60	1,460	$30,000.00	$0.00	0.00%	$0	0.00	1.00
Facilities Bldg	C61	22,730	$6,516,305.50	$349,504.21	5.36%	$0	1.00	0.95
Warehouse Receiving 1	C64	13,083	$1,195,575.02	$64,873.36	5.43%	$0	1.00	0.95
Warehouse Receiving 3	C65	20,000	$1,827,677.18	$158,341.39	8.66%	$0	1.00	0.91
ESU Bldg	C67	7,694	$1,233,762.69	$54,569.84	4.42%	$0	1.00	0.96
Material Control Support Space	C73	2,351	$363,961.77	$6,264.31	1.72%	$0	1.00	0.98
Gas Cylinder Storage	C74	1,200	$109,660.63	$25,645.00	23.39%	$0	1.00	0.77
RESA Bldg	C90	20,750	$5,086,331.85	$551,156.03	10.84%	$0	1.00	0.89
CAS Bldg	C91	15,000	$1,370,757.88	$437,448.02	31.91%	$0	1.00	0.68
Hazmat Storage Bldg	C93	2,100	$191,906.10	$68,728.60	35.81%	$0	1.00	0.64
Mod 3 (HP Calibration Lab)	C94	2,170	$622,102.19	$87,193.00	14.02%	$0	1.00	0.86
LEC Building (Liquid Effluent Collection)	D34	4,550	$1,191,995.72	$46,161.00	3.87%	$0	1.00	0.96
Rad Waste Handling Facility	D35	5,600	$1,372,696.78	$0.00	0.00%	$0	1.00	1.00
Experimental Area	D42	92,136	$64,963,991.28	$687,286.00	1.06%	$0	1.00	0.99
FCPC	D52	33,997	$7,312,423.12	$210,289.00	2.88%	$0	1.00	0.97
NBPC	D53	43,680	$12,796,927.68	$143,612.00	1.12%	$0	1.00	0.99
D-Site Cooling Tower/Pumphouse	D70	4,600	$1,205,094.58	$65,414.97	5.43%	$0	1.00	0.95
D-Site MG Bldg	D72	39,760	$12,713,134.08	$215,418.00	1.69%	$0	1.00	0.98
Off-Site (Rt. 1) Canal Pumphouse	P1	700	$183,383.95	$140,534.60	76.63%	$0	1.00	0.23
TOTALS...		724,166	$203,017,577.39	$10,286,767.42				

AUI Range = 1.00 > 0.98 Excellent, 0.98 > 0.95 Good, 0.95 > 0.90 Adequate, 0.90 > 0.75 Fair and 0.75 > Poor

ACI Range = 1.00 > 0.98 Excellent, 0.98 > 0.95 Good, 0.95 > 0.90 Adequate, 0.90 > 0.75 Fair and 0.75 > Poor

NO.	DATE	REVISION	BY	CH	APPROVED		
	5/10/06	DELETED C33, REV. C60 PER ECN #5127	FJ	JN	JG	JS	



C-SITE

C01 LSB East Wing
C02 LSB West Wing
C03 LSB Guard Booth
C12 Cafeteria/Admin Wing
C13 Administration Bulding - GPCC/Library
C20 Engineering Wing
C21 L Wing Addition
C22 Laboratory Building
C23 Theory Wing
C32 Shop Building
C40 RF Building
C41 CS Building
C42 COB Building
C50 Systems Test Building (Exper. Pwr./ESAT)
C51 MG Building
C52 PLT Power Building
C55 Modular Building 6
C60 Cooling Tower Pit
C61 Maintenance Building
C62 Switchyard
C64 Receiving #1
C65 Receiving #3
C67 Emergency Ser Bldg
C73 Material Control Support Facility
C74 Gas Cylinder Stor Bldg
C90 Research Equip Stor & Assy
C91 CAS Bldg
C93 Material Storage Bldg
C94 HP Cal Lab Mod 3

D-SITE

D31 TFTR-Control Room Tunnel

D34 LEC Building
D35 Rad Waste Facility
D42 Mock-Up Building
D43 TFTR Test Cell
D44 Hot Cell & NB Test Cell
D52 FCPC Building
D53 NBPC Building
D70 TFTR Cooling Tower Pump House
D72 TFTR MG Building

Parking lots refered to as lettered

PRINCETON PLASMA PHYSICS LABORATORY

"C"-SITE & "D"-SITE BUILDINGS

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	Project Number	Gross Building Area	FY 2006 Approp. ($000)	FY 2007 Budget ($000)	FY 2008 Budget ($000)	FY 2009 Budget ($000)	FY 2010 Budget ($000)	FY 2011 Budget ($000)	FY 2012 Budget ($000)	FY 2013 Budget ($000)	FY 2014 Budget ($000)	FY 2015 Budget ($000)	FY 2016 Budget ($000)	FY 2017 Budget ($000)
SITE NAME: Princeton Plasma Physics Laboratory														
PROGRAM: Science														
1.0 Capital Line Item (Include project number & identify Funding Program)														
1.1 New Construction (facilities and additions)														
1.2 All Other Projects (recap)														
Subtotal Line Item Projects														
2.0 General Plant Project (GPP) (Include project number & identify Funding Program)														
2.1 New Construction (facilities and additions)														
2.2 All Other Projects (recap)														
C-Site Diesel Generator	G157		66											
Upgrade CS Building High Bay Crane - Construction	G161		307											
CS Building HVAC Upgrade	G166		200	50										
CS Building Exterior Wall System Upgrade	G164		407											
D-Site Fire Alarm Upgrade - Test Cells	G158		150											
Narrowband Paging System Conversion	G167		58	413										
Upgrade LSB 1st Floor and Covered Walkway Roofing	G163		346											
HVAC Upgrade to CAS/RESA Building	G168		194											
Replace Elevated Water Tower Riser	G165		63		345									
CS Building Control Room HVAC	AT 1			108										
CS Building Test Cell Nitrogen Exhaust Ventilation System	AT 2			144										
CS Building Control Room Ceiling, Lighting, & Convenience Outlets	AT 3			288										
CS Building Fire Supression System	AT 4			50										
MG Building Neutral Beam Rectifier Enclosure HVAC	AT 5			75										
Upgrade Administration / Administration Wing / Theory Roofing	AT 6			550										
Upgrade RESA/CAS Roofing System	AT 7			132	268									
BAS Alarm System / Trunk Upgrade	AT 8				150									
MG & RF Building Exterior Wall System Upgrade	AT 9				1,500									
Install New Wall Unit Heaters at Lab Wing and Theory Wing	AT 10				37	213								
Computer Center Drainage Improvements	AT 11					30								
Cafeteria Upgrade	AT 12					200								
Consolidation of Waste Management Operations	AT 14					200								
C-Site Fire Alarm Upgrade	AT 15					500								
D-Site Cooling Tower Upgrade	AT 16					165								
Upgrade VQT1 Transformer	AT 17					350								
Substation Breakers	AT 18					842	1,758							
L-Wing 1st Floor Electrical Distribution Upgrades	AT 19						115							
L-Wing 2nd Floor Electrical Distribution Upgrades	AT 20						290							
Install New Window Assemblies at Lab Wing, Administration Wing, and Administration Building	AT 21						340							
Replace CICADA Computer HVAC Units	AT 22						150							
Replace PPLCC Central Computer HVAC Unit	AT 23						140							
LSB Basement UPS for Computer Room & Critical Control Room Stations	AT 24						7	43						
C & D-Site Roadway Improvements	AT 25							200						
15KV & 4KV Circuit Breakers	AT 26							400						
Upgrade Emergency Generator Controls	AT 27							50						
Upgrade XQT1 Transformer	AT 28							993						
C-Site HVAC Systems Upgrades	AT 29							1,189	211					
D-Site HVAC Systems Upgrades	AT 30								1,100					
Replace HVAC Equipment (CFC's)	AT 31								230					
New Cooling Tower - Phase 1	AT 32								445					
Modify Cafeteria Courtyard	AT 33								80					
138kV Switchyard Fire Protection Improvements	AT 34								200					
Grounds Improvement	AT 35								100					
Replace LSB Basement HALON Systems	AT 36								255					
Additional Reserve Fuel Oil Tank for Central Plant	AT 37								300					

Upgrade Restroom Facilities	AT 38								39					
Outyear Projects										2,990	2,997	3,005	3,012	3,020
Subtotal GPP:			1,791	1,810	2,300	2,500	2,800	2,875	2,960	2,990	2,997	3,005	3,012	3,020
3.0 Institutional General Plant Project (IGPP)														
Subtotal IGPP Projects														
4.0 Operating/Expense for Excess Elimination and Other														
4.1 Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column														
4.1 Subtotal														
4.2 All Other (List direct O&E maintenance under 5.1)														
4.2 Subtotal														
Subtotal Operating/Expense Projects														
TOTAL Capital & Operating Investment: *			1,791	1,810	2,300	2,500	2,800	2,875	2,960	2,990	2,997	3,005	3,012	3,020
TOTAL Overhead Investments (IGPP)														

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	Project Number	Gross Building Area	FY 2006 Approp. ($000)	FY 2007 Approp ($000)	FY 2008 Budget ($000)	FY 2009 Budget ($000)	FY 2010 Budget ($000)	FY 2011 Budget ($000)	FY 2012 Budget ($000)	FY 2013 Budget ($000)	FY 2014 Budget ($000)	FY 2015 Budget ($000)	FY 2016 Budget ($000)	FY 2017 Budget ($000)
SITE NAME: PPPL														
PROGRAM: Science														
5.0 Maintenance & Repair														
5.1 Direct Funded (by HQ or Site Program)														
List direct O/E maintenance projects														
5.1._ Deferred Maintenance Reduction (Direct Funded)			119											
Sub-Total Direct Maintenance & Repair			119											
5.2 Indirect (from Overhead)														
Include indirect O/E maintenance projects in total			4,545	4,714	5,124	5,261	5,401	5,547	5,695	5,826	5,960	6,097	6,237	6,381
OPEX projects														
Test and Inspect fire Protection Systems			50	51	51	52	52							
Combine BAS (Building Automation System) Cabinets			16	17	17	18	18							
Replace insulation on chilled/steam lines			3	3	4	4	4							
Replace Telephone room HVAC Unit			47											
Replace fencing around Canal Pump House			11	14										
Provide back up heat to PEARL Lab				28	21									
Replace carpeting in selected areas			18	21	22	22	23							
Improve outside lighting					19	29	29							
Roadway and Parking lot paving and striping			100											
Replace variable speed drives on selected HVAC			5	6	6	10	10							
Replace LSB East Addition Dry Cooler			20											
Hallway Painting and carpet installation			100	100	100	100	100							
Replace HVAC units			80	85	85	90	90							
Repairs to the D-Site Cooling tower			50	50	50	50	50							
Outyear projects								375	375	384	392	401	411	420
Subtotal Indirect Maintenance & Repair (from Overhead)			5,045	5,089	5,499	5,636	5,777	5,922	6,070	6,210	6,352	6,499	6,648	6,801
5.2._ Deferred Maintenance Reduction (Indirect Funded)			-	396	720	1,050	1,380	1,380	1,412	1,444	1,477	857	0	0
Sub-Total Indirect Maintenance & Repair (Overhead & DM Reduction)			5,045	5,485	6,219	6,686	7,157	7,302	7,482	7,654	7,829	7,356	6,648	6,801
TOTAL Maintenance and Repair (Direct and Indirect Funded)			5,164	5,485	6,219	6,686	7,157	7,302	7,482	7,654	7,829	7,356	6,648	6,801
6.0 Indirect O&E Excess Elimination (demolition, sale, lease, transfer) Show area eliminated in Gross Area column														
Total Indirect Excess Elimination														

Integrated Facilities and Infrastructure Budget Data Sheet (IFI)	FY 06 Square Feet	FY 07 Square Feet	FY 08 Square Feet	FY 09 Square Feet	FY 10 Square Feet	FY 11 Square Feet	FY 12 Square Feet	FY 13 Square Feet	FY 14 Square Feet	FY 15 Square Feet	FY 16 Square Feet	FY 17 Square Feet
SITE NAME												
PROGRAM:												
7.0 Area of Excess Eliminated												
List of projects, by type of funding, with project number, and excess AREA eliminated by fiscal year accomplished.												
Excess Elimination: Removal of CASL	2,170											
GPP												
IGPP												
Operations/Expense												
Indirect Operations/ Expense												
Transfer by sale or lease, or transfer to an outside federal agency												
Subtotal of Excess Facility Area Eliminated	2,170											
Total Area to be Eliminated Each Year (Demolition, Sale or Transfer Completion Year)												
Total Area to be Added by GPP, IGPP, and LI Construction (List Area Under Occupancy Year)												

Attachment 4

Acronyms

ACI	Asset Condition Indices
AUI	Asset Utilization Index
BAS	Building Automation System
BHP	boiler horsepower
BTU	British Thermal Unit
CAMP	Capital Asset Management Process
CASL	Calibration and Service Laboratory
CCWP	Central Chilled Water Plant
CDX-U	Current Drive Experiment-Upgrade
CEA	Classification Exception Area
CY	Calendar Year
D&D	Decontamination and Decommissioning
DESC	Defense Energy Support Center
DM	Deferred Maintenance
DOE	Department of Energy
DOE-SC	Department of Energy off Office of Science
ES&H	Environment, Safety and Health
ES&H/IS	Environment, Safety and Health and Infrastructure Support Department
ESU	Emergency Services Unit
EVES	Emergency Voice Evacuation System
F&I	Facilities and Infrastructure
FCPC	Field Coil Power Conversion
FESAC	Fusion Energy Sciences Advisory Committee
FIMS	Facility Information Management System
FY	Fiscal Year
GPD	gallons per day
GPE	General Purpose Equipment
GPM	gallons per minute
GPP	General Plant Projects
HVAC	heating, ventilating and air conditioning
IFE	Inertial Fusion Energy
IFI	Integrated Facilities and Infrastructure
ISM	Integrated Safety Management
ITER	International Thermonuclear Experimental Reactor
kA	Kilo-amps
KSTAR	Korea Superconducting Tokamak Research Project
kW	Kilo-watts
kWh	Kilowatt-hour
LANL	Los Alamos National Laboratory
LECT	Liquid Effluent Collection Tanks
LLNL	Lawrence Livermore National Laboratory
LPDA	Laboratory Program Development Activities
LSB	Lyman Spitzer Building
LVG	Large Volume firm Gas
M&O	Maintenance & Operations Division
MFE	Magnetic Fusion Experiment
MG	motor-generator
MHD	magneto-hydrodynamic

MNX	Magnetic Nozzle Experiment
MOU	Memorandum of Understanding
MPI	Modernization Planning Indicator
MRX	Magnetic Reconnection Experiment
NASA	National Aeronautics and Space Administration
NBI	Neutral Beam Injection
NCSX	National Compact Stellarator Experiment
NEPA	National Environmental Policy Act
NERSC	National Energy Research Scientific Computing
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NSST	Next Step Spherical Torus
NSTX	National Spherical Torus Experiment
OFES	Office of Fusion Energy Sciences (DOE)
ORNL	Oak Ridge National Laboratory
PBX-M	Princeton Beta Experiment-Modification
PEPCO	Potomac Energy Power Company
PPPL	Princeton Plasma Physics Laboratory
PSACI	Plasma Science Advanced Computing Institute
PSE&G	Public Service Electric and Gas
QA	Quasi-axisymmetry
QAS	quasi-axisymmetric stellarator
QO	Quasi-omniginous
QOS	Quasi-omniginous Stellarator
R&D	Research and development
RF	radio frequency
RI	remedial investigation
RIC	Rehab and Improvement Cost
RPAM	Real Property Asset Management
RPV	Replacement Value
SBRSA	Stony Brook Regional Sewage Authority
SC	Office of Science (DOE)
SciDAC	Scientific Discovery through Advanced Computing
SEAB	Secretary of Energy Advisory Board
SLI	Science Laboratory Infrastructure
SPCC	Spill Prevention Control and Countermeasure
sq. ft.	Square Feet
ST	Spherical Torus
TFTR	Tokamak Fusion Test Reactor
TRC	Technical Resources Committee
TSG	Transportation Service Gas
TYSP	Ten-Year Site Plan
UHF	Ultra high frequency
VOCs	volatile organic compounds

Attachment 5.

List from FIMS of All SC Excess Facilities (All are Non-Operational)

Excessed Buildings

Site Name	Prpty ID	*Excessed Buildings - Property Name*	G.S.F.	Excess Year
PPPL	C60	C-Site Pumphouse (Cooling Tower Demolished)	1,460	2004

Excessed Real Property Trailers

Site	RP Trailer Prpty ID	Real Prpty Trailers Prpty Name	GSF	Year

Excessed Other Structures and Facilities

Site Name	Prpty ID	OSF Prpty Name	Excess Yr.