

Supplement 3: Site and Facilities

A. Description of Site and Facilities

1. Overview of Site and Facilities

Argonne National Laboratory conducts basic and technology-directed research at two sites owned by DOE. Argonne-East is located on a 1,500-acre site in DuPage County, Illinois, about 25 miles southwest of Chicago. Argonne-West is located on an 800-acre tract within the Idaho National Engineering and Environmental Laboratory, about 35 miles west of Idaho Falls, Idaho. Argonne-West is devoted mainly to R&D on nuclear technology.

a. Argonne-East

Activities at Argonne-East support the full range of missions described in Chapter II. Major facilities at the site include the Advanced Photon Source (APS), the Laboratory's newest and largest user facility; the Intense Pulsed Neutron Source (IPNS); the Argonne Tandem-Linac Accelerator System (ATLAS); and the Electron Microscopy Center. Researchers from outside Argonne use all these facilities heavily. Argonne-East also houses a full spectrum of administrative and technical support organizations, as well as DOE's Chicago Operations Office and the New Brunswick Laboratory, both of which use facilities operated and maintained by Argonne.

Altogether, Argonne-East currently houses approximately 4,800 persons, including employees of DOE and contractors and other guests. An additional 2,200 individuals visit the site each year to use the Laboratory's research facilities. The Argonne-East site includes 101 buildings having 4.6 million total square feet of floor space. An additional 110,000 square feet of space is provided by various other structures and facilities throughout the site. The replacement value of all existing facilities and other structures at

Argonne-East is estimated to be approximately \$1.9 billion. (See Table S3.1.)

Research programs supported by DOE's Office of Science account for over half of the space usage at Argonne-East. Figure S3.1 summarizes the distribution of space at Argonne-East (and Argonne-West) by functional unit (administrative, R&D, housing, and so on) and by condition of space, as a percentage of gross square footage.

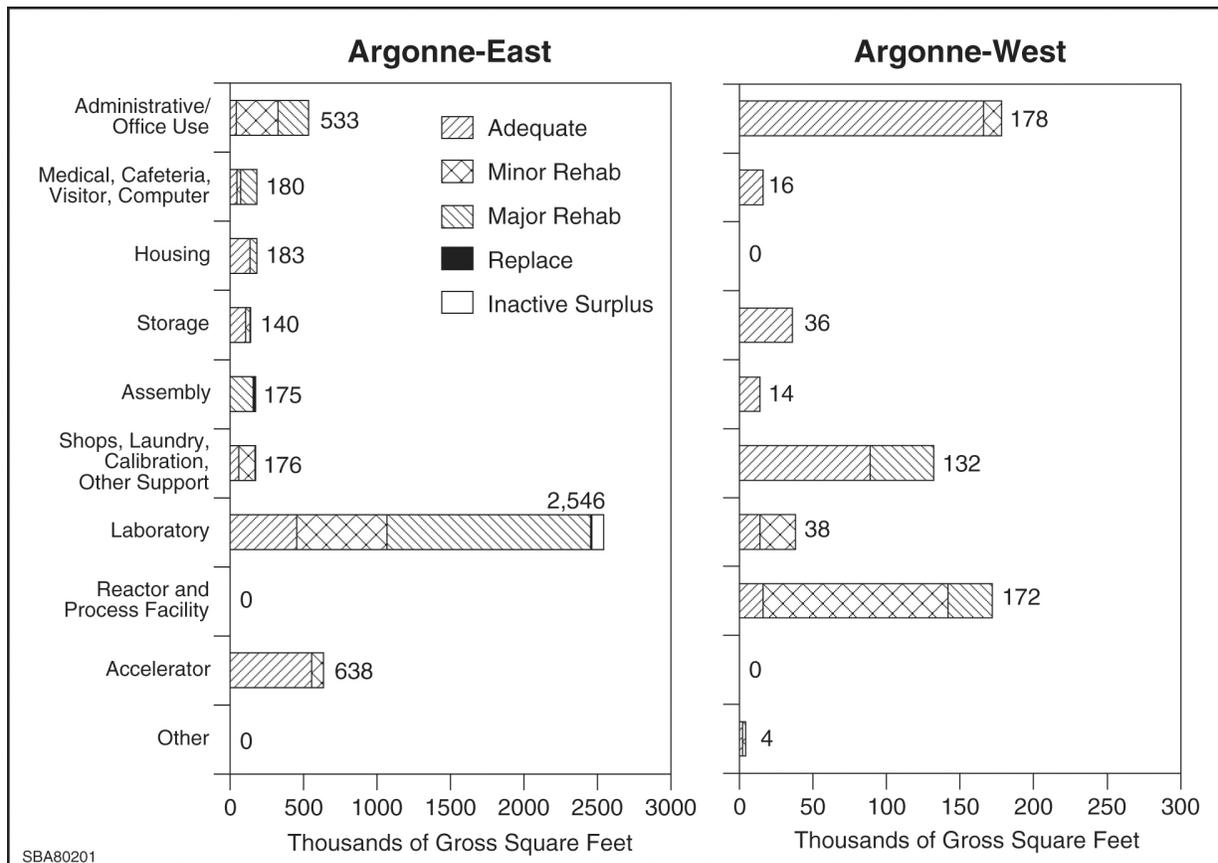
The Laboratory also leases 77,000 square feet of space near the Argonne-East site to alleviate a space shortage. Other leased property totals an additional 23,000 square feet, primarily for offices in the Washington, D.C., area and in Colorado. Occupancy of off-site space has remained stable for several years.

Adequate land is available to accommodate Argonne's plans for expanded programs in basic research and other areas. The site road and utilities infrastructure generally can accommodate modest growth. Facilities are now almost fully occupied, so additional construction will be required to satisfy the needs of growing programs.

Argonne's long-range vision is to "retool" its physical setting to a 21st century infrastructure having appropriately configured research facilities that provide reliable, safe, efficient, and attractive working environments suitable for world-class science, engineering, and technical services.

Table S3.1 Replacement Value of Argonne Facilities (\$ millions)

Facilities Type	Argonne-East	Argonne-West
Buildings	1,087	242
Utilities	148	13
All Others	655	463
Total	1,890	718



	Space at Argonne-East					Space at Argonne-West				
	Active				Inactive Surplus	Active				Inactive Surplus
	Adequate	Minor Rehab	Major Rehab	Replace		Adequate	Minor Rehab	Major Rehab	Replace	
Administrative/Office Use	41	284	208	0	0	166	12	0	0	0
Medical, Cafeteria, Visitor, Computer	47	27	107	0	0	16	0	0	0	0
Housing	136	0	47	0	0	0	0	0	0	0
Storage	106	31	2	2	0	36	0	0	0	0
Assembly	0	0	156	19	0	14	0	0	0	0
Shops, Laundry, Calibration, Other Support	58	113	0	5	0	89	0	43	0	0
Laboratory	452	618	1,385	8	83	14	24	0	0	0
Reactor and Process Facility	0	0	0	0	0	16	126	30	0	0
Accelerator	557	81	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	2	2	0	0	0
TOTAL ^a	1,396	1,154	1,904	34	83	353	164	73	0	0
(Percent of All Space)	(30.5)	(25.3)	(41.7)	(0.7)	(1.8)	(59.8)	(27.8)	(12.4)	(0.0)	(0.0)

^aTotals and column entries were rounded independently.

Figure S3.1 Distribution of Space at Argonne-East and Argonne-West in 2003 by Use and Condition (thousands of gross square feet)

b. Argonne-West

Argonne-West conducts R&D and operates facilities for DOE. After termination of the Integral Fast Reactor program in FY 1994, the programmatic mission of the Argonne-West facilities changed significantly. Current primary missions are (1) the use of electrometallurgical techniques to treat driver and blanket assemblies from the Experimental Breeder Reactor-II (EBR-II) and (2) development of technologies for deactivating other sodium-cooled reactors. In addition to Nuclear Energy, Science and Technology, DOE programs using Argonne-West facilities include Environmental Management, Defense Nuclear Nonproliferation, and Defense Programs. The most prominent programmatic facilities and their current missions are described briefly below.

The EBR-II has been shut down and defueled. While it was being placed in an industrially safe, stable condition, it served as a demonstration facility for the development of deactivation methods applicable to other nuclear power plants. One key technology issue still being investigated is treating EBR-II spent fuel to stabilize it, by going from a mixed hazardous waste to a final form that meets the requirements of a geologic repository. This problem is being addressed in the Fuel Conditioning Facility (FCF), where sodium is removed from inside the EBR-II fuel and where the spent fuel is converted from a mixed hazardous waste to a stable metallic and mineral waste form. Resolution of two other technological issues has now been demonstrated. First, large quantities of contaminated sodium were processed into a nonreactive waste form for disposal. Second, a safe process was developed and implemented for controlled reaction of the sodium remaining in the reactor's primary system following drainage. In January 2003, the state of Idaho issued the Resource Conservation and Recovery Act (RCRA) Part B Permit for the EBR-II. The permit requires development and implementation of a *RCRA Clean Closure Plan* for treating and removing any remaining hazardous materials, such as residual sodium metal, contaminated lead, and other mixed waste.

The FCF, one of the original facilities at Argonne-West, has operated since 1964. A major

refurbishment completed in 1996 made the FCF one of DOE's most modern hot cell facilities, meeting current safety and environmental requirements for handling irradiated materials, including transuranics. The FCF has two operating hot cells — one with an air atmosphere for handling contained fuel and the other with an inert argon atmosphere for conducting operations (including electrorefining) with exposed fuel materials. The FCF is the primary facility involved in applying electrometallurgical technology to the preparation of sodium-bonded spent nuclear fuels for ultimate disposition.

The main cell of the Hot Fuel Examination Facility (HFEF) is a large, multipurpose hot cell filled with inert gas, in which operations on highly radioactive fuels and materials can be performed. The HFEF is being used to prepare ceramic waste products as part of the treatment of sodium-bonded spent fuel. The HFEF is also used for post-irradiation testing of various irradiated fuels and materials, including spent fuel that has become degraded during storage and experimental target rods designed to determine the potential for producing tritium in commercial light-water reactors. The HFEF is an extremely versatile facility that is suitable for such work as examination (nondestructive or destructive) of radioactive materials and development of spent fuel waste forms, as well as for other kinds of work requiring remote handling of radioactive materials. The HFEF was modified in 1999 to accept for examination fuel assemblies as long as those used in commercial reactors.

The Waste Characterization Area (WCA) within the HFEF at Argonne-West is used for sampling and characterizing waste ultimately bound for the Waste Isolation Pilot Plant. The WCA features remote operations and glove boxes for sampling of various kinds, from gas sampling to core drilling.

The Neutron Radiography Reactor Facility, located in the basement of the HFEF facility, is a TRIGA (training, research, isotope, and general atomic) research reactor. It is equipped with two beam tubes and two separate radiography stations, making it one of the finest facilities in the world for radiography of irradiated and unirradiated components.

The Sodium Processing Facility treated sodium from EBR-II and other sources, converting elemental sodium into sodium hydroxide for ultimate disposal. The technology demonstrated could be adapted to processing sodium from other sodium-cooled reactors after they are deactivated, such as the Fast Flux Test Facility or the BN-350 reactor in Kazakhstan.

The Transient Reactor Test Facility (TREAT) is currently in standby status and is not operating. In the past, TREAT was used for testing of reactor physics and design and for analysis of nuclear materials, and it is still capable of performing that role. Nonreactor portions of TREAT are still supporting ongoing DOE programs, such as testing of waste treatment technologies.

The Zero Power Physics Reactor (ZPPR), now in standby status, was used for physics testing of new reactor core designs. The facility includes a large fuel storage vault that provides state-of-the-art storage for special nuclear materials. Associated Argonne experience in the care and treatment of special nuclear materials has been the basis for efforts to help the former Soviet Union with nonproliferation technology. The ZPPR facility and surrounding buildings will also support the Radioisotope Power System/Heat Source project that was recently funded by DOE-Nuclear Energy, Space and Defense Programs. This project will assemble and maintain radioisotope power systems ("space batteries").

The Fuel Manufacturing Facility (FMF), previously used to fabricate fuel for the EBR-II, has completed manufacturing of stainless steel subassemblies for replacement purposes in the defueling of EBR-II. The FMF has glove boxes and a storage vault for special nuclear materials. Equipment for materials testing and characterization is being installed in the glove boxes to support treatment of spent fuel and stabilization of degraded ZPPR fuel plates.

Supporting the major facilities at Argonne-West is an array of shops, warehouses, laboratories, offices, and utility systems. This array of supporting facilities includes a newly refurbished Analytical Chemistry Laboratory with full capability for analyzing irradiated nuclear materials, including transuranics.

Argonne-West houses about 690 persons. The site includes approximately 70 buildings having 600,000 gross square feet of floor space. Figure S3.1 summarizes the distribution of space at Argonne-West by functional unit and condition of space. Most of the buildings and other infrastructure were originally built during the mid to late 1960s but have since been upgraded and expanded. Figure S3.2 summarizes the ages since original construction for Argonne-West (and Argonne-East) facilities. The replacement value of existing facilities at Argonne-West is estimated to be \$718 million. (See Table S3.1.)

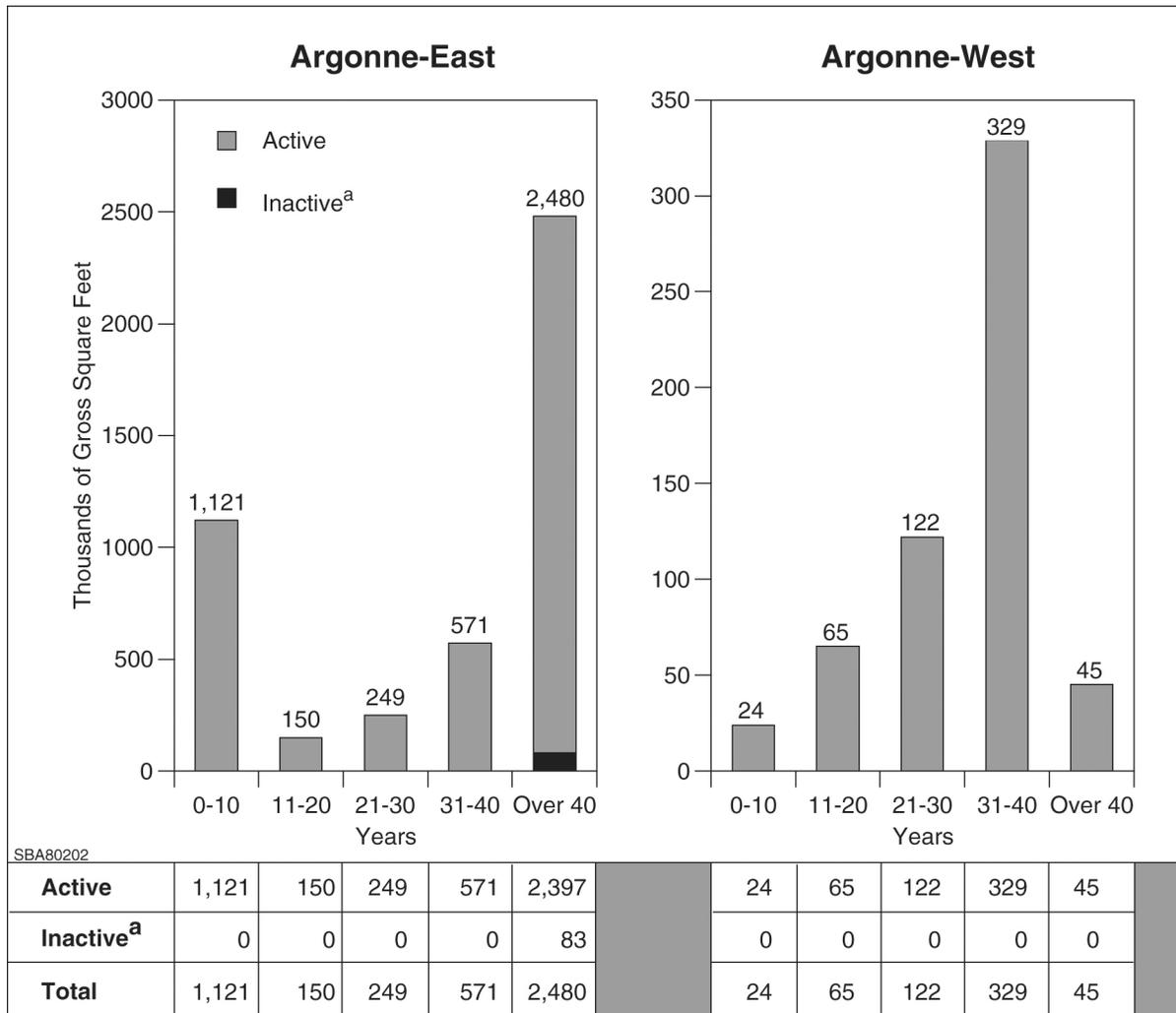
2. Status of Existing Facilities and Infrastructure

Because most building and facility infrastructure systems have a useful-life expectancy of 25-35 years, many Argonne facilities constructed in the 1950s and 1960s now require upgrading or replacement. This aging of facilities has caused the accumulation of a large inventory of needed revitalization. Figure S3.2 summarizes the ages of Argonne-East (and Argonne-West) facilities.

Argonne's management of site and facilities includes a systematic, comprehensive program to ensure that facilities effectively satisfy research needs, as well as requirements for safety, health, security, and environmental acceptability. The Laboratory's ongoing facility planning includes site development planning, the Condition Assessment Survey (CAS) process, and prioritization of resource requirements. The following discussions for Argonne-East and Argonne-West describe the current status of each site in the context of this management program.

a. Argonne-East

The principal challenges being addressed by Argonne-East are the normal aging of buildings and infrastructure and the need to upgrade laboratory facilities to meet 21st century challenges.



^aInactive space is sometimes too small to be displayed graphically. Entries were rounded independently.

Figure S3.2 Age of Laboratory Buildings at Argonne-East and Argonne-West in 2003 (thousands of gross square feet, distributed by age in years)

As indicated in Figure V.1 in Chapter V, over 54% of Argonne-East facilities are over 40 years old. Systems and equipment in these older facilities must be upgraded to serve modern R&D adequately. In recent years, Argonne-East has successfully reduced substandard space to 2.5% of total space by replacing or rehabilitating older facilities and by adding new programmatic facilities. Figure V.2 in Chapter V summarizes the condition of all types of building space at the two Argonne sites.

Argonne employs a standardized approach to classifying facility condition, based on the cost of

rehabilitation compared to the cost of replacement construction. Facilities are classified as “adequate” if the estimated cost ratio of rehabilitation to replacement is less than 10%; “minor rehabilitation” indicates a ratio from 10% to 25%, “major rehabilitation” a ratio from 25% to 60%. When the ratio is greater than 60%, facilities are recommended for replacement or disposal as excess. On the basis of these criteria, we estimate that 39% of occupied Argonne-East facilities space needs major rehabilitation or upgrades, while 31% is in adequate condition.

Table S3.2 Facility Condition Statistics for Argonne-East by Asset Type

Asset Type	Number of Buildings	Replacement Plant Value ^a (\$ millions)	Gross Floor Area (square feet)	Deferred Maintenance Needs		Rehabilitation and Improvement Cost (\$ millions)	Cost (\$ millions)	Summary Condition Index ^c (%)
				Cost (\$ millions)	Index ^b (%)			
Buildings^d								
Administrative/Office Use	11	90.9	532,901	0.9	1.0	18.4	19.4	21.3
Medical, Cafeteria, Visitor, and Computer	10	29.8	180,371	2.3	7.9	5.8	8.1	27.3
Housing	9	26.1	182,769	0.0	0.2	5.0	5.1	19.5
Storage	14	79.2	140,460	0.7	0.9	3.5	4.2	5.3
Assembly	4	37.8	174,568	6.3	16.6	8.6	14.9	39.5
Shops, Laundry, Calibration, and Other Support	10	36.7	175,918	0.4	1.1	5.1	5.5	15.0
Laboratory and Accelerator	43	783.7	3,184,005	11.3	1.4	167.1	178.4	22.8
Total Buildings	101	1,084.1	4,570,992	22.0	2.0	213.5	235.5	21.7
Other Structures and Facilities		256.3		17.9	7.0	34.9	52.8	20.6
All Argonne-East Facilities		1,340.4		39.9	3.0	248.4	288.3	21.5

^a Excludes value of accelerators and scientific equipment.

^b Deferred maintenance divided by replacement plant value.

^c Deferred maintenance plus other needed rehabilitation and improvement, all divided by replacement plant value.

^d Grouped by FIMS (Facility Information Management System) use code.

Since 1994 Argonne-East has eliminated a substantial amount of inefficient, obsolete space. Fifty-two owned or leased trailers accounting for more than 45,000 gross square feet were removed, leaving only 11 trailers in use. Also removed were 32 buildings totaling more than 198,000 gross square feet. Currently, some research staff are housed in a 77,000 square foot rental office facility about a mile from the site. The lease for the facility is scheduled to be renewed on July 31, 2003. Approximately 1.3% of space on the Argonne-East site is unused or vacant (not counting space undergoing or scheduled for decontamination and decommissioning [D&D]). This space is mostly in isolated small pockets that cannot be economically consolidated to house a new work group; the vacancy rate for administrative space (for offices, secretarial services, support services, and the like) is less than 0.5%. At the beginning of FY 2002, the removal of six buildings from the site's east area eliminated approximately 90,000 gross square feet of substandard space. At the APS, construction of an additional laboratory-office module increased the total number of buildings on the site to 101. Except for the New Brunswick Laboratory (Building 350), all of these buildings are owned and operated under the management responsibility of the DOE Office of Science (DOE-SC).

Among the site's 100 DOE-SC buildings, 7 are identified as excess. Two buildings (330 and 301) totaling 82,588 square feet have been shut down. Five others, totaling 19,497 square feet, remain operational, pending replacement and subsequent disposal. Altogether, active excess facilities account for less than 0.5% of the Argonne-East space inventory; shutdown facilities, associated with D&D supported by DOE-Environmental Management (DOE-EM) but not yet completed, account for less than 2% of the space inventory. Office trailers at Argonne-East house only about 18 staff. (Six further staff members are housed in trailers at remote research locations out of state.) For practical purposes, the site's active facilities are completely utilized.

In general, the capacities of site utility systems are adequate for anticipated needs. Still needed are upgrading of sewer system sections not rehabilitated during the 1990s and improvements in the reliability of the site's electrical distribution system. Further improvements to the Central

Heating Plant are needed to modernize its auxiliaries and distribution systems, in order to extend the plant's service life and reliability. The general site circulation infrastructure (roads, walks, and parking) is substantially degraded and needs major rehabilitation or outright replacement.

Table S3.2 summarizes three statistics used by DOE-SC to evaluate the condition of various types of facilities at its laboratories: (1) deferred maintenance as a percentage of replacement plant value, (2) other costs for needed rehabilitation and improvements, and (3) total identified expenditures needed as a percentage of replacement plant value. (DOE-SC attaches condition descriptors ["poor" to "excellent"] to percentages in particular ranges, as indicated in the table.) These statistics reflect the increasingly urgent need for greater capital funding at Argonne-East to maintain reliability and support modernization as the site's facilities continue to age. The greatest need is for laboratory and accelerator buildings, especially for rehabilitation and improvement beyond current deferred maintenance. That rehabilitation and improvement of laboratory and accelerator buildings is the focus of modernization plans presented in the Argonne-East *Strategic Facilities Plan*.

b. Argonne-West

The Infrastructure Program at Argonne-West aims to (1) meet the needs of the Laboratory's programs; (2) meet environment, safety, security, and health (ESS&H) requirements; (3) provide a workplace that encourages high productivity and creativity; and (4) protect the large government investment in the site's facilities.

As indicated by Figure V.1 in Chapter V, more than half of Argonne-West facilities are over 30 years old. Although the major nuclear facilities have been well maintained and are generally "mission ready," their structures, systems, and equipment need to be rehabilitated and upgraded to ensure that they provide reliable, cost-effective support for R&D and demonstration activities, now and in the future. General purpose facilities have been maintained in a workable state of repair with limited available funds, but they need to be

rehabilitated and upgraded to restore them to mission-ready status. The capacities of the site utility systems are generally adequate for current and anticipated needs, though most of the systems (e.g., electrical switchgear and the steam and condensate system) are over 30 years old and need to be replaced and upgraded. The general site circulation infrastructure — such as roads, sidewalks, and parking areas — has degraded significantly and needs major rehabilitation or complete replacement. The general policy at Argonne-West is to give priority to repairs or upgrades that are needed to ensure a safe, secure, and environmentally benign workplace. Remaining limited funds are used for tasks that are necessary to prevent much more costly future repairs. Limited funding over multiple years has caused a backlog of needed repairs and upgrades with a total deferred maintenance cost of approximately \$14 million.

As existing programs evolve and new programs begin at Argonne-West, facilities are modified and upgraded accordingly. Infrastructure funding is generally not available to support such changes, so individual programs must fund them. For example, the Radioisotope Power System/Heat Source project is funding modifications and upgrades to Building 792 that support associated assembly and maintenance activities. Figures S3.1 and S3.2 summarize the condition and age, respectively, of facilities at Argonne-West (and Argonne-East).

B. Site and Facilities Trends

Argonne manages its two sites to maximize the contribution that their physical resources make to the Laboratory's research programs while preserving the sites' environmental settings. This section discusses trends at each site that provide context for understanding the Laboratory's general plans and strategies for managing its sites and facilities.

1. Argonne-East

Management of the site and facilities at Argonne-East must cope with two contradictory major trends. First is the normal aging of

buildings and infrastructure in the face of increasing needs for upgrades to meet 21st century challenges. Second is declining real capital funding for rehabilitation and upgrades.

For many years, R&D facilities at Argonne-East have accounted for about 60% of total built space. This preponderance of R&D facilities has allowed the Laboratory to adapt well to the shifting research priorities typical of a multiprogram laboratory. The site's R&D buildings today are generally larger, more complex, and more adaptable to changing research programs than they were in the past.

Argonne-East buildings fall into three major groupings having similar ages and needs. The site's original permanent structures, built in the early and mid 1950s, typically need wholesale modernization. The complex of facilities and support areas for the Zero Gradient Synchrotron, built in the 1960s, has been evolving into a collection of special-purpose facilities that today typically need selective modernization. The buildings of the APS complex were built in the mid 1990s and require little modernization.

Figure V.2 in Chapter V indicates that an estimated 31% of occupied Argonne-East space is in adequate condition. Figure S3.3 shows that the percentage of facilities considered to be in adequate condition has trended downward since FY 1998. The continued aging of these facilities — including those of the APS, which has now operated for nearly a decade — implies imminent increases in needed maintenance, replacement, and modernization.

Overall, the condition of utilities and other structures and facilities at Argonne-East is unchanged from prior years; that is, minor rehabilitation is required.

Argonne-East has historically received insufficient line-item construction project (LICP) funding to significantly reduce its backlog of needed upgrades to general purpose facilities. Now, LICP funding for new project starts has been eliminated for both FY 2003 and FY 2004, and recent budget guidance extends the elimination of new LICP funding through FY 2005. Delays in urgently needed LICP funding

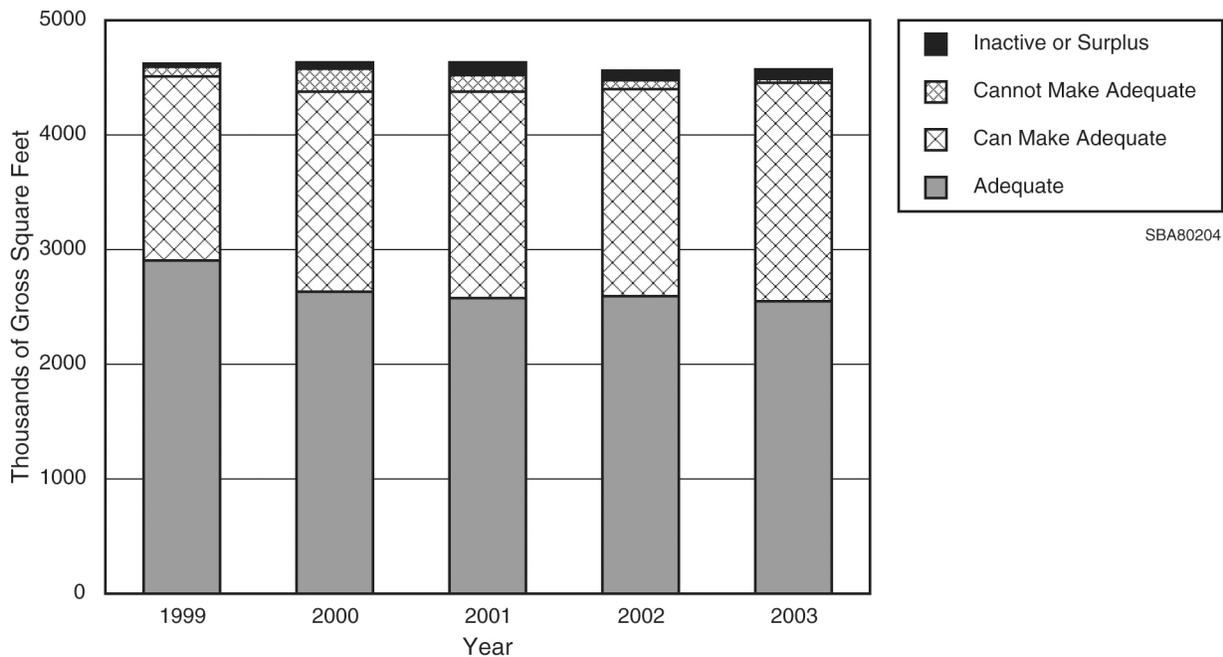


Figure S3.3 Condition of Argonne-East Buildings, 1999-2003

are inordinately burdening the Laboratory’s General Purpose Project (GPP) and indirect funds. Increased capital funding projected in the Argonne-East *FY 2002 Strategic Facilities Plan* was intended to improve the site’s overall infrastructure condition from “minor rehabilitation needed” to “adequate” over a five-year span. Continuation of capital funding at current levels, as proposed in the DOE budget formulation funding tables and related guidance, will lead to continued degradation of the Argonne-East physical plant.

Real GPP funding at Argonne-East has also been declining in recent years, causing an increasing backlog of unfunded facility upgrades. The Laboratory has accordingly raised its requests for GPP funds, especially to meet needs documented by its ESS&H and infrastructure (ESSH&I) process. Those needs total \$14.8 million for FY 2004 and \$17.2 million for FY 2005.

Delayed upgrades invariably lead to age-related equipment failures that must be resolved by using limited indirect funds. That strain on indirect funds in turn reduces resources available for routine maintenance and orderly replacement of building equipment. In recent years, 60% of the

maintenance at Argonne-East has been corrective rather than scheduled. As reported in the DOE corporate physical assets database (FIMS [Facility Information Management System]), actual maintenance costs totaled \$25.5 million in FY 2002 (including \$19.0 million for buildings and \$6.5 million for other structures and facilities); deferred maintenance totaled an additional \$39.9 million (\$22.0 million for buildings, plus \$17.9 million for other structures and facilities). Estimated maintenance expenditures for FY 2003 are \$19.6 million.

Insufficient General Purpose Equipment (GPE) funding over the past decade has led to serious aging and obsolescence of equipment for support activities and an inability to introduce needed major new equipment in a timely manner. Excluding laboratory equipment, the site’s general plant equipment is now on average 73% depreciated (asset value weighted). For equipment that is not already fully depreciated, the average remaining life expectancy is approximately 3.8 years. This statistic reflects recent additions of new equipment, which nevertheless have been insufficient to retire much of the equipment remaining in service beyond its economic lifetime. Continuation of recent funding trends implies that the Laboratory will continue to be unable to

replace general purpose equipment at recommended rates.

2. Argonne-West

The Argonne-West site includes 70 buildings and 8 government-owned trailers that altogether have a total floor space of approximately 600,000 gross square feet. (The 8 trailers provide approximately 4,850 square feet.) Most of the buildings and infrastructure were built during the mid to late 1960s. A new fire station (9,240 square feet) was completed during 1998. Total space at the site has increased only slightly in recent years. The expected trend is to maintain and possibly modify existing facilities for current and future missions. All trailers are currently in use, but long-run plans call for their removal.

Most of the upgrades for the Argonne-West infrastructure require GPP, GPE, or LICP funding. Over the past few years such funding has been inadequate. For FY 2002, Argonne-West requested \$1,200,000 in GPP and GPE but received \$450,000. For FY 2003, the site requested \$2,480,000 in GPP and GPE, plus \$750,000 in LICP, but received no funding. The request for FY 2004-FY 2009 is \$8,586,000 in GPP and GPE, plus \$80,400,000 in LICP. The continuing funding shortfall increases the backlog of unfunded facility upgrades, and it degrades the site's mission-ready status.

Funding for operational maintenance also continues to decline. Maintenance costs of \$13.4 million for FY 2003 mainly support essential and corrective maintenance but not preventive and predictive maintenance. Deferred preventive and predictive maintenance results in running systems and equipment to failure and investing in corrective repairs only for equipment needed to meet ESS&H requirements — unless a research program is willing to fund a repair directly.

Currently, there are no surplus facilities at Argonne-West, but that situation might change when "RCRA clean closure" of EBR-II is complete. All facilities at the site are presently used to support R&D programs.

C. Facility Management Operating Strategies

Argonne remains fully committed to its formal strategic facilities planning processes for site development and management of facilities and real property assets. Argonne's sites and facilities support the execution of world-class basic and technology-directed research by providing reliable, efficient, cost-effective facilities offering work environments that are safe, secure, healthful, and environmentally sound and that generally stimulate creativity and high productivity.

1. Argonne-East

Three major goals and associated strategies support the Argonne-East vision for the 21st century: (1) maintain excellence in ESS&H, (2) ensure effective use of facilities and systems, and (3) maintain a setting suitable for world-class research.

a. Maintain Excellence in ESS&H

Argonne strives to comply with federal codes, standards, and regulations, both in ongoing operations and in the construction of its facilities. The Argonne-East prioritization process for ESS&H focuses management attention on the most urgent infrastructure requirements.

Environmental restoration undertaken by Argonne has characterized and contained most formerly contaminated areas and waste disposal and storage sites. Corrective actions currently under way include remediation and monitoring to assure environmental quality. The D&D of contaminated reactors, accelerators, and hot cell facilities at Argonne-East aims to return these facilities to the site's space inventory, to the extent practical.

b. Ensure Effective Use of Facilities and Systems

Argonne-East employs several management strategies to ensure the effective use of its existing facilities.

Landlord and tenant roles are clearly delineated. The Plant Facilities and Services Division functions as landlord for the site, with responsibility for all aspects of the general purpose physical plant, including operation, maintenance, and compliance with ESS&H regulations. This approach ensures balanced, comprehensive prioritization of attention to all Laboratory facilities. Facility occupants are responsible for managing, maintaining, and repairing their own specialized equipment, experimental apparatus, and systems dedicated to programmatic activities, including ESS&H aspects of such equipment and systems.

Site development planning supports the efficient use of land and facilities. This planning is closely linked to the institutional planning process and to application of the CAS to existing facilities.

Land use planning considers natural aesthetics, as well as future development of major programmatic initiatives within dedicated development areas of the site. (See, for example, Section III.A.2 for discussion of the Rare Isotope Accelerator as a proposed expansion of ATLAS.)

Argonne-East manages its space to meet the needs of its research programs while satisfying General Services Administration guidelines, thereby maximizing occupancy rates and routinely accommodating changes in research programs. The Laboratory's clearly defined space management program requires that each organization pay rent based on the square footage of space occupied. Occupancy charges paid by all site users are based on operational and maintenance costs calculated for the individual facility. In FY 2002 these costs averaged approximately \$5.77 per gross square foot. Utility use is metered and the cost passed on proportionately to facility occupants, if it is not directly charged to the operators of metered equipment. This system gives research programs a strong incentive to keep space and utility usage to a minimum.

The Laboratory's CAS uses industry and DOE standards to systematically evaluate the condition of the physical plant. Assessments performed by outside specialists provide a credible, auditable basis for determining physical plant needs. Each

facility or utility is surveyed every three to five years, and a life-cycle-based ten-year forecast of needs is developed. These assessments use standard cost estimating data, and needs are rated by using the Capital Asset Management Process (CAMP; DOE Order 4320-2A) scoring system.

Further inspections and assessments performed include environmental surveys; safety and environmental audits and inspections; monthly life safety inspections; and semiannual environment, safety, and health inspections. Imminent dangers are corrected immediately. All safety inspection findings are tracked until they are resolved. The Laboratory's suite of internal, independent inspections ensures that facility deficiencies are identified and evaluated quickly and are corrected on the most advantageous schedule possible.

Argonne's ESSH&I prioritization process focuses on ranking the needs identified by the complementary processes discussed above. Facility needs are regularly analyzed, integrated into a single list, and prioritized in a formalized, documented process that includes representation from all support and programmatic personnel, up to the Laboratory's most senior level. Communication and agreement with DOE and other stakeholders help ensure comprehensive evaluation of facility needs, in preparation for the annual development of funding plans and the systematically prioritized use of limited resources.

Argonne manages some of the programmatic obsolescence of its facilities by simple reprogramming for a new use or remodeling and rehabilitation for reuse to meet a current need. An example is reuse of the Experimental Boiling Water facility, after D&D, as the Radioactive Waste Storage Facility. That reprogramming freed maintenance funds for productive use elsewhere.

Replacement of outmoded facilities with more efficient facilities reduces maintenance and overall operating costs. Demolition of surplus facilities and equipment reduces surveillance and maintenance costs and makes land available for reuse. For example, the east area and the 800 area of the site are now ready for redevelopment and reprogramming.

c. Maintain a Setting for World-Class Research

Achievement of world-class research is fostered by appropriate settings, both for the immediate workplace and for the surrounding campus. Argonne's goal is modern, flexibly appointed research and support facilities whose designs take advantage of the latest construction technologies to achieve sustainability, flexibility, versatility, and longevity. The new Central Supply Facility, a good example of the application of sustainable design and integration of facilities, recently received a silver award in the LEED evaluation process, the first federal facility to achieve this distinction. (The LEED [Leadership in Energy and Environmental Design] Green Building Rating System™ is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.)

To maintain facilities that are an appropriate setting for world-class research, the Laboratory appropriately enhances both the functionality and appearance of interior work space, which helps to attract superior scientists and engineers and then contributes to their productivity and creativity. Projects undertaken include renovation of public areas, upgrades to increase accessibility, improvements of lobbies and conference facilities, modifications to landscaping and parking areas, and general enhancement of the site's appearance to reflect its world-class status.

Argonne-East has been notably successful in integrating its development pattern into the site's natural landscape and making the buildings in each area aesthetically compatible. Argonne-East is protecting environmentally sensitive areas of the site in their natural state, especially along existing natural areas, floodplains, streams, and steep slopes. Former ecology plots are being managed to enhance their natural biodiversity, which contributes to the park-like setting. These plots remain available as a strategic reserve for programmatic development that cannot be accommodated elsewhere on the site.

The campus-like ambience of Argonne-East has been enhanced by a site beautification program, the use of common architectural elements to unite various areas visually, and

demolition of temporary and aged facilities, such as the large number of trailers employed earlier.

2. Argonne-West

Argonne-West conducts R&D and demonstration programs that support the Laboratory's overall mission in nuclear technology. Those programs generally fall into one of the following categories: (1) Advanced Fuel Cycle Initiative, (2) Generation IV Nuclear Energy program, (3) Space Nuclear Power, (4) Nuclear-Hydrogen Technology, (5) Homeland Security, or (6) International Safety and Nonproliferation.

In FY 2001, at the request of DOE-Nuclear Energy, Argonne-West formalized the Argonne-West Infrastructure Program to maintain the site's facilities in a mission-ready state and generally support DOE missions and programs. Mission-ready work scopes in the Infrastructure Program provide well-maintained facilities and support systems that are ready to serve research programs. These work scopes also provide core operational staff to assist in planning program-specific activities, preparing ES&H and quality assurance documents, and developing program-specific operational procedures, but they do not provide operations staff to perform direct programmatic work. Instead, specific programs fund the activities and resources needed to accomplish program implementation (e.g., spent fuel treatment). These resources include facility operators, technical staff, and operations support (e.g., health physics technicians).

The DOE-Nuclear Energy funding for the Infrastructure Program supports the operating costs of all Argonne-West nonprogrammatic facilities and site utilities, including both physical and human resources. First priority is given to "essential" work; as additional funds are available, they are applied to mission-ready work. Inadequate mission-ready funding results in problems such as (1) inability to keep nonessential facility systems and equipment ready for immediate use, (2) reduced facility availability, and (3) reduced availability of staff to respond immediately to programmatic requests.

Environmental activities command high priority at Argonne. The objective of the

environmental program at Argonne-West is to ensure no adverse effect to the environment and compliance with environmental regulations. Major activities include (1) sampling, analyzing, and remediating past releases of hazardous materials into ponds, ditches, and other areas; (2) replacing underground pipes and tanks; (3) upgrading the radioactive scrap and waste facility with cathodic protection; (4) seeking permits from the U.S. Environmental Protection Agency and the state of Idaho for certain ongoing activities; (5) developing a facility for remotely handled mixed transuranic waste; and (6) converting elemental sodium into solid sodium hydroxide for disposal.

D. Planning Approach for General Purpose Infrastructure

Argonne's planning for general purpose infrastructure focuses on maintaining facilities that are both safe and efficient, upgrading R&D facilities to 21st century standards, and providing adequate utilities and transportation networks. This section describes the Laboratory's overall planning approach. Subsequent sections describe particular resource requirements.

1. Argonne-East

The Argonne-East site can physically accommodate facilities aggregating to two to three times the present state of development. Environmentally sensitive and interconnecting open-space areas that support the natural ecology and hydrologic drainage of the site are being retained in their natural condition. The intensity of planned development on the balance of the site — in terms of covered area, floor area ratio, and landscaping standards — will remain consistent with the character of areas already developed.

Achieving the Laboratory's strategic vision for the 21st century begins by eliminating deficiencies in existing facilities due to aging and obsolescence. Beyond restoring impaired functionality, the Laboratory must upgrade telecommunications, improve building electrical and mechanical services, and modernize the layouts and furnishings of laboratory space.

Maintaining and upgrading sound but depreciated facilities is central to Argonne's operating strategy for existing general purpose facilities. Also proposed are construction of essential new facilities and disposal or replacement of inefficient structures.

Building systems upgrades and modernization are focused primarily on the older multiprogram laboratory-office buildings in the 200 and 300 areas. Of the 10 major building in those areas, 7 require major rehabilitation, and 3 require minor to moderate rehabilitation. Throughout Argonne-East, 12 buildings totaling 2 million gross square feet account for the bulk of the modernization requirements.

Argonne-East plans to implement its upgrading and modernization programs in rotating phases that concurrently address common system needs across several buildings. Broadly speaking, building electrical systems will be upgraded for reliability and load capacity. Mechanical and control equipment and distribution systems will be improved to provide a more flexible and adaptable building utility support network. Space will be reconfigured, rehabilitated, and modernized, in part by improving partitioning, laboratory furnishings, and architectural features. Argonne plans to implement modernization in wings or floors of buildings, so that entire buildings need not be shut down. However, because existing space is almost entirely utilized, a new multiprogram laboratory-office building is needed as the first step in the modernization process, to house research and operations programs with minimal disruption during work on their current space.

Also needed is a new general purpose high bay facility to supplement current facilities and to consolidate R&D during the upgrades to other high bay facilities discussed below. Aging high bay facilities suffer from many of the same problems as research laboratories. Particularly needed is more effective control of temperature and humidity. Midwestern temperature extremes, in both winter and summer, affect work in many high bay facilities, including the assembly area in Building 366 and work spaces in Buildings 306 and 363. These buildings need to be provided with adequate heating, lighting, air conditioning, and humidity control and to be made energy efficient.

Within the Laboratory's aggressive plan for rehabilitating and modernizing Argonne-East buildings, the replacement of roofs is the highest priority for FY 2005. Many roofs have reached the end of their design life, and costs of repair and replacement are beginning to escalate. Recent budget guidance from DOE indicates that these upgrades will not be supported by LICP funding.

The roads and utility systems at Argonne-East require further rehabilitation but are adequate for future expansion. Major rehabilitation of roadways and parking lots has not been undertaken in 20 years. The general site circulation infrastructure — roads, walks, and parking — is substantially degraded and needs major rehabilitation and outright replacement in certain locations. Operating funding alone is not sufficient to restore paved surfaces in a timely fashion.

Portions of major utilities also need rehabilitation, most notably the laboratory and sanitary sewer systems that were not fully restored in the 1990s. At the Central Heating Plant, auxiliary systems and components require upgrading during this planning period to extend service life and reliability. The site's electrical distribution system needs additional equipment upgrades to achieve reliability during maintenance shutdowns or unplanned service conditions, thereby assuring uninterrupted service to R&D facilities.

Argonne-East envisions demolition of Buildings 40, 301, and 604. Demolition of Building 330 is complicated by residual contamination that was not removed by the D&D project funded by DOE-EM, which has suspended funding for D&D and is not expected to restore funding until FY 2007. This suspension will delay elimination of some ES&H liabilities for at least another five years. By that time the Laboratory expects to be in a position to undertake D&D and demolition of the M-Wing hot cells in Building 200. However, DOE-EM is providing funding for surveillance and maintenance of Building 301, the Juggernaut Reactor in Building 335, and the Zero Power Reactor area in Building 315. Restart of the DOE-EM work program will require funding above current baseline projections to update plans for the work and to ensure compliance with future ES&H requirements.

2. Argonne-West

At Argonne-West, the main issue for general purpose facilities is facility aging, with its normal requirements for upgrading and renovation. When DOE-Nuclear Energy established the Argonne-West Infrastructure Program, the program office asked the site to develop a *Plant Assets Management Plan* identifying physical infrastructure needs, including both existing and new facilities, along with other resources required to support current and anticipated missions of the DOE office's programs. See Section S3.E.2 for details.

Argonne-West develops its *Plant Assets Management Plan* by using the recently enhanced Asset Management and Infrastructure Prioritization (AMIP) process, by which it identifies, prioritizes, and manages its physical asset needs. The AMIP process ensures systematic, comprehensive, consistent management and oversight of physical assets over their life cycles. The AMIP process comprises four major activities: identification, prioritization, scheduling, and information sharing. The first phase identifies all unfunded physical asset needs at Argonne-West, regardless of the prospective funding source (e.g., GPP, LICP, direct, or indirect). Asset needs are identified through four processes: (1) ES&H inspections, assessments, and audits; (2) mission needs calls for particular research projects or programs; (3) the CAS process; and (4) inspections, walkthroughs, and requests from managers of particular facilities or research divisions.

After an infrastructure need has been identified and documented, it is ranked for risk and prioritized with the CAMP methodology. The resulting comprehensive list of asset needs is the basis for making informed decisions on allocating available resources and developing funding requests. Generally, the top 10 to 15 GPP and GPE needs are included in the seven-year *Plant Assets Management Plan*. The work scope, costs, and schedule for implementing the funded upgrade projects for the current year are described in the *Infrastructure Program Implementation Plan*. This document provides the measures by which the performance of Argonne-West in managing its infrastructure is evaluated by

Laboratory management and DOE. The information developed and collected during the CAMP prioritization process is also used as a primary resource for other management and reporting processes, including the FIMS database of the DOE Office of Engineering and Construction Management and the Argonne-West Engineering Task Authorization database.

E. Facilities Resource Requirements

Argonne has historically received only part of the funding needed for (1) infrastructure improvements and replacement facilities and (2) remediation and upgrades to correct ESS&H and other deficiencies. This section discusses the particular projects needed to achieve the Laboratory's vision of a 21st century infrastructure.

1. Argonne-East

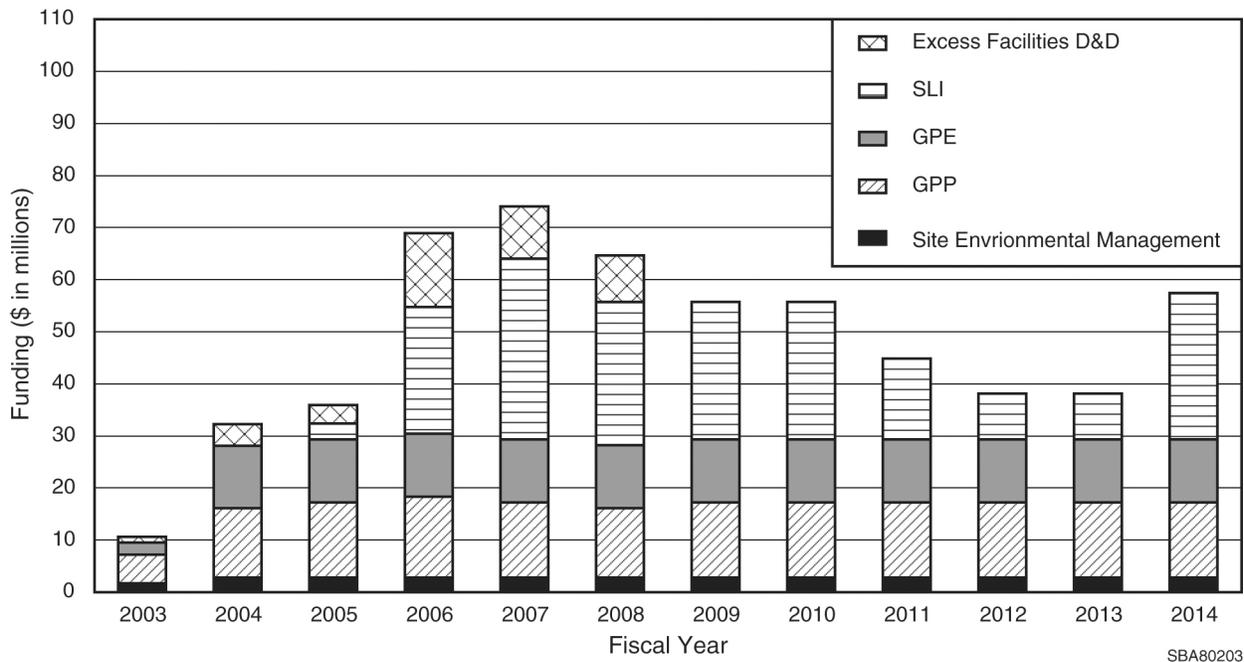
Funding received through the Science Laboratories Infrastructure (SLI) program and the GPP program allows Argonne-East to replace or rehabilitate functionally important or deteriorated elements of the site's infrastructure. These facilities serve a wide variety of evolving research programs and national user facilities, as well as support services and administrative functions needed to carry out the broad mandate of a multiprogram laboratory. The ability of Argonne-East facilities to continue functioning safely, efficiently, and economically depends on sustained support from DOE infrastructure funding.

Recommended funding to support the projects described in this section is described in Table S3.3 (located at the end of this supplement because of its length). The table also describes recommended GPP and GPE funding. These funding recommendations are consistent with the FY 2002 10-year *Strategic Facilities Plan* for Argonne-East, which specifies the infrastructure modernization needed to support current and planned mission activities in a cost-effective, safe, secure, and productive manner.

Figure S3.4 graphically summarizes total funding requirements for all infrastructure modernization needs at Argonne-East. The figure shows total 12-year (FY 2003-FY 2014) capital funding needs of approximately \$495 million, consisting of \$205 million from DOE's SLI program, \$160 million from the GPP program, and \$130 million from the GPE program. (These three DOE programs are discussed in the subsections immediately below.) In addition, Figure S3.4 shows \$41 million for D&D and demolition of facilities that are excess, inactive surplus, or contaminated, plus \$31 million for site environmental management at Argonne-East. (See the discussion of Inactive Surplus Facilities in Section S3.F.3.a.) The Laboratory proposes that both (1) site environmental management and (2) D&D and excessing of contaminated surplus facilities be supported by direct operating funding *apart from* that provided by DOE-EM. Beyond the infrastructure modernization investments by DOE summarized in Figure S3.4, maintenance at Argonne-East is supported by Laboratory indirect funding. This maintenance funding is projected to gradually rise from \$17 million to approximately \$20 million annually (see Section S3.E.1.d), representing an increase from 1.38% of infrastructure replacement plant value to 1.61%. (Restrictions on the use of Laboratory operating funding preclude devoting more to maintenance expenditures.)

a. Science Laboratories Infrastructure Program

The SLI program has provided an important part of recent funding for rehabilitation of major buildings and utility systems at Argonne-East, as well as funding for construction of new general purpose facilities. Total SLI funding has averaged approximately \$6.5 million annually since 1995. The Laboratory estimates that future line-item SLI needs over the five-year planning horizon FY 2005-FY 2009 total \$116 million, including \$22 million for new facilities and \$94 million for rehabilitation and modernization of existing facilities. The line-item projects included are summarized below.



SBA80203

Excess Facilities D&D	1.2	4.2	3.5	14.1	10.1	9.0	0.0	0.0	0.0	0.0	0.0	0.0
SLI	0.0	0.0	3.1	24.4	34.7	27.5	26.5	26.5	15.6	8.9	8.9	28.1
GPE	2.3	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
GPP	5.5	13.3	14.5	15.6	14.5	13.4	14.5	14.5	14.5	14.5	14.5	14.5
Site Environmental Management	1.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Total	10.7	32.3	35.9	68.9	74.1	64.7	55.8	55.8	44.9	38.2	38.2	57.4

Figure S3.4 Capital Funding Requirements for Argonne-East, FY 2003-FY 2014

i. New General Purpose Facilities

Multiprogram Laboratory and Office Building. This project provides for the design and construction of a Multiprogram Laboratory and Office Building (60,000 square feet) to house DOE-SC programs now in Building 212. The building will facilitate the rehabilitation of other laboratory and office space by providing appropriately designed, flexible space suited to the relocation of scientific programs without inordinate disruption of their work. Systems and components in the new building will be designed to minimize life cycle costs and improve environmental performance.

General Purpose Laboratory Facility. This project will provide a flexible high bay research

facility (25,000 square feet) to supplement current facilities and to meet changing needs more readily. A freestanding location will facilitate expansion and reconfiguration and will achieve proximity to laboratory space with minimal physical obstructions. These capabilities cannot be achieved through rehabilitation or reprogramming of existing high bay areas, because of the resulting disruption of current work and the type of construction used in the existing buildings.

ii. Building Rehabilitation and Upgrades — Existing Facilities

Building Roof Replacements. This project involves comprehensive replacement of the roofing systems on older buildings, including all

original buildings in the 200 and 300 areas and buildings constructed between 1970 and 1990. The last comprehensive roof replacement at Argonne-East occurred between 1983 and 1987 and used roofing systems with a predicted life of 20 years. Repair of small leaks is now necessary with increasing frequency.

Building Electrical Service Upgrades — Phases II-V. These projects will upgrade critical parts of the electrical power distribution system in the 200, 300, and 360 areas and their support facilities. The systems will be updated to meet current safety standards, to improve reliability and performance, to support new research programs, and to reduce maintenance and repair costs. The work will include (1) upgrading of lighting and power panel boards, 13.2-kV switches, 480-V switchgear, and transformers and (2) the provision of emergency power for selected buildings. Particularly important will be replacing 13.2-kV switches and 480-V switchgear with new equipment having state-of-the-art metering and protection devices.

Mechanical and Control Systems Upgrades — Phases I-IV. This series of four projects will upgrade critical parts of mechanical and control systems. The projects involve rehabilitation and upgrading of heating, ventilation, and air conditioning systems; exhaust systems; drainage systems; and controls to address concerns such as reliability of operations and environmental protection. Phase I was funded to begin in FY 2002.

Laboratory Space Upgrades — Phases I-III. These projects encompass essentially all aspects of modernizing laboratory space, including reconfiguration and upgrading of laboratory space envelopes; laboratory interiors; work area furnishings; communications, security, and electrical distribution systems; plumbing systems; and laboratory and process piping. The projects address safety and health concerns by including upgrades of fume hoods, vacuum frame hoods, canopy hoods, and glove boxes, along with associated utilities. Also included are removal and disposal of potentially contaminated or hazardous materials such as hoods, exhaust ductwork, piping, and asbestos insulation.

iii. Utilities and Site Infrastructure Upgrades

Roads, Parking, Walks, Street Lighting. Many roads, parking lots, and sidewalks at Argonne-East have deteriorated beyond amenability to general maintenance and basic repair. Other areas require additional parking and walkways. This project will rehabilitate or upgrade the surfaces of selected roads, parking lots, and sidewalks (and will use recycled materials where possible). The project will also replace inefficient lighting along streets and around parking lots and building exteriors. A new sitewide high-pressure sodium lighting system will cut electrical loads by approximately half and will provide better coverage at roadway intersections and in parking lots.

Central Heating Plant Auxiliaries Upgrade. Upgrading of the steam production auxiliary systems and components at the Central Heating Plant will improve the reliability and efficiency of the steam production process, saving energy and reducing overall operating costs. This project may be undertaken in part as an energy conservation project under third-party financing.

Electrical System Upgrade — Phase IV. This project will upgrade 5-kV overhead lines to 13.2 kV and will increase the capacity of the 13-kV overhead lines in the 200, 300, and 400 areas. The project will also replace 13.2-kV switchgear and interrupter switch lineups that serve the 300 area, increase the capacity of transformer T3, and replace transformer T6. Outdoor automatic transfer switches will be installed to serve Buildings 201 and 221. Most importantly, additional electrical service capacity will be brought to the site distribution system from Commonwealth Edison's supply grid, increasing reliability and service levels.

iv. Environment, Safety, and Health Support Projects

Fire Safety Improvements — Phase V. This project addresses remaining capital improvements needed for fire protection. Work includes correction of deficiencies affecting property protection and potential interruption of work, installation or upgrading of fire barriers, replacement of halon systems and obsolete building sprinkler water supply connections, and repair of

hydraulically deficient sprinkler systems not related to life safety.

Building 362 Asbestos Abatement. Asbestos-containing materials (ACMs) are present in numerous older buildings at Argonne-East. Damaged ACMs threaten building occupants and workers and must be repaired or removed; undamaged ACMs may be left undisturbed or sealed. This project will remove asbestos fireproofing materials now under floor decks and attached to steel structural elements in Building 362. Where needed, the project will clean up friable asbestos.

b. General Plant Project Funding

At Argonne-East, GPP funding averaging approximately \$4.85 million annually in FY 1996-FY 2003 has supported urgently needed facility modifications and upgrades and replacement of equipment. GPP funding also supports environmental projects, near-term infrastructure improvements, and key safety upgrades. In general, GPP funds are crucial for work that goes beyond short-term maintenance and repair but must be undertaken more quickly than would be allowed by the normal lead times for LICP funds. GPP funding does not support particular R&D programs.

Historically, GPP funding received by Argonne has been inadequate to address infrastructure and modernization needs. Requirements over the six-year planning horizon of the *Institutional Plan* total more than \$86 million, nearly three times current funding levels. Use of “institutional general-purpose project funding” does offer some flexibility in funding infrastructure upgrades of the scale appropriate for GPP. However, at this time the Laboratory has no plans to utilize this funding option.

Strategic application of GPP funds continues to fall into three general areas. First, the recent practice of applying GPP funds to smaller-scale upgrades and modifications of buildings will continue. These projects modernize smaller buildings and implement less extensive reconfigurations, thereby complementing larger-scale renovations.

Second, GPP funding will support upgrades to sitewide utility systems at selected locations. These systems include laboratory and sanitary sewer collection systems that were not completely rehabilitated under earlier projects supported by DOE-EM. Upgrades undertaken will also include continuing improvements to the canal water and storm water systems.

Third, GPP funding will complement LICP funding by supporting construction of smaller new facilities costing less than \$5 million. GPP funding will also support construction of new general purpose support facilities. Examples are a replacement facility for the Emergency Services Department (Building 333) and replacement of scattered, older, contaminated storage facilities that are still active (i.e., Buildings 325C, 329, and 374A) with a better located, more efficient, centralized waste storage facility. These replacement facilities are envisioned to increase operational efficiencies without significantly changing the total building space involved.

c. General Purpose Equipment Funding

Argonne-East GPE funds will be used for vital support purchases, including (1) plant maintenance monitoring equipment; (2) operating equipment meeting current ESS&H standards; (3) equipment for monitoring and controlling release of effluents to the environment; (4) motor vehicles; and (5) technological support in areas such as computing, electronic data communications, cyber security, machine shops, and electronics.

Beginning in FY 2004, the annual GPE funding requirements of Argonne-East are \$12 million, as shown in Table S3.4. Increases over current funding levels are required for purposes such as appropriately configuring and updating computer simulation equipment and high-bandwidth hubs. The increased funding level will allow the Laboratory to take advantage of current technologies and to satisfy researchers' increasing needs for computer simulation. The increase will also be used to acquire and rehabilitate general purpose equipment (but not to support specific R&D programs).

Table S3.4 Proposed General Purpose Equipment Funding for Argonne-East (\$ in millions BA)

FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
1.6	2.3	12.0	12.0	12.0	12.0	12.0	12.0

d. Maintenance Funding

Approximately 60% of maintenance at Argonne-East is devoted to corrective maintenance, as opposed to recurring, operational, or preventive maintenance. This situation reflects the large proportion of systems that are still operating beyond their normal service lifetimes. Modernization of older systems will lessen the current need for corrective maintenance, allowing the Laboratory to focus more on preventive maintenance that lengthens the service life of equipment and reduces costs in the long run.

Maintenance supported from operating funds remained roughly stable at approximately \$17.1 million in FY 2003. As reported in the May crosscut budget, this real property maintenance is projected to be \$19.0 in FY 2004, \$19.5 in FY 2005, and \$20 million in subsequent years. Replacement plant value (RPV) is expected to increase only slowly, following general inflation trends. Maintenance expenditures as a percentage of RPV are projected to rise to slightly more than 1.6%.

2. Argonne-West

As facilities and infrastructure at Argonne-West continue to age, the highest priority is to upgrade and renovate deteriorating assets, replace obsolete and heavily depreciated equipment, and plan for new facilities and capabilities to meet current and future needs of DOE programs and missions. Also vital is the ongoing maintenance of existing physical assets.

Argonne-West received \$13.4 million for essential and corrective maintenance in FY 2003. An additional \$5.3 million is needed in FY 2003 for preventive and predictive maintenance and for maintaining site facilities in a mission-ready state. The total deferred maintenance backlog is \$14 million. Argonne-West has identified specific

infrastructure needs of \$10 million in GPP and GPE for FY 2003-FY 2009. Also needed are two LICPs having a total cost of \$88 million. Specific GPP, GPE, and LICP requests are summarized below.

a. General Plant Projects

Argonne-West GPP funds support key safety upgrades, environmental compliance projects, and near-term infrastructure improvements. These funds are dedicated to upgrading and renovating the physical plant, beyond the routine maintenance and repair to keep the plant and equipment operating. GPP funds do not directly support specific R&D and demonstration programs and equipment. Argonne-West needs \$10 million for FY 2003-FY 2009 to support top-priority GPP projects. Three salient top-priority projects are as follows:

- *Industrial Waste Pond.* The Record of Decision (ROD) signed by DOE, the Environmental Protection Agency, and the state of Idaho includes a commitment to remediate the Industrial Waste Pond, starting in FY 2003-FY 2004. DOE-EM, which has provided the funding for the previous six Argonne-West remediation activities, wishes to turn over the two remaining sites (Industrial Waste Pond and Sanitary Sewage Lagoons) to DOE-Nuclear Energy, which funds programmatic work at Argonne-West. Currently, no funding is available in FY 2003 for these remediation activities. The agreements and commitments in the ROD are legal and binding, with fines and penalties levied for noncompliance. Argonne-West’s failure to comply with the provisions of the ROD will constitute violation of the ROD and subject the Laboratory to the fines (up to \$10,000 per week) outlined in the *INEEL Federal Facility Agreement and Consent Order*. The total estimated cost for remediation is \$1.6 million.
- *Electrical Switchgear Upgrade — Phases I-II.* This project will upgrade critical portions of the sitewide electrical power distribution system to meet current safety standards, improve the system’s reliability and performance, and reduce costs of maintenance and repair. Existing 2.4-kV and 13.8-kV

switchgear will be replaced with new equipment that contains modern metering and protection devices; associated feeder cables will also be replaced. The present switchgear is over 40 years old, and replacement parts are typically nonexistent. Failure of either the 2.4-kV or 13.8-kV system would severely affect overall site safety and operations. The total estimated cost is \$1.62 million.

- *Steam and Condensate System Component Replacement.* This project will replace and upgrade the 30-year-old sitewide steam and condensate system, which has experienced increasingly frequent failures over the past few years. Most operational facilities and office space are heated by the centralized steam plant; heat is distributed through the steam and condensate system. Steam is also used by several R&D programs for process applications. This project will replace old piping and install cathodic protection to minimize corrosion. The steam and condensate system is critical to site operations, and its failure would severely affect overall site safety and operations. The total estimated cost is \$1.215 million.

- *Fuel Conditioning Facility Hot Cell Shield Window Refurbishment.* The shielding windows in Fuel Conditioning Facility are 40 years old, and 16 of the 27 windows require refurbishment. Most of the windows have experienced multiple oil leaks and show signs of optical degradation. Window refurbishment is critical to treating EBR-II spent fuel for final disposal. The total estimated cost is \$2.982 million.

b. General Purpose Equipment

Argonne-West GPE funds are used to replace worn-out and obsolete general purpose equipment that supports activities such as (1) environmental monitoring and control of effluents; (2) facility maintenance and monitoring; (3) materials handling and operations with heavy equipment; and (4) technical support, including computing, electronic data communications, machine shop, and electronics. Argonne-West requested \$197,000 in GPE funding for FY 2003 and \$1,234,900 for FY 2003-FY 2009. No funding

was provided in FY 2003, and none is anticipated in FY 2004. Continued underfunding of GPE will increase the cost of corrective maintenance and increase the down time of facilities and support functions.

c. Line-Item Construction Projects

Argonne-West has identified two LICPs. The Remote Treatment Facility (RTF) is an \$80 million project that needs LICP funding beginning in FY 2004. The second LICP is an \$8 million office facility scheduled for later years. Details are as follows:

- *Remote Treatment Facility.* The RTF project is required to maintain compliance with the Idaho National Engineering and Environmental Laboratory (INEEL) *Site Treatment Plan* and the *State of Idaho Settlement Agreement*. The RTF will segregate, characterize, treat, and repackage remotely handled mixed transuranic waste that has accumulated at Argonne-West and INEEL over the past several decades. The project includes the design and construction of the RTF, which will be located adjacent to the existing Hot Fuel Examination Facility and connected to it through a transfer tunnel to facilitate transfers and use of some common support systems. Failure to proceed with this LICP in FY 2004 could result in administrative and judicial actions, including fines and penalties, and in suspension of spent fuel shipments to Argonne-West and INEEL.

- *Multiprogram Office Building.* This project includes the design and construction of a multiprogram office building (40,000 square feet) that will replace the eight remaining temporary office buildings at Argonne-West. Plans call for LICP funding of \$8 million for FY 2010-FY 2012.

F. Assets Management, Space Management, and Inactive Surplus Facilities

In partnership with DOE, Argonne plans for, acquires, operates, maintains, and disposes of

physical assets as valuable national resources. This stewardship of physical assets to meet the Laboratory's mission is accomplished in a cost-effective manner. The associated planning process integrates programmatic, ecologic, economic, cultural, and social factors; considers the site's larger regional context; and includes the participation of stakeholders.

Under the current *Prime Contract* for operation of Argonne, management of site, facilities, and assets at Argonne-East continues to determine 5% of the fee received by the contractor.

1. Assets Management

Argonne's assets are acquired, rehabilitated, and upgraded to support the Laboratory's mission. DOE executes all real estate acquisitions through a Department-certified real estate specialist. All modifications and improvements are designed and constructed in compliance with applicable state, regional, and national building codes. The principles and practices of Integrated Safety Management are fully integrated into the Life Cycle Asset Management processes by which Argonne implements site improvements. The result is a safe work environment achieved through safe work practices.

The DOE corporate physical assets database — FIMS — includes a current inventory of the Laboratory's physical assets. Periodically, this inventory is systematically reviewed, and the condition of the assets is assessed. Backlogs associated with maintenance, as well as with repairs and capital improvements, are managed through a systematic prioritization process. Integrity of all physical assets and systems is ensured through a configuration management process.

Surplus facilities identified through the Laboratory's planning process are reported to DOE in a timely manner. Assets are transferred between program offices through the process established by DOE. Disposal of real estate is subject to DOE approval. For the disposition of nuclear facilities, the Laboratory develops a

decommissioning turnover plan and, if appropriate, decontamination plans. A deactivation readiness review is completed before any physical work begins.

Retirement of surplus equipment is largely constrained by the backlog of GPE needs. Divestiture is usually limited to equipment still in use well beyond its original estimated service life. This equipment generally has little salvage value. Divestiture of surplus equipment and excess materials follows DOE guidelines.

2. Space Management

Argonne-East has long used a system of space charges that facilitates the allocation of annual infrastructure costs among various users. Occupants are assessed for costs on the basis of their use of assignable building space (which does not include general passageways, docks, or space for building equipment and mechanical systems). Space charges include recovery of sitewide expenditures for grounds, road repairs, snow-plowing, and other general utility and maintenance services. Building-specific charges reflect historical levels of maintenance for each particular building, custodial costs, and expenses for services such as sewer, water, electricity, and steam. Within buildings, services to production facilities, dedicated scientific and research apparatus, and other special-purpose equipment are metered separately for direct billing to users.

For the past decade, space utilization at Argonne-East has approached practical limits. Overall vacancy rates have averaged less than 2%, and they now approach 1.3%. Vacancy rates for office space are less than 0.5%. Moreover, available space is usually in isolated small pockets that cannot be economically consolidated to house an additional work group (such as a group now working off-site).

3. Inactive Surplus Facilities

Inactive surplus facilities present significantly different challenges for the two Argonne sites.

a. Argonne-East

The DOE-EM funding for D&D of Argonne-East facilities no longer in use ended in April 2002, after completion of more than 70% of the D&D work identified in the DOE-EM baseline for Argonne-East.

The D&D of the JANUS reactor (Building 202) and the Argonne Thermal Source Reactor (Building 316) was completed, and those facilities are now available for reuse. Argonne was in a position to complete, by the end of FY 2003, all D&D activities identified in the approved baseline, if specified funding had continued to be provided.

The site's two remaining contaminated surplus facilities (Buildings 330 and 301) continue to be candidates for future DOE-EM funding that ultimately would support demolition. Two additional facilities, neither yet surplus, have been documented to DOE as requiring future D&D: (1) the M-Wing hot cells in Building 200 (a partial facility), for which DOE-EM funding had been sought, and (2) the instrument calibration facility in Building 40 (the last remaining original building in the east area).

Candidates not yet formally identified for future DOE-EM support include parts of buildings, such as the M-Wing hot cells in Building 200 (which will become surplus by the time the transfer to DOE-EM begins) and the H-Wing high bay areas in Building 205.

Surplus facilities that are not contaminated have also been a long-standing concern at Argonne-East. Removal of facilities from the old 800 area is complete. Removal of Building 207 has facilitated planning for proposed expansion of the ATLAS complex. Following removal of Building 40, emphasis will shift to the selective removal of permanent, single-purpose buildings that can no longer function efficiently. The Laboratory will continue to remove abandoned or disconnected equipment, such as chillers.

The large majority of funding from the DOE-SC Excess Facilities Disposition Program is devoted to removal of excess equipment and

broader mission support through risk reduction (e.g., removal of hazards), footprint reduction, cost savings (e.g., by elimination of surveillance and maintenance), and provision of building space and land for new research activities. In the middle years of the ten-year *Strategic Facilities Plan*, replacement facilities constructed with GPP funding will enable decontamination and disposal of several obsolete waste storage facilities (Buildings 325C, 329, and 374A), as well as replacement of the Emergency Services Department fire station (Building 333).

Resource requirements for elimination of surplus facilities (both contaminated and uncontaminated, including D&D, surveillance, and maintenance of facilities pending disposal) total \$41 million through FY 2009. In addition, environmental management and long-term stewardship of the site's natural assets and ecosystems will continue through the planning horizon. Wetlands management will be funded through operating funds, as will continued maintenance of formerly contaminated sites; funding required for these activities will total \$16 million through FY 2009.

b. Argonne-West

Currently, all major facilities at Argonne-West are actively used, including many EBR-II systems that provide power switching, site monitoring, cooling water, compressed air, and other services to the entire site. Currently, TREAT, ZPPR, and the Sodium Processing Facility are in standby status and not operating. However, these unique scientific and engineering assets could be extremely valuable in supporting future DOE programs, such as the Generation IV Nuclear Energy program, the Advanced Fuel Cycle Initiative, and the Space Nuclear Power program. In addition, the closed EBR-II facility has unique scientific and engineering attributes and unique materials that can be applied to future DOE programs. (The EBR-II Plant Closure Project was completed in FY 2002, and the recently issued EBR-II RCRA Part B Permit requires that EBR-II be "RCRA clean closed" within the next 20 years.)

G. Energy Management and Sustainable Design

Energy efficiency and conservation are strong priorities at Argonne. The Laboratory benefits from continued participation in the demand-side load management program of its local electric distribution company, Commonwealth Edison. The Laboratory also pursues funding for energy conservation projects from the Federal Energy Management Program, and it assists DOE in (1) the development and implementation of facility retrofitting projects using energy savings performance contracts involving third-party financing and (2) the competitive procurement of electricity.

Argonne-East remains on track in achieving the 30% reduction in energy usage by FY 2005 that is mandated by DOE order. However, for a second consecutive year the Laboratory is encountering continuing delays in obtaining DOE approvals for both its first proposed project (under the Super Energy Savings Contract program) and its second proposed project (under the Utility Energy Savings Contract program). The combined total estimated cost of these two projects exceeds \$3 million.

The current electric utility contract for Argonne-East is between DOE's Argonne Area Office and Commonwealth Edison. The resulting cost of electricity is the lowest available to the Laboratory. Natural gas is supplied through a supply contract and a separate delivery contract. The gas is purchased as a commodity through a Defense Logistics Agency supply and transportation contract, which assures the Laboratory of the lowest available cost. Nicor, Inc., provides distribution and storage services for the delivered gas. DOE's Argonne Area Office also holds the gas contracts for Argonne-East. The Laboratory provides technical support to DOE for evaluating and selecting the site's utility contracts.

The Laboratory continues to develop concepts for reducing the cost of the basic energy commodities it purchases. Argonne-East has reduced the cost of natural gas for its boiler plant by taking advantage of its physical location along

interstate gas pipelines and the resulting opportunity to bypass service from the local distribution company. The Laboratory is now in its third three-year, special-rate delivery service contract with Nicor, Inc. The Laboratory agrees not to bypass the Nicor system in exchange for a reduced rate for natural gas distribution. Argonne-East also saves on coal purchases by making an annual lump sum bid. Coal is then trucked to the site as needed.

It is a formal Argonne policy to incorporate strategies for sustainable design and pollution prevention into all design and construction projects. Sustainable design strategies are integrated at the initial stages of new projects through use of the Environmental Evaluation Notification Form, which considers both sustainable design and pollution prevention. The Laboratory also provides training, resources, and support for sustainable design and pollution prevention to managers of projects throughout design, construction, and demolition.

H. Third-Party Financing

Argonne-East remains a leader in the use of third-party financing to develop needed facilities. A prominent recent example is funding by the state of Illinois for the design and 1997 construction of the APS housing complex (Building 460), a facility providing 124,000 square feet of space. The state has also contributed \$3.6 million for development of the master plan for the Rare Isotope Accelerator (RIA) and for design of the Illinois Science Center, whose construction the state is considering funding as part of RIA construction at Argonne. The state is also supporting construction of the building for the Center for Nanoscale Materials. In FY 2002 and FY 2003 the state contributed \$19 million toward this \$36 million project. We anticipate that the remaining \$17 million will be included in the state's FY 2004 budget. In the future we plan to consider collaborative funding for science facilities that would serve two other major Laboratory initiatives discussed in Chapter III: a computer and computational science building and a genomics building at the APS.

Table S3.3 Major Construction Projects^a (\$ in millions BA)

	TEC	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Funded Projects								
<i>AF-01</i>								
Office of Nuclear Energy, Science and Technology Nuclear Energy Research and Development General Plant Projects, ANL-West ^b	1.6	-	1.6	-	-	-	-	-
<i>FS-30</i>								
Office of Environmental Management Safeguards and Security — Environmental Waste Management General Plant Projects, ANL-West ^b	1.0	-	1.0	-	-	-	-	-
<i>KB-04</i>								
Office of Science Nuclear Physics Accelerator Improvements, ANL-East ^b	0.8	0.4	0.4	-	-	-	-	-
<i>KC-02</i>								
Office of Science Basic Energy Sciences Materials Sciences Advanced Photon Source Accelerator Improvements, ANL-East ^b	7.8	3.9	3.9	-	-	-	-	-
<i>KC-03</i>								
Office of Science Basic Energy Sciences Chemical Sciences General Plant Projects, ANL-East ^b	10.4	5.4	5.0	-	-	-	-	-
<i>39-KG-02</i>								
Office of Science Science Laboratories Infrastructure Environment, Safety, and Health Support, ANL-East Environment, Safety, and Health Compliance Mechanical and Control Systems Upgrade - Phase I (02-CH-056)	9.0	0.8	3.0	5.2	-	-	-	-
TOTAL FUNDED PROJECTS	30.6	10.5	14.9	5.2	0.0	0.0	0.0	0.0

Table S3.3 Major Construction Projects^a (Cont.)

	TEC	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Budgeted Projects								
<i>AF-01</i>								
Office of Nuclear Energy, Science and Technology Nuclear Energy Research and Development General Plant Projects, ANL-West ^b	5.5	-	-	5.5	-	-	-	-
<i>AF-95</i>								
Office of Nuclear Energy, Science and Technology Nuclear Energy Research and Development General Plant Projects, ANL-West ^b	0.5	-	-	0.5	-	-	-	-
<i>FS-30</i>								
Office of Environmental Management ^c Safeguards and Security — Environmental Waste Management General Plant Projects, ANL-West ^b	1.0	-	-	1.0	-	-	-	-
<i>KB-04</i>								
Office of Science Nuclear Physics Accelerator Improvements, ANL-East ^b	0.4	-	-	0.4	-	-	-	-
<i>KC-02</i>								
Office of Science Basic Energy Sciences Materials Sciences Advanced Photon Source Accelerator Improvements, ANL-East ^b	3.9	-	-	3.9	-	-	-	-
<i>KC-03</i>								
Office of Science Basic Energy Sciences Chemical Sciences General Plant Projects, ANL-East ^b	14.9	-	-	14.9	-	-	-	-
TOTAL BUDGETED PROJECTS	26.2	0.0	0.0	26.2	0.0	0.0	0.0	0.0
TOTAL FUNDED AND BUDGETED PROJECTS	56.8	10.5	14.9	31.4	0.0	0.0	0.0	0.0

Table S3.3 Major Construction Projects^a (Cont.)

	TEC	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Proposed Projects								
<i>AF-95</i>								
Office of Nuclear Energy, Science and Technology Nuclear Energy Research and Development General Plant Projects, ANL-West ^b	7.6	-	-	-	4.5	1.2	0.9	1.0
<i>39-AF-95</i>								
Office of Nuclear Energy, Science and Technology Nuclear Energy Research and Development Remote Treatment Facility	86.0	-	-	-	9.7	19.4	18.6	28.2
<i>FS-30</i>								
Assistant Secretary for Environmental Management ^c Safeguards and Security — Environmental Management General Plant Projects, ANL-West ^b	2.0	-	-	-	0.7	0.7	0.3	0.3
<i>KB-04</i>								
Office of Science Nuclear Physics Accelerator Improvements, ANL-East ^b	1.6	-	-	-	0.4	0.4	0.4	0.4
<i>KC-02</i>								
Office of Science Basic Energy Sciences Materials Sciences Advanced Photon Source Accelerator Improvements, ANL-East ^b	15.6	-	-	-	3.9	3.9	3.9	3.9
<i>KC-03</i>								
Office of Science Basic Energy Sciences Chemical Sciences General Plant Projects, ANL-East ^b	61.8	-	-	-	17.2	15.6	14.5	14.5
<i>39-KG-01</i>								
Office of Science Science Laboratories Infrastructure General Purpose Facilities New General Purpose Facilities Multiprogram Laboratory Office Building (05-CH-011) General Purpose Laboratory Facility	18.0	-	-	-	1.5	8.3	8.2	-
	6.0	-	-	-	-	-	-	1.0

Table S3.3 Major Construction Projects^a (Cont.)

	TEC	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Proposed Projects (Cont.)								
Building Rehabilitation and Upgrade								
Upgrade Existing Facilities								
Building Roof Replacements (05-CH-012)	15.8	-	-	-	1.1	6.0	6.0	2.7
Building Electrical Service Upgrade - Phase II (05-CH-062)	9.1	-	-	-	0.7	5.2	3.1	-
Mechanical and Control Systems Upgrade - Phase II	10.5	-	-	-	-	1.0	4.8	4.7
Laboratory Space Upgrade - Phase I	13.0	-	-	-	-	-	1.0	5.9
Building Electrical Service Upgrade - Phase III	11.0	-	-	-	-	-	-	1.0
Mechanical and Control Systems Upgrade - Phase III	11.0	-	-	-	-	-	-	1.0
Laboratory Space Upgrade - Phase II ^d	13.5	-	-	-	-	-	-	-
Building Electrical Service Upgrade - Phase IV ^d	8.0	-	-	-	-	-	-	-
Mechanical and Control Systems Upgrade - Phase IV ^d	10.0	-	-	-	-	-	-	-
Building Electrical Service Upgrade - Phase V ^d	8.0	-	-	-	-	-	-	-
Laboratory Space Upgrade - Phase IV ^d	26.0	-	-	-	-	-	-	-
Upgrade Utilities								
Roads-Parking-Walks-Street Lighting Upgrade	14.0	-	-	-	-	1.0	7.0	6.0
Central Heating Plant Auxillaries Upgrade	8.0	-	-	-	-	-	1.0	4.0
Electrical System Upgrade - Phase IV ^d	11.0	-	-	-	-	-	-	-
<i>39-KG-02</i>								
Office of Science								
Science Laboratories Infrastructure								
Environment, Safety, and Health Support, ANL-East								
Environment, Safety, and Health Compliance								
Fire Safety Improvements - Phase V	6.0	-	-	-	-	-	-	1.0
Building 362 Asbestos Abatement ^d	6.0	-	-	-	-	-	-	-

^a This table excludes construction funded from non-DOE sources.

^b General Plant Projects and Accelerator Improvements are not line-item construction projects in the President's Budget; other projects in the table are.

^c Safeguards and Security at Argonne-West will be funded by the Office of Nuclear Energy, Science and Technology, beginning in FY 2004.

^d To begin after FY 2008.

