

**Deferred Maintenance Reporting for Federal Facilities: Meeting the Requirements of Federal Accounting Standards Advisory Board Standard Number 6, as Amended**  
Federal Facilities Council Standing Committee on Operations and Maintenance

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# **DEFERRED MAINTENANCE REPORTING FOR FEDERAL FACILITIES**

**Meeting the Requirements of Federal Accounting Standards Advisory Board  
Standard Number 6, as Amended**

Federal Facilities Council Standing Committee on Operations and Maintenance

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## Executive Summary

### BACKGROUND

The federal government owns approximately 500,000 facilities and associated infrastructure worldwide. Facilities are complex structures with numerous separate but interrelated systems and components. Inevitably, over time the performance of facilities declines due to aging, wear and tear of systems and components, functional changes, and a variety of other factors. The life of facilities can be optimized, however, through adequate and timely maintenance and repair. Conversely, delaying or deferring maintenance and repairs can, in the short term, diminish the quality of services and, in the long term, lead to shortened facility life and reduced asset value. The existence of deferred maintenance is significant because it *implies* the quality and reliability of service provided by infrastructure on which maintenance has been deferred is lower than it should be, and thus the infrastructure is not, or will not later be, adequately serving the public (The Urban Institute, 1994).

In 1996 the Federal Accounting Standards Advisory Board (FASAB)<sup>1</sup> enacted Standard Number 6, Accounting for Property, Plant, and Equipment (PP&E), the first government-wide initiative requiring federal agencies to report dollar amounts of deferred maintenance annually. The FASAB has identified four overall objectives in federal financial reporting: budgetary integrity, operating performance, stewardship, and systems and control. FASAB Standard Number 6, as amended, focuses on operating performance and stewardship.

### STUDY ORIGIN

The FASAB has determined that information about deferred maintenance is of importance to users of federal financial reports and for measuring an agency's efficiency and effectiveness in managing property, plant and equipment. Recognizing that this is a

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<sup>1</sup> The Federal Accounting Standards Advisory Board was established in October 1990 by the Secretary of the Treasury, the Director of the Office of Management and Budget, and the Comptroller General of the United States. The board was created to consider and recommend accounting standards and principles for the federal government to improve the usefulness of federal financial reports.

new standard, the FASAB believed that a period of experimentation was desirable to determine the best methods to report deferred maintenance.

The implementation experience to date with FASAB Standard Number 6, as amended, has raised concerns with both agencies and auditors regarding the number of different interpretations of the standard, as well as cost-benefit and audit issues. For these reasons, in the summer of 1999 the Chief Financial Officers (CFO) Council<sup>2</sup> initiated an interagency effort led by the Department of Defense (DoD) to review deferred maintenance reporting for real and personal property, national defense PP&E, heritage assets, and stewardship land. The Federal Facilities Council (FFC)<sup>3</sup> Standing Committee on Operations and Maintenance, supplemented by staff from other agencies, provided technical assistance for the interagency effort by identifying and reviewing issues arising from FASAB Standard Number 6, as amended, as it related to deferred maintenance reporting for facilities (real property).

### STUDY OBJECTIVES

The work of the FFC Standing Committee on Operations and Maintenance and this report focused on fulfilling two primary objectives. The first is to identify issues related to the reporting of deferred maintenance for facilities as required by FASAB Standard Number 6, as amended. The second objective is to identify for consideration potential approaches for reporting deferred maintenance for facilities that (a) will have credibility in the facilities community, federal agencies, and Congress; (b) can be used to track trends within and across agencies; and (c) do not require an inordinate investment of time and resources to implement.

The FFC Standing Committee on Operations and Maintenance has prepared this report to identify potential issues that should be considered in any future amendments to the standard and to suggest approaches for resolving them. The committee's intent is to assist the CFO Council, federal agencies, the FASAB, and others as they consider how best to meet the objectives of federal financial reporting for facilities. *It is important to note that the FFC Standing Committee on Operations and Maintenance has not made*

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<sup>2</sup> The Chief Financial Officers Council is comprised of chief financial officers and deputy chief financial officers of the largest federal agencies and senior officials of the Office of Management and Budget and the Department of the Treasury. Members work collaboratively to improve financial management in the U.S. government.

<sup>3</sup> The FFC is a cooperative association of federal agencies, each of which requires the acquisition, maintenance, and operation of a significant inventory of buildings and other constructed facilities in support of its mission. The federal agencies that sponsored this study through the FFC are the U.S. Air Force, Air National Guard, U.S. Army, U.S. Department of Energy, U.S. Department of the Interior, U.S. Navy, U.S. Department of State, U.S. Department of Veterans Affairs, Federal Bureau of Prisons, Food and Drug Administration, General Services Administration, Indian Health Service, Internal Revenue Service, National Aeronautics and Space Administration, National Institutes of Health, National Institute of Standards and Technology, National Science Foundation, Office of the Secretary of Defense, Smithsonian Institution, and the U.S. Postal Service. (See Internet site at <http://www4.nationalacademies.org/cets/ffc.nsf> for additional information.)

*any recommendations for reporting deferred maintenance for facilities or advocated specific positions.*<sup>4</sup>

### ISSUES RELATED TO DEFINITIONS

One of the difficulties that federal agencies have found in complying with Standard Number 6, as amended, as it relates to facilities, has been the use of terms that are not typically used in the facilities management field, that are loosely defined, and/or that do not accurately reflect facility maintenance and repair practices. Of specific concern were the FASAB (1996) definitions for maintenance and deferred maintenance, which are:

maintenance—the act of keeping fixed assets in acceptable condition. It includes preventive maintenance, normal repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to provide acceptable services and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended.

deferred maintenance—maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed for a future period.

These definitions are intended to apply to a broad class of assets, including facilities, vehicles, weapons system, and other types of property, plant, and equipment. These classes of assets have life cycles ranging from a few to 50 or more years and substantial variations in characteristics, complexity, and uses. In the case of facilities, some of these assets may be historic in nature. When applying these general definitions to specific classes of assets, problems arise. For facilities the treatment of repairs as a subset of maintenance, the use of the term “expected life,” and references to “originally intended uses” were identified as problematic.

The committee has proposed for consideration the following revised definitions that it believes better reflect current facility management practices for maintenance and repair:

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<sup>4</sup> The NRC was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with the general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the federal government, the public, and the scientific and engineering communities. Under operating procedures approved by the National Research Council, the FFC conducts activities carried out by standing committees composed primarily of federal employees to address issues of common interest. Because FFC standing committees are not appointed by the NRC and are not required to meet NRC requirements for committee composition and balance, bias, and conflict of interest, or report review, FFC reports cannot contain specific recommendations and are published under the aegis of the FFC, not the NRC.

maintenance and repairs—activities directed toward keeping fixed assets in a condition to effectively support the mission. Activities include preventive maintenance, repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to support the mission. Maintenance and repairs exclude activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than its current use.<sup>5</sup>

deferred maintenance and repairs—maintenance and repairs that were not performed when they should have been or were scheduled to be and which, therefore, were put off or delayed for a future period.

### ISSUES AND POTENTIAL APPROACHES RELATED TO METHODOLOGIES FOR DEFERRED MAINTENANCE REPORTING

FASAB Standard Number 6, as amended, specifies that federal agencies report dollar amounts of deferred maintenance based on methodologies that use condition assessment surveys, a total life-cycle cost method<sup>6</sup>, or their equivalent. Applying explicit methodologies (or their equivalent) to a broad class of assets again can be problematic in the case of a specific class. For example, the data elements for the total life-cycle cost method required by FASAB Standard Number 6 are not reflective of facilities management practices.

Condition assessment surveys are a recognized, valid, facilities management tool for identifying and reporting maintenance and repair needs. However, concerns were raised that the standard implies or could be interpreted to imply that condition assessment information should be available for all facilities in an inventory and that such information should be updated annually. In practice, the availability of condition assessment data varies widely from agency to agency. For those agencies that have instituted inventory-wide condition assessment programs, facilities are typically inspected on a cycle of every three to five years or longer.

In [Chapter 3](#) of this report, the committee identifies a number of alternative methodologies that are similar to condition assessment surveys or the total life-cycle cost method or combine elements of the two. Allowing agencies greater flexibility in choosing methodologies, including statistical sampling, to report deferred maintenance and repairs for facilities may help to better align the objectives and methodologies of federal financial reporting and FASAB Standard Number 6, as amended.

<sup>5</sup> During the review process, alternative wording was suggested. The alternatives are noted in [Chapter 2](#).

<sup>6</sup> Throughout FASAB Standard Number 6, life cycle costing is described or defined using several terms. The terms life cycle cost plans, life cycle cost forecasts, life cycle costing and total life cycle cost method are used interchangeably. In order to remain consistent, this report uses one term, total life cycle cost method.

## **DEFERRED MAINTENANCE AND REPAIRS AS AN INDICATOR OF FACILITY CONDITION**

FASAB Standard Number 6, as amended, implies that the dollar value of deferred maintenance is a surrogate (estimate) for management's ability to maintain facilities. Although the existence of deferred maintenance may indicate that the quality and reliability of services are substandard, calculating a dollar figure for deferred maintenance and repairs does not indicate how well facilities are performing or their overall condition (operating performance). Because of the variations in size, composition, and value of facility inventories, a dollar amount alone does not place the number in context with the size or value of an individual agency's facilities inventory and it does not allow for comparisons across agencies. A single dollar amount also does not indicate whether agencies are using their available maintenance and repair funds efficiently or effectively or provide an indication of whether the government's financial situation has improved or deteriorated (stewardship). In the committee's opinion, deferred maintenance and repairs would be a more meaningful indicator if it is (1) used in conjunction with other indicators, (2) derived by each agency in a consistent manner over time and (3) tracked over a period of time so that trends can be observed. In [Chapter 4](#), the committee identifies some potential indicators that might be used in conjunction with deferred maintenance and repairs. This issue, however, requires further study.

### **REFERENCE**

The Urban Institute. 1994. *Issues in Deferred Maintenance: The Federal Infrastructure Strategy Program*. Alexandria, VA: Institute for Water Resources Publications.

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# 1

## Introduction

### BACKGROUND

The approximately 500,000 facilities and associated infrastructure owned by the federal government constitute a portfolio of significant durable public assets that reflect the investment of more than 300 billion tax dollars (NRC, 1998). Ownership of facilities by the federal government carries with it an obligation to act responsibly and to ensure that resources are allocated effectively to sustain that investment.

Buildings, or facilities, are complex structures with a number of separate but interrelated components, including walls, roofs, windows/doors, and critical servicing systems such as mechanical, electrical, plumbing, heating, air conditioning, ventilation, communication, and fire safety, among others. Components and systems must perform well individually and in combination with others to optimize the performance of facilities.

Inevitably, over time the performance of facilities declines due to aging and wear and tear of components and systems, functional changes, and a variety of other factors. The life of facilities can be optimized, however, through adequate and timely maintenance and repairs. Conversely, delaying or deferring maintenance and repairs can, in the short term, diminish the quality of building services and, in the long term, lead to shortened building life and reduced asset value (APWA, 1992). This concept is illustrated in [Figure 1.1](#).

Deferring needed maintenance indefinitely may ultimately result in significantly higher costs. For example, the steel cladding on a warehouse needs to be painted at scheduled intervals. If the painting, a relatively minor cost, is deferred continually, the cladding will eventually rust and deteriorate, necessitating significant repairs or replacement, at many times the cost of having painted it on schedule.

Apart from Federal Accounting Standards Advisory Board (FASAB) Standard Number 6, as amended, deferred maintenance<sup>1</sup> has been defined by the Urban Institute (1994) as “the extent of maintenance, repair, rehabilitation, etc., that is needed to bring capital assets from a sub-par condition to needed service levels”. Generally it can be

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<sup>1</sup> Deferred maintenance is also known as unfunded maintenance, backlog of maintenance and repair, or unaccomplished maintenance.

quantified as the estimated cost of the maintenance and repairs needed to bring a facility up to a minimum acceptable condition (NRC, 1998). The existence of deferred maintenance is significant in that it implies that the quality and reliability of service provided by infrastructure on which maintenance has been deferred are lower than they should be, and thus the infrastructure is not, or will not later be, adequately serving the public (The Urban Institute, 1994).

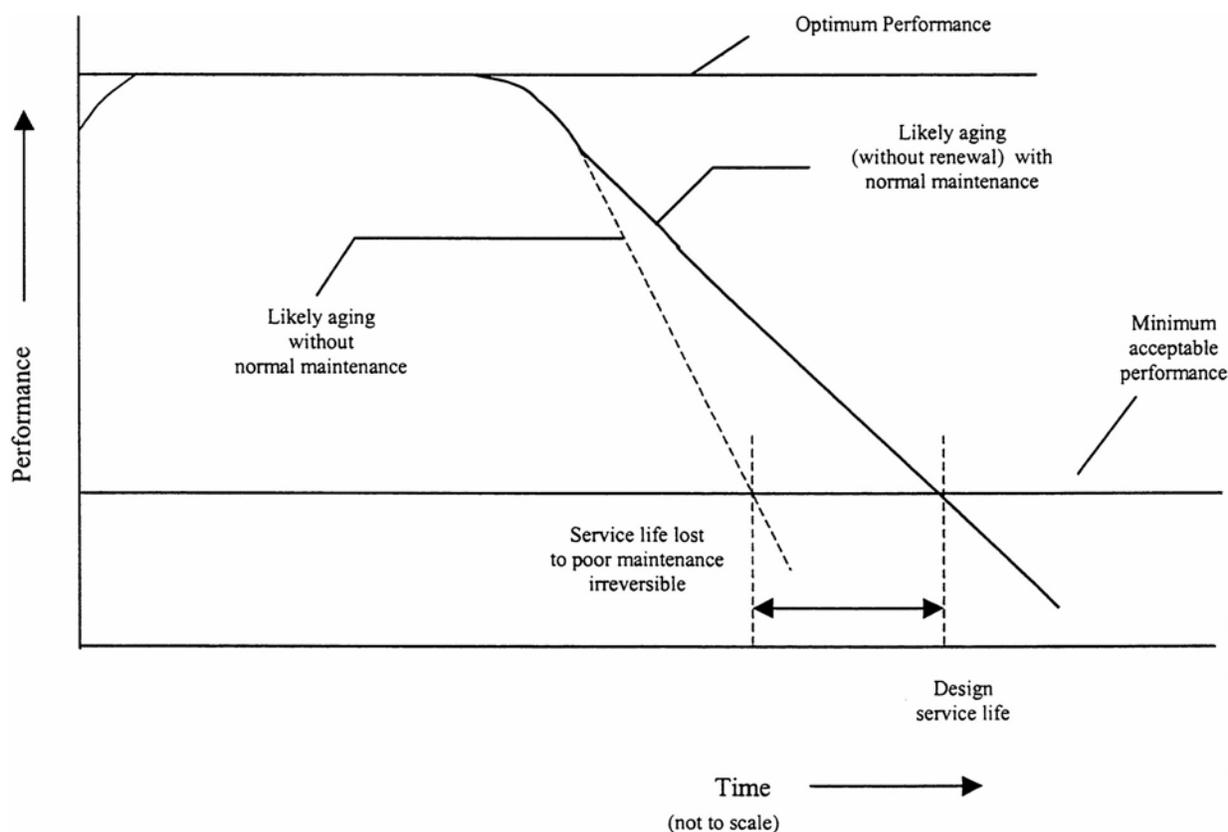


Figure 1.1 Effect of adequate and timely maintenance and repairs on the service life of a building. Source: NRC (1993).

### FACILITIES MAINTENANCE AND REPAIR PROGRAMS

The appropriate level of maintenance and repairs expenditures for facilities can be influenced by many factors, including building size and complexity; types of finishes; current age and condition; mechanical and electrical system technologies; historic or community value; types of occupants or users; climate; tenancy turnover rates; criticality of role or function; labor, energy, and materials prices; and distances between buildings in inventories (NRC, 1990). An effective program for facilities maintenance and repair employs a combination of strategies and approaches. These include preventive maintenance, programmed major maintenance, predictive testing and inspection, routine repairs, service calls, and run-to-failure (FFC, 1996).

Preventive maintenance has been defined as the planned scheduled periodic inspection, adjustment, cleaning, lubrication, parts replacement, and minor repair of equipment and systems for which a specific operator is not assigned (FFC, 1996). It consists of many checkpoint activities on items that, if disabled, would interfere with an essential installation operation, endanger life or property, or involve high cost or long lead time for replacement.

Programmed major maintenance includes those maintenance tasks that are planned to occur on a multiyear cycle, such as every three or five years. Examples include painting, roof maintenance, road and parking lot maintenance, and utility system maintenance.

Predictive testing and inspection refers to activities that involve the use of specialized tests, such as ultrasonic testing, infrared thermography, vibration analysis, and lubricant and wear particle analysis, to identify maintenance requirements (FFC, 1996).

Routine repairs and replacements include actions taken to restore a system or component to its original capacity. The need to replace an item or system may arise from obsolescence, cumulative effects of wear and tear, premature service failure, or destruction by fire and other hazards (NRC, 1990). Replacements do not significantly increase the capacity of the item involved and would be considered routine repairs if they are required for the continued operation of a facility (FFC, 1996). Service calls include requests for system or equipment repairs that are unscheduled and unanticipated. They are generally received when a system or component has failed.

Systems or components not included in a preventive maintenance program are candidates for run-to-failure repair (unplanned), programmed major maintenance (planned), or planned maintenance and repair based on condition and need. Typically, components included in a run-to-failure strategy are small noncritical components that can be repaired or replaced on a service call (FFC, 1996).

### REASONS FOR DEFERRING MAINTENANCE AND REPAIRS

Maintenance and repairs for federal facilities are deferred for many reasons. These issues have been documented in the report *Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets* (NRC, 1998). They include:

- A focus on design and construction costs, the so-called first costs of facilities ownership, as opposed to life-cycle costs, in the federal budget process.
- Inadequate funding for maintenance and repairs.
- Aging facilities that require increased levels of maintenance and repair to keep them operating effectively.
- Lack of information that would assist facilities program managers in making compelling arguments for maintenance and repair budgets to decision makers.
- Lack of accountability for stewardship.<sup>2</sup>

<sup>2</sup> See [Appendix A](#) for excerpts from the *Stewardship of Federal Facilities* report.

As of 1998, the cost to substantially reduce total deferred maintenance for federal facilities was estimated to be in the tens of billions of dollars.<sup>3</sup>

In the past, public officials have called into question the methodologies that federal agencies used to define building deficiencies and to calculate the costs involved in repairing them. Officials have also expressed concern that agencies included inappropriate items in the maintenance backlog to increase the overall estimate and argue for larger budget appropriations (NRC, 1998).

Several causes have been noted for these concerns. First, prior to 1996, there was no government-wide requirement to report deferred maintenance. Thus, the responsibility for developing methodologies fell to individual agencies. FASAB Standard Number 6, as amended, seeks to address this issue. Second, fundamental differences exist among accounting structures used to track expenditures for maintenance and repairs from agency to agency. These differences influence maintenance and repair practices and how deferred maintenance is quantified. For example, the General Services Administration (GSA) uses two accounts: Operations and Maintenance and Repairs and Alterations. GSA's Operations and Maintenance account includes operations, maintenance, and maintenance repairs (up to a certain dollar threshold), and the Repairs and Alterations account includes all repairs, replacements, improvements, and alterations in excess of a certain dollar threshold with no upper limit.

At the National Institutes of Health (NIH), the various institutes are assessed a given amount each year to cover the cost of maintenance by government personnel and minor repairs by contractors. NIH also receives a direct appropriation from Congress as part of the Building and Facilities Budget to cover major repairs and improvements by contractors. The Smithsonian Institution has three categories of maintenance and repair accounts, the State Department has four. The National Aeronautics and Space Administration (NASA) is funded for human space flight, science and technology, and mission support; major programs in the agency fund field installation activities, including maintenance and repair (FFC, 1996; NRC, 1998).

An example from the University of Virginia (UVA) illustrates how accounting structures can influence facilities maintenance and repair practices. Prior to 1996, if a UVA facility had a malfunctioning sprinkler system it could be identified as a deficiency, and maintenance funds could be used to repair it. However, if a facility had no sprinkler system yet needed one, it could not be paid for from maintenance funds and therefore could not be identified as a deficiency, an "all-to-common scenario [which] made for a dramatically inaccurate backlog total and campuswide FCI [facilities condition index]" (Syme and Oschrin, 1996). Similar scenarios arise in federal agencies and can lead to substantial differences in calculating dollar amounts of deferred maintenance for facilities.

Third, there are no government-wide standards for determining items that are appropriately included in maintenance and repair budgets/accounts. This stems in part from the accounting systems and from overlaps and gray areas of maintenance and repair work, operations, and alteration projects. For example, some government facilities

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<sup>3</sup> FFC sponsor agencies reported in their 1998 accountability reports the following deferred maintenance amounts: Department of Energy, \$927 million; Department of the Interior, \$7 billion to \$16 billion; Department of State, \$155 million; NASA, \$1.4 billion; Department of Defense, \$37 billion; Indian Health Service, \$438 million.

include a central utility plant that is staffed 24 hours a day, 365 days per year. Staff at these facilities ordinarily perform maintenance as a routine part of operations. Agencies must decide if any portion of the operations funding will be included in the maintenance and repair budget. These amounts are not trivial when multiplied over hundreds or even thousands of facilities. The Federal Facilities Council (1996) report *Budgeting for Facilities Maintenance and Repair Activities* and the NRC (1998) report, *Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets* both address items that are appropriately included in maintenance and repair budgets and those that are related to operations, alterations, and capital improvements.

### OTHER STANDARDS IN EFFECT

Some agencies need to meet other standards that may be in conflict with or raise other issues for complying with FASAB Standard Number 6, as amended, for deferred maintenance reporting for facilities.

Agencies that operate hospitals, medical centers, or other health care organizations must be accredited by the Joint Commission for Accreditation of Healthcare Organizations (JCAHO) or the Health Care Finance Administration as a requirement to receive federal payments or by federal policy as is the case for federal health care providers. Both organizations require rigorous maintenance programs and accomplish onsite inspection as well as review of maintenance records. Agencies subject to these standards include the Department of Veterans Affairs, NIH, and several defense organizations.

The JCAHO standards lead health care organizations to include building systems in a larger category of utility systems and to determine their criticality to the organization's mission. The organization inventories each utility system's components, analyzes each components' maintenance needs, and develops a maintenance program including scheduling, documentation, and review of their maintenance. Utility systems considered critical to a health care organization's mission must be maintained and must operate reliably to meet accreditation standards.

The power marketing administrations (PMAs) of the Department of Energy (i.e., Bonneville PMA, Southwestern PMA, Western PMA, and Southeastern PMA) are regulated to industry standards by regional utility commissions. The condition of the physical assets must meet specific criteria related to safety and reliability of operations. In meeting these standards the PMAs are not permitted to defer any maintenance.

Although all government agencies may not have to submit to the rigor of specific standards developed by accrediting agencies, mission requirements involving continuous 24 hours per day, 7 days per week, 365 days per year use, such as that found in operations centers, emergency response facilities, and air traffic control centers, may require a more rigorous standard, set by statute or by the responsible agency, that will not permit the facility to operate unless operations and maintenance are fully funded.

To meet accreditation or other standards, federal agencies may find it necessary to invest a significant portion of maintenance and repair budgets into specific types of facilities and to defer needed maintenance and repair at other facilities not subject to such standards. When considering any modifications to the reporting requirements of FASAB

Standard Number 6, it is important to recognize that some, if not all, federal agencies must meet other internal and external regulations and statutes that directly influence how maintenance and repair funds are to be expended.

### FEDERAL FINANCIAL ACCOUNTING

Since 1990 a number of laws and regulations have been enacted with the general objectives of providing greater accountability by the federal government to its citizens.<sup>4</sup> One such measure is FASAB Standard Number 6, Accounting for Property, Plant, and Equipment. Enacted in 1996, Standard Number 6, as amended, is the first government-wide initiative requiring federal agencies to report on deferred maintenance as part of their annual financial reporting statements.

The FASAB is responsible for developing accounting standards to enhance the financial information reported by the federal government, wherein “federal financial reporting helps to fulfill the government’s duty to manage programs economically, efficiently, and effectively and to be publicly accountable” (FASAB, 1993). The FASAB has identified four objectives of federal financial reporting:

- *budgetary integrity*, providing information on the status of budgetary resources, including how budgetary resources have been obtained and used;
- *operating performance*, addressing the costs of providing specific programs, the efficiency and effectiveness of the government’s management of its assets, and the efforts associated with federal programs;
- *stewardship*, identifying if the government’s financial position improved or deteriorated over the period, if future budgetary resources will be sufficient to sustain public services and meet obligations, and if the government’s operations have contributed to the nation’s current and future well-being;
- *systems and control*, providing information on whether transactions are executed in accordance with budgetary and financial laws and requirements, if assets are properly safeguarded to deter waste, fraud, and abuse, and that performance measurement information is adequately supported (FASAB, 1993).

### FASAB STANDARD NUMBER 6, AS AMENDED

The FASAB has established standards for federal agencies to follow to meet the objectives of federal financial reporting. FASAB Standard Number 6<sup>5</sup> is designed to meet objectives for operating performance and stewardship. To meet operating performance objectives, the FASAB has provided accounting standards intended to result in “relevant and reliable cost information for decision-making by internal users (e.g., program

<sup>4</sup> These include the Chief Financial Officers Act of 1990, the Government Performance and Results Act of 1993, and the Government Management Reform Act of 1994, which incorporates the Federal Financial Management Act of 1994.

<sup>5</sup> Excerpts from FASAB Standard Number 6 are contained in [Appendix B](#). [Appendix C](#) contains amendments to Standard Number 6.

managers, budget examiners, and officials); comprehensive, comparable cost information for decision-making and program evaluation by Congress and the public; and information to help assess the efficiency and effectiveness of asset management (e.g., condition of assets including deferred maintenance)” (FASAB, 1996). The standard also establishes accounting standards that seek to meet the stewardship objectives by requiring information on asset condition; changes in the amount and service potential of PP&E; the cost of PP&E, where applicable; and spending for acquisition of PP&E versus noncapital spending (FASAB, 1996).

Standard Number 6 seeks to provide information on asset condition by requiring agencies to report on deferred maintenance. The standard (FASAB, 1996) defines maintenance as:

the act of keeping fixed assets in acceptable condition. It includes preventive maintenance, normal repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to provide acceptable services and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended.

Deferred maintenance is defined by FASAB as “maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed for a future period” (FASAB, 1996).

Standard Number 6, as amended, acknowledges that facilities may differ as to the level of acceptable condition and that this level may vary across and within agencies; therefore, the standard allows facility management to determine the condition rating. Under the standard, management may estimate the amount of deferred maintenance for its agency through condition assessment surveys, a total life cycle cost method or other methods that are similar or identical to condition assessment surveys or total life-cycle cost.

To comply with FASAB Standard Number 6, as amended, federal agencies must include the following as required supplementary information for all PP&E in their annual financial reports:

1. Each major class of asset for which maintenance has been deferred. The standard states that major classes of assets are to be determined by the agency. Examples of major classes of assets are buildings and structures, furniture and fixtures, equipment, vehicles, and land.
2. The method by which the agency measured the deferred maintenance for each class of PP&E. If the agency has chosen to measure its deferred maintenance by using a condition assessment survey, it should present for each major class of PP&E:
  - a. a description of the requirements or standards for acceptable operating condition.
  - b. any changes in the condition requirements or standards.
  - c. asset condition and a range or point estimate of the dollar amount of maintenance needed to return it to its acceptable operating condition.

Examples of condition information are averages of standardized condition rating codes; percentage of assets above, at, or below acceptable condition; or narrative information.

If the agency chooses to use the total life-cycle cost method, it should include the following for each major class of PP&E:

- a. the original date of the maintenance forecast and an explanation for any changes to the forecast.
- b. prior-year balance of the cumulative deferred maintenance amount.
- c. the dollar amount of maintenance that was defined by the professionals who designed, built, or manage the PP&E as required maintenance for the reporting period.
- d. the dollar amount of maintenance actually performed during the period.
- e. difference between the forecast and actual maintenance.
- f. any adjustments to the scheduled amounts deemed necessary by the managers of the PP&E.
- g. the ending cumulative balance for the reporting period for each major class of asset experiencing deferred maintenance.

The standard states that agencies may provide as optional information the stratification between critical and noncritical amounts of maintenance needed to return each major class of asset to its acceptable operating condition. If management elects to report this information, management's definitions of critical and noncritical maintenance must be included; Standard Number 6, as amended, does not provide definitions for critical or noncritical maintenance.

### STUDY ORIGIN

The FASAB,<sup>6</sup> the entity that created Standard Number 6, has determined that information about deferred maintenance is of importance to users of federal financial reports and for measuring an agency's effectiveness and efficiency in managing PP&E. Recognizing that this is a new standard, specifically with regard to deferred maintenance reporting, the FASAB believed that a period of experimentation was desirable to determine the best methods to report deferred maintenance. Experience to date with implementing the standard has raised concerns by both agencies and auditors regarding the number of different interpretations of the standard, as well as cost-benefit and audit issues. The FASAB and the Office of Management and Budget (OMB) suggested that an interagency project be initiated to suggest government-wide methods to calculate

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<sup>6</sup> State and local government agencies are held accountable to accounting standards and principles established by the Governmental Accounting Standards Board. Its mission is to establish and improve standards of state and local governmental accounting and financial reporting that will result in useful information for users of financial reports and guide and educate the public, including issuers, auditors, and users of those financial reports.

deferred maintenance as well as more detailed guidance on the preparation of deferred maintenance estimates.

In January 1999 the Federal Facilities Council (FFC) Standing Committee on Operations and Maintenance began discussing and reviewing issues of deferred maintenance reporting for facilities to meet FASAB Standard Number 6, as amended. In the summer of 1999 the Chief Financial Officers (CFO) Council initiated an interagency effort led by the Department of Defense (DoD) to review deferred maintenance reporting for real and personal property, national defense PP&E, heritage assets, and stewardship land. Because the efforts of the FFC Operations and Maintenance Committee and the CFO Council/DoD shared some common objectives, it was determined that the FFC Operations and Maintenance Committee, supplemented by staff from other federal agencies and supported by the DoD, would provide technical assistance for the interagency effort as it relates to deferred maintenance reporting for facilities (real property) and FASAB Standard Number 6, as amended.

### STUDY OBJECTIVES

The work of the FFC Standing Committee on Operations and Maintenance and this report focused on fulfilling two primary objectives. The first is to identify issues related to the reporting of deferred maintenance for facilities as required by FASAB Standard Number 6, as amended. The second objective is to identify for consideration potential approaches to reporting deferred maintenance for facilities that (a) will have credibility within the facilities community, federal agencies, and Congress; (b) can be used to track trends within and across agencies; and (c) do not require an inordinate investment of time and resources to implement.

The FFC Standing Committee on Operations and Maintenance has prepared this report to identify potential issues that should be considered in any future amendments to the standard and to suggest approaches for resolving them. The committee's intent is to assist the CFO Council, federal agencies, the FASAB, and others as they consider how best to meet the objectives of federal financial reporting for facilities. *It is important to note that the FFC Standing Committee on Operations and Maintenance has not made any recommendations for reporting deferred maintenance for facilities or advocated specific positions.*

### STUDY METHOD

The sponsor agencies of the FFC approved the study in September 1999 as a high-priority item for the calendar year 2000 Technical Activities Program. The committee met 10 times between September 1999 and September 2000. Incorporated into the study was information obtained from FFC Operations and Maintenance Committee agencies' facilities managers and personnel. Additional information was compiled from facilities management literature.

Norwood Jackson, formerly of the FASAB, met with the committee to discuss FASAB Standard Number 6, as amended, and to clarify issues that were of importance to the committee and to the completion of this study. Jay Janke, Office of the Secretary of

Defense (Installations), met with the committee to present and discuss the DoD Facilities Sustainment Model. The final draft of the report was reviewed by the FFC Operations and Maintenance Committee, other participants in the study, and the senior representatives of the FFC sponsor agencies.

## REPORT ORGANIZATION

[Chapter 2](#) identifies issues related to definitions and some potential revisions for consideration. [Chapter 3](#) discusses issues related to the methodologies specified in FASAB Standard Number 6 for reporting deferred maintenance as they relate to facilities and identifies other valid approaches that could be used. [Chapter 4](#) identifies issues related to the use of deferred maintenance as an indicator of facility condition and potential approaches for increasing its utility.

[Appendix A](#) contains excerpts from the report *Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets*. Excerpts from FASAB Standard Number 6, and the amendments to FASAB Standard Number 6, are contained in [Appendix B](#) and [Appendix C](#), respectively.

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## 2

### Definitional Issues and Potential Revisions

FASAB Standard Number 6, as amended, is intended to apply to a broad class of property, plant, and equipment, including buildings, vehicles, weapons systems, and stewardship land. These classes of assets have life cycles ranging from a few to 50 or more years and substantial variations in characteristics, complexity, and uses. In the case of facilities, some of these assets may be historic in nature. By developing definitions intended to apply to several classes of assets, difficulties arise in applying them to specific categories. Thus, one difficulty for agencies in complying with FASAB Standard Number 6, as amended, as it applies to facilities (real property) has been the use of terms that are not widely used in the facilities management field, that are defined very broadly, or that do not reflect how facility maintenance and repair programs and practices are implemented in federal agencies.

#### ISSUES

##### Maintenance

Maintenance is defined by FASAB Standard Number 6, as amended, as:

the act of keeping fixed assets in acceptable condition. It includes preventive maintenance, normal repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to provide acceptable services and achieves its expected life. Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended (FASAB, 1996).

This definition of maintenance treats repairs as a subset of maintenance. In facilities management literature and general practice, maintenance and repairs are treated as separate activities with different objectives. For example, maintenance has been

defined as the “upkeep of property and equipment, i.e., work necessary to realize the originally anticipated useful life of a fixed asset.” In contrast, repair involves “work to restore damaged or worn-out property to a normal operating condition” (NRC, 1998). Thus, the continuing deferral of routine maintenance may lead to more serious deficiencies and the need for repairs.

As noted in [Chapter 1](#), an effective and proactive facilities management program combines several strategies that address different aspects and components of maintenance and repair and have different objectives. These strategies may include preventive maintenance, programmed or planned major maintenance, predictive testing and inspection, routine repairs and replacements, emergency service calls, and run-to-failure (FFC, 1996; NRC, 1998).

### **Deferred Maintenance**

FASAB Standard Number 6, as amended, defines deferred maintenance as “maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed for a future period”. The reader must go back to the definition of maintenance to see that repairs are included as a subset of maintenance. This structure sets up the possibility that agencies would account for deferred maintenance but not deferred repairs. The intent of the standard would be clearer if this definition were amended to refer specifically to repairs.

### **Acceptable or Useable Condition**

FASAB Standard Number 6, as amended, contains some minor inconsistencies in its definitions. For example, in the text, maintenance is described as the “act of keeping fixed assets in acceptable condition.” In the glossary of terms, maintenance is described the “act of keeping fixed assets in useable condition.” The terms acceptable or useable condition are not defined because the standard allows agencies the flexibility to establish their own standards for what constitutes acceptable or useable condition based on a facility’s use, type, and its relationship to mission.

### **Economic Life, Useful Life, Expected Life**

FASAB Standard Number 6, as amended, defines economic life as “the period during which a fixed asset is capable of yielding services of value to its owner (see ‘useful life’).” Useful life is defined as “the normal operating life in terms of utility to the owner.” Standard Number 6, as amended, also uses the term expected life in the definition of maintenance but does not define it.

Facilities managers refer to the economic life or service life (or lives) of buildings and their major systems, for example, mechanical, electrical, heating, ventilating, air conditioning, depending on the context. Looking at facilities as an aggregation of components is important because different elements (walls, roofs, foundations, windows,

plumbing, and so forth) wear out at different rates and require different levels of maintenance and repair.

Elsewhere, economic life has been defined as “the period of time over which costs are incurred and benefits or disbenefits are delivered to an owner; an assumed value sometimes established by tax regulations or other legal requirements or accounting standards and not necessarily related to the likely service life of a facility or [its] subsystems” (NRC, 1991). Service life, in contrast, has been defined as “the period of time over which a building, component, or subsystem provides adequate performance; a technical parameter that depends on design, construction quality, operations and maintenance practices, use, and environmental factors” (NRC, 1991). The term expected life did not appear in the facilities management literature reviewed for this study.

Using a descriptive term such as expected, useful, service, or economic life, or a phrase such as “achieves its expected life” implies a timeframe of finite duration, such as 30 years. Using a finite time period may be appropriate for tax depreciation purposes for privately owned buildings. However, in the federal government, facilities are routinely used for many years beyond their economic or useful life, a practice that results in higher maintenance and repair costs. A significant proportion of the existing facilities inventory is more than 40 to 50 years old; many buildings are still in use 100 or more years after they were constructed with no expectation of replacement or disposal. Budget procedures, lack of funding, and other factors make it difficult to replace or dispose of buildings. As a consequence, some federal facilities are surplus and others are used long after any standard projections of expected, service, economic, or useful life, even if they are obsolete and are more costly to operate than a new one would be.

Federal facilities are also routinely renovated to serve new functions, which may be quite different than their original use. (In these cases, the projection of economic or useful life would be recalculated.) In practice, federal facilities usually receive some level of maintenance and repair as long as they are being used for some function, whether or not it is the original function and whether or not the facility is functionally obsolete.

Inadequate funding for facilities maintenance and repair programs is a long-standing, well-documented issue (NRC, 1998). Federal agencies do not receive the funding required to keep all facilities in acceptable operating condition. Consequently, they must prioritize the investment of the maintenance and repair funds they do receive. Because facilities are generally used in support of a particular program or mission of an agency, maintenance and repair activities are directed toward keeping a facility in a condition to effectively support the mission rather than achieving a specific number of years of use. An exception might be historical assets that are being kept as a public trust but which have no direct impact on the performance of an agency's mission.

In reviewing FASAB Standard Number 6 as it relates to deferred maintenance reporting for facilities (not necessarily to vehicles, land, or weapons systems), the committee concluded that it is important to recognize that maintenance and repair funds are limited. They are typically invested in facilities on a priority basis to effectively support agency programs and missions rather than to achieve a specific number of years of use or life.

## POTENTIAL REVISIONS

FASAB Standard Number 6, as amended, is intended to address both maintenance and repair programs for facilities and other classes of assets, with significantly different characteristics, uses, and life cycles. As noted above, the committee has suggested potential revisions for consideration that would more closely reflect current federal practices as they relate to facilities. They would also provide facilities managers with the flexibility necessary to apply a government-wide standard to agencies having a wide variety of missions, different accounting systems, and different maintenance and repair practices. Suggested revisions to the definitions that would address the noted deficiencies could read as follows:

**Maintenance and repairs.** Maintenance and repairs are activities directed toward keeping fixed assets in a condition to effectively support the mission. Activities include preventive maintenance, repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to support the mission. Maintenance and repairs exclude activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from or significantly greater than its current use.<sup>1</sup>

**Deferred maintenance and repairs.** Maintenance and repairs that were not performed when they should have been or were scheduled to be and which, therefore, were put off or delayed for a future period.

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<sup>1</sup> One reviewer of this report took issue with the change to “effectively support the mission.” The concern was that it would be difficult to compute maintenance and repair requirements without reference to the life of a building and its components. A second reviewer suggested that the last sentence read “maintenance and repairs exclude activities aimed at materially changing capability, capacity, or extending its useful life.”

### 3

## Methodological Issues and Alternative Approaches for Calculating Deferred Maintenance for Facilities

FASAB Standard Number 6, as amended, specifies two methods that can be used to calculate deferred maintenance for all classes of property, plant, and equipment: condition assessment surveys or a total life-cycle cost method. The standard states that “other methods” may be used but stipulates that the other methods must be identical or similar to the total life-cycle cost method or condition assessment surveys (FASAB, 1996). It is the federal agency management’s discretion to determine which method to use.

As noted in [Chapter 2](#), developing definitions to apply to classes of assets with substantial variations in character, life cycle, complexity, and use can be problematic when applying them to a particular class of asset. Similarly, specifying methodologies for deferred maintenance reporting for different classes of assets can be problematic. An additional consideration is the level of resources required to implement these methodologies that will depend, in part, on the methodology itself and also on the availability of data. When data are available, the costs of implementation can be minimized. However, when the specified data are not available, the cost of gathering the data can be high, and this raises cost-benefit issues.

Methodologies based on condition assessment surveys and total life-cycle cost are appropriate and valid for deferred maintenance reporting for facilities. However, several concerns were raised by the committee regarding specific aspects of FASAB Standard Number 6, as amended. One concern was that the standard implies or could be interpreted to imply that condition assessment survey data should be available for all facilities in an agency’s inventory and that such data should be updated annually. In practice, the availability of condition assessment data varies from agency to agency. Data collection procedures also vary; typically, those agencies that have instituted comprehensive condition assessment survey programs reinspect facilities on a cycle of every 3 to 5 years or longer. A second concern was that the data elements required by the standard for the total life-cycle cost method are not reflective of facilities management practices and limit the use of this methodology for deferred maintenance reporting for facilities.

This chapter focuses on issues related to methodologies for deferred maintenance reporting for facilities and describes additional approaches that are similar to condition

assessment surveys and the total life-cycle cost method that could be used to meet federal financial accounting objectives for operating performance and stewardship.

### CONDITION ASSESSMENT SURVEYS

FASAB Standard Number 6, as amended, defines condition assessments as “periodic inspections of PP&E to determine their current condition and estimated cost to correct any deficiencies.” Elsewhere, condition assessments have been defined as the “process of systematically evaluating an organization's capital assets in order to project repair, renewal, or replacement needs that will support the mission or activities they were designed to serve” (Rugless, 1993).

Condition assessment surveys, as the name implies, are effective for determining the current condition of a facility and its components and in identifying deficiencies. Condition assessment surveys generally utilize trained personnel who inspect each facility and make a determination regarding the facilities' physical condition, how the facility is performing, and if any maintenance and/or repair deficiencies are present (NRC, 1998). The trained personnel may be government employees, private-sector personnel under contract to the agency, or a combination of both.

The use of condition assessment survey (CAS) programs by federal agencies is reviewed in *Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets* (NRC, 1998). In the early 1990s the Department of Energy (DOE) and later the Department of Defense (DoD) undertook programs to develop and implement CAS programs across their infrastructures. Both departments focused on developing comprehensive processes that included detailed inspection standards, inspector training programs, automated data collection devices, and the ability to aggregate information at multiple levels based on location and organization. The DOE CAS was designed as an industry-based system of standards to develop deficiency-based capital maintenance and repair costs for use in managing DOE assets.

The DoD program was originally intended to be implemented department wide. However, after pilot testing of a system, the implementation costs were determined to be too high to deploy it across all services. Within DoD individual services developed their own systems. The Air Force Commanders' Facility Assessment Program was designed to link facility condition to mission requirements to ensure that resources for maintenance, repair, and minor construction are allocated to the most critical mission needs of field commanders. The U.S. Army's Installation Status Report system was designed to assist installations in articulating their infrastructure needs to the Department of the Army and to allow the department to develop funding requests to Congress (NRC, 1998). For these agencies and for others that may have implemented comprehensive condition assessment survey programs, the necessary data may be available to meet the requirements of FASAB Standard Number 6, as amended.

In reviewing condition assessment practices, the committee that authored the Stewardship study noted that the use of condition assessments by federal agencies is increasing. Federal agencies with such programs have generally developed them independently to meet their specific needs within financial and staff constraints; consequently, the level of sophistication varies widely. However, one of the committee's findings was that, based on available information, “condition assessment programs, as currently practiced in federal agencies, are labor intensive, expensive to maintain, and time consuming. In theory, condition assessment surveys provide

excellent information as a basis for facilities management practices and maintenance and repair budget requests. In practice, the data are usually not provided in a time frame or format that is useful for cost-effective facilities management” (NRC, 1998).

There are several reasons for this finding. Federal agencies can have hundreds or even thousands of facilities. The costs incurred in conducting condition assessment surveys will vary significantly, depending on the complexity, the depth and breath, and the level of the inspection. For example, an inspection could be a relatively simple walk through of a facility to identify deficiencies that are easily visible. Or an inspection could be a detailed diagnostic inspection by specialized personnel who look at the performance of mechanical, electrical and other internal systems.

Information obtained from Federal Facilities Council (FFC) sponsor agencies participating in this study indicates that the costs of condition assessments can range from 3¢ to 35¢ or more per square foot, depending on the type and location of the facility, type of inspection, and qualifications of the inspectors, among other factors. Thus, assessing the condition of a 200,000 square foot facility could range from \$6,000 to \$70,000 or more, depending on building type (warehouse versus research facility), system complexity, location, level of inspection, and other factors. Multiplied over hundreds or thousands of buildings, the costs can quickly outstrip agency budgets for maintenance and repair. Thus, “tradeoffs occur between the amount of data collected, the frequency at which it is collected, the quality of the data, and the cost of the entire process, including data entry and storage” (Sanford and McNeil, 1997). In practice, therefore, when federal agencies conduct condition assessment surveys for an entire inventory of facilities it is typically done on a cycle of every 3 to 5 years or longer. Federal agencies may also conduct condition assessment surveys for specific facilities in specific circumstances, for example, when looking to acquire or dispose of a facility, change tenants, or take on a new program or mission.

### TOTAL LIFE-CYCLE COST METHOD

The second method specifically identified by FASAB Standard Number 6, as amended, to calculate deferred maintenance is total life-cycle cost. This method is defined by the standard as an acquisition or procurement technique that considers operating, maintenance, and other costs in addition to the acquisition cost of assets (FASAB, 1996). Standard Number 6, as amended, states that since life-cycle costing results in a forecast of maintenance expense, these forecasts may serve as a basis against which to compare actual maintenance expenses and estimate deferred maintenance (FASAB, 1996). Required data elements for this methodology include the original date of maintenance forecast, the dollar amount of maintenance defined by the professionals who designed, built, or manage property, plant, and equipment as required maintenance for the reporting period, and the dollar amount of maintenance activity performed, among others.

Life-cycle costing for facilities is most commonly used early in the acquisition process to facilitate decision making about the types of materials, systems, and other components to be incorporated and to estimate total operation and maintenance costs over the life cycle of the building. Given the age of many federal facilities, it is unlikely that agencies could identify the original date of maintenance forecast (if one was ever done) or any changes to the forecast. Other data required by the FASAB standard, in particular the amount of maintenance performed, would

also be difficult to provide with any level of accuracy or consistency because this type of information is not typically tracked for facilities. However, variations on life-cycle costing methodologies have been developed. Some of these are described below as potential alternative approaches that could be used by federal agencies to meet the objectives of FASAB Standard #6, as amended.

### **OTHER POTENTIAL APPROACHES TO DEFERRED MAINTENANCE REPORTING FOR FACILITIES**

One of the overall objectives of federal financial accounting is to “provide a framework for assessing the existing financial reporting systems of the federal government and for considering how new accounting standards might help to enhance accountability and decision-making in a cost-effective manner” (FASAB, 1993). Alternative approaches for reporting deferred maintenance and repairs for facilities are described below. All involve some form of life-cycle costing, condition assessment survey data, or a combination of the two. For those agencies that do not have comprehensive condition assessment survey information available, one or more of these approaches may provide a cost-effective method for calculating deferred maintenance and repairs to comply with FASAB Standard Number 6, as amended.

#### **Alabama Commission on Higher Education Model**

A 1986 article by Cushing Phillips, Jr., “Facilities Renewal: The Formula Approach,” describes a method for estimating the amount of money required for facilities renewal for a college or university or other type of facilities inventory. Facilities renewal is defined as “the complete reworking of a building (or facility), including the expected useful life equal to that of a new facility.” The primary interest of the agency developing the methodology was to generate values for total renewal allowance and total renewal backlog as the basis for budget recommendations for annual operating budgets and capital budgets.

At the time the formula was developed, the author was working for the Alabama Commission on Higher Education. Alabama’s public colleges and universities had a “heavy backlog of deferred maintenance,” due in part to “rapid expansion and short operating and maintenance appropriations” (Phillips, 1986). Most of the institutions had “less than adequate data as to the actual amounts and the projects making up this backlog” and “had not made recent or complete maintenance inspections or evaluations of their plants” (Phillips, 1986). The author notes that:

Even if we were able to obtain valid and certifiable estimates of the amount and cost of needed repair and renovation on each campus, we still would have only a “snap-shot” of our problem. It is entirely possible that mechanical failures or unanticipated roof problems next year would invalidate our conclusions. In short, unless we were able to obtain annual (or at the least biennial) reports from each campus showing current inspection results, we would have difficulty presenting a current and defensible statement of needs to the Governor and the Legislature. (Phillips, 1986)

In this environment the author developed a methodology to “recognize the aging of our facilities by reserving some part of their replacement value each year against their future need for renewal.” This approach produces an estimate of the annual renewal allowance, defined as the amount of funding to be earmarked each year to offset the aging during that year. An overall renewal backlog is defined as “the value of the unmet renewal requirement represented in the present plant in current dollars” (Phillips, 1986).

In this methodology, facilities are categorized by type, and major systems are categorized as either 25- or 50-year systems. <sup>1</sup> *Systems or elements that require reworking at intervals of substantially less than 25 years are excluded “as being more suitable for renewal using maintenance and operation funds”* (Phillips, 1986). Estimated replacement costs in dollars per gross square foot, adjusted for regional price differentials, are determined and totaled for all 25- and 50-year systems by category of facility. To recognize that the effects of aging “increase the likelihood of expensive (even terminal) breakdowns,” the distribution of renewal estimates is skewed in the direction of the older facilities. This is done by apportioning to each year of the age of a building a fraction of the system replacement cost, which is determined by dividing the age by the sum of the years of its maximum age: 325 for the 25-year systems and 1,275 for the 50-year systems. “Thus, the annual facility renewal allowance, i.e., the amount which should be set aside each year for facility renewal, for a 10-year old building, is the sum of 10/325 of the replacement cost of the 25-year systems and 10/1275 of the replacement costs of the 50-year systems” (Phillips, 1986).

The total facility renewal backlog is the sum of each year's renewal allowance from the time of completion of the building to the present. The total facility renewal backlog is determined by multiplying the replacement costs of the 25-year systems by the sum of the years from 1 to the current age of the building, dividing it by 325, multiplying the replacement costs of the 50-year systems by the sum of the years and dividing it by 1,275 and then adding the two numbers. The same types of calculations are performed for individual facilities and then totaled for the entire inventory (Phillips, 1986). A separate methodology is applied to buildings in which some or all of the major systems have been partly or completely renovated.

### Stanford University Model

A different approach for estimating facility renewal needs was developed at Stanford University in 1980 and described in a paper entitled “Before the Roof Caves In: A Predictive Model for Physical Plant Renewal” (APPA, 1982). It is a mathematical approach that predicts the cost and time of facilities renewal based on building subsystem life cycles and costs.

In the Stanford University model, facilities are first analyzed in terms of their subsystems, defined as major components or systems such as mechanical, plumbing, electrical, elevators, roofs, and so forth, that have a significant impact on facility wear-out and resulting replacement/renewal costs. An estimate of the life cycle is then made for each subsystem. Buildings with similar uses and subsystems are grouped into categories such as laboratories, housing, offices, and so forth. Average replacement costs are then estimated for each subsystem in dollars per square foot for each category of facility. Facilities are then further classified into 5-

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<sup>1</sup> Fifty-year systems include exterior walls, partitions, conveying systems, specialties, fixed equipment, plumbing and fire protection, and electrical; 25-year systems include roofing, heating, air conditioning and ventilation (Phillips, 1986).

year cohorts by the date of construction or most recent major renovation. For each cohort the total square footage of the buildings is identified. Projections are then developed for each 5-year cohort of each facilities type as to when specific subsystems will require replacement and the associated cost. The projected replacement costs are then summed across all subsystems and facility categories to estimate the total facility renewal needs during each 5-year period. Because the projections generally show a highly cyclical pattern of expenditures, a moving average is used. *“According to the basic theory of the model, the difference between actual expenditures made and facilities renewal needs (over any period of time) should be approximately equal to the increase in deferred maintenance needs over that same period of time”* (Biedenweg and Cummings, 1997). This approach is not unlike the total life-cycle cost method defined in FASAB Standard Number 6, as amended, in which forecasts of maintenance may serve as the basis to compare actual maintenance expenses and to estimate deferred maintenance.

To determine the validity of this model for predicting facilities renewal needs, in 1995 Stanford University tested the original published predictions in two ways. First, the forecast for annual facilities renewal expenditures was compared with actual budgeted expenditures for facilities renewal over a 10-year period. Second, “the accumulated shortfall between the predicted and actual expenditures over that period was then compared with cost estimates of deferred maintenance prepared by the building-by-building inspection performed by an independent contractor” (Biedenweg and Cummings, 1997).

The initial testing resulted in only a 2 percent difference between the numbers. The degree of similarity was so high, in fact, that the authors of the paper believed it to be “an anomaly and differences of ten to twenty percent are more likely outcomes. However, the similarity did support the reasonableness of the approach and the viability of the model as a forecasting tool, and further analysis, by subsystem, was performed.” The analysis identified a number of adjustments that could improve the model's performance, including modifications/additions of certain subsystem categories and “an acknowledgement that facility obsolescence due to program reasons also needs to be considered.”

In this review the authors concluded that the experience at Stanford University demonstrates the “model can provide accurate estimates of both deferred maintenance and future plant renewal needs.” Key features of the approach include:

- An executive-level view of facilities renewal that is grounded in sound theory and industry standards. This statistical approach accurately predicts both current deferred maintenance and future facilities renewal needs.
- Recognition that renewal expenditures must vary from year to year based on the actual construction history of campus buildings.
- The ability to distinguish between different types of buildings and the systems that support those buildings.
- Identification of individual facilities and subsystems that are likely to be most in need of renewal.
- The capability of including facility obsolescence (due to program reasons) in long-range planning.
- A model that is tailored to individual circumstances and that is relatively easy to maintain (Biedenweg and Cummings, 1997).

### Applied Management Engineering Model

*Management of the Facilities Portfolio: A Practical Approach to Institutional Facility Renewal and Deferred Maintenance* describes a time- and condition-based approach to deferred maintenance reporting developed by Applied Management Engineering (AME, 1991). The approach provides a comprehensive process of identification, costing, and prioritization of short- and long-range facility maintenance and repair requirements, recommended critical management indicators and reporting tools, and a detailed approach to capital planning and budgeting. The goal is to achieve a clearly defined equilibrium for all facility assets and maintenance of their functional and financial value over the long term through steady and predictable reinvestment based on facility condition, age and complexity (EMR, 2000).

The AME approach requires a comprehensive condition assessment of all assets that identifies long- and short-term maintenance and repair requirements, their estimated costs, and their relative priorities for accomplishment. The priority ranking is based on assigned condition codes and an indication of when the deficiency should be corrected. The study provides formulas for the projection of maintenance and repair backlogs and for the funding required to eliminate the backlog. The backlog projection uses the current backlog, the current replacement value and inflation rate, factors for backlog and physical deterioration, and average inventory growth and planned funding to project the backlog for any future year (EMR, 2000). The methodology involves a combination of time- and condition-related data; it is complex, and requires a significant amount of data and continuous condition assessment surveys.

### University of Virginia Model

A condition-based approach used by the University of Virginia (UVA) is described in “How to Inspect Your Facilities and Still Have Money Left to Repair Them” (Syme and Oschrein, 1996). UVA began its program in 1980 as a formal assessment inspection program to document the condition of each of its 600 buildings, of which 390 were at least 30 years old, 235 were at least 50 years old, and 57 were 100 or more years old. One of the primary purposes of the program was to identify the dollar value of the maintenance backlog. Initially, inspections focused only on maintenance deficiencies as defined by the budget process, that is, deficiencies that could be funded out of maintenance accounts. Deficiencies were defined as “the repair of an existing building, or any of its permanent components or systems, back to their original condition.” Inspections were done on a four-to-six-year cycle for the majority of facilities, and over time the inspection data were entered into a computerized database. Annual reports were published that showed “the replacement value of each of our [UVA's] buildings, the estimated dollar value of the deficiencies we [inspectors] found, and the resulting Facilities Condition Index (deficiency value divided by replacement value)” (Syme and Oschrein, 1996). This system became the model for an effort to produce similar data on all the institutions of higher education in the Commonwealth of Virginia.

In time the model evolved such that inspectors are looking not only at deficiencies that are strictly maintenance items but also “renewal deficiencies” related to modernization, code compliance, and hazardous material abatement.

As noted in the article:

The true cost of maintaining the physical plant is not only replacing ceiling tile, painting and replacing mechanical systems. Our experience has shown that the renovation of an older facility or the replacement of an HVAC [heating, ventilation, and air conditioning] system in a 40-year-old facility will always lead to costs over and above those originally anticipated. Whether any grandfather clauses are tripped or not, prudent facilities managers will take those opportunities to perform additional upgrades such as the installation of a sprinkler system, smoke alarm system, or telecommunications cabling. Additionally, they will be required to comply with newer code issues such as ADA [Americans with Disabilities Act] or will be required to remove asbestos or lead from their facility. Including these additional items as deficiencies gives a more accurate accounting of the condition of the physical plant than the FCI [Facility Condition Index] by itself (Syme and Oschrein, 1996).

In the modified system, deficiencies are separated into maintenance and renewal deficiencies, each with its own index. The FCI (maintenance deficiencies divided by current replacement value) and the Facility Renewal Index (FRI) (renewal deficiencies divided by current replacement value) are added together to produce the Facility Assessment Index (FAI).

$$\text{FCI} + \text{FRI} = \text{FAI}$$

The inspection process has three parts: data collection, data entry, and report generation. Inspections include a review of previous inspection reports, plans, work orders, and warranties; visual inspection of the facility; consultations with building occupants, users, and facilities management personnel. Data are entered into the database. Each record in the database is tagged with a year from 0 to 100 representing the estimated year in which a repair should be made. A tag of 0 means the repair should be done within the year. Tagging the repairs allows for managers to plan for and prioritize maintenance and repairs.

The database automatically calculates estimated costs based on user-defined costs and cost factors. Facilities managers can tell whether current funding will satisfy their need to maintain their physical plant in good condition (Syme and Oschrein, 1996).

### DoD Facilities Sustainment Model

The Facilities Sustainment Model (FSM), prepared by DoD's Office of the Deputy Under Secretary (Installations), is designed to forecast the funding requirements for sustainment of an inventory of facilities (Janke, 2000). As a life-cycle cost model, FSM generates an annual funding requirement to sustain an inventory over a normal life cycle. FSM is grounded in standard facility-specific benchmarks, is tied to the inventory that must be sustained, and is applicable throughout DoD.

The FSM identifies the cost to “sustain” facilities, the outcome of regular maintenance and repair activities. Facilities sustainment under FSM means “maintenance and repair activities necessary to keep an inventory of facilities in good working order.” The full definition<sup>2</sup> used by

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<sup>2</sup> Facilities sustainment: maintenance and repair activities necessary to keep an inventory of facilities in good working order. It includes regularly scheduled inspections, preventive maintenance tasks, and service calls and emergency responses. Activities also include major repairs or replacement of facility components (usually accomplished by contract) that are expected to occur periodically throughout the life cycle of facilities. This includes such work as regular roof replacement, refinishing of wall surfaces, ceilings and flooring, and repairing and replacement of heating and cooling systems. It does not include certain restoration, modernization, and environmental compliance costs, which are funded elsewhere. Other tasks associated with facilities operations (such as custodial services, grass cutting, landscaping, waste disposal, and the provision of central utilities) also are not included.

DoD excludes activities that are sometimes considered “maintenance” (such as grass cutting) as well as some repair activities that go beyond sustainment (such as restoration of a facility destroyed by fire or repairs done solely to implement a new standard).

To use FSM the following are needed: a standard classification of facilities into categories with common units of measure; a standard per-unit sustainment cost for each category of facility; a real property inventory with accurate unit quantities, locations, and projections; and an area cost factor and inflation table. For per-unit sustainment cost factors, DoD obtained standard, off-the-shelf, commercial cost factors wherever possible.<sup>3</sup>

Computation of a sustainment requirement is as follows:

$$\text{Requirement} = \text{Facility Quantity} \times \text{Unit Cost Factor} \times \text{Area Cost Factor} \times \text{Inflation Factor}$$

The sustainment requirement formula is run for each category of facility at each location, and the results are summed to the desired level (or view) of the data. For DoD, FSM can provide a sustainment cost by installation, major command, state or country, military service, or for the department as a whole.

To determine whether sustainment requirements are being met, two additional tools are necessary: (1) a “table of responsibilities” that allocates responsibility for sustainment to a suborganization and funding source and (2) a budget category that matches the sustainment definition for each responsible organization and funding source combination.

### Table of Responsibilities

Facility quantities (and hence sustainment requirements) must be allocated to the subcomponent organization and funding source that has sustainment responsibility. This process produces a matrix like the one below, where the columns represent funding sources, the rows represent responsible organizations, and the cells are filled in with facility sustainment requirements generated by FSM:

Funding Sources	Responsible Organization				
	1	2	3	4	n
A					
B					
C					
n					

<sup>3</sup> DoD Facilities Cost Factor Handbook, April 2000, Office of the Deputy Under Secretary (Installations).

## Budget Categories

Ideally, for each cell in the responsibilities matrix there is a budget line item to which the FSM requirement can be compared. The difference between FSM-generated requirements and annual sustainment funding represents deferred *sustainment* of facilities. There are two limitations to consider: (1) FSM addresses only deferral of work that meets the definition of sustainment and (2) FSM does not assist in calculating a pre-existing “compounded” backlog.

FSM can be used to compute the amount of sustainment deferred annually but cannot be used to compute deferral of costs outside the definition of sustainment. DoD has created a second budget category—termed Facilities Restoration and Modernization—which complements Facilities Sustainment by identifying “beyond sustainment” requirements. Typically these are modernization projects, minor construction projects, or large repair projects that restore a facility to acceptable status.

FSM provides a method to compute annual deferral but does not attempt to provide a way to compound successive deferrals into a multiyear backlog. Although FSM could be used to compute deferral over a 3-year period, for example, it does not assist in determining how much of what was deferred remains in the backlog at the end of 3 years.

When sustainment is not accomplished, sustainment activities do not automatically roll over to become repair backlogs—if this year's oil change is not done, it doesn't need to be done twice next year. The incremental loss of facility life for delaying the sustainment will eventually show up in a restoration requirement, perhaps sooner than expected. But it is not automatic unless the lack of sustainment results in an immediate failure and new restoration requirement.

To be comprehensive, two separate accounting entries are required. The first entry would be “deferred sustainment” and would be the annual amount of regular maintenance and repairs (i.e., sustainment) not funded. FSM provides a way to compute this number.

The second entry would reflect unfunded restoration requirements, most (but not all) of which result from deferred sustainment. The unfunded restoration requirement is generated separately and is not a direct rollover from deferred sustainment. As an option, unfunded “modernization” projects could be added if desired. To be clear, this entry might be labeled “Backlog of Restoration and Modernization” rather than “Backlog of Repair” since not all projects in this backlog would be repairs.

## NASA Backlog of Maintenance and Repair Model

A potential approach to reporting deferred maintenance is called the National Aeronautics and Space Administration (NASA) Backlog of Maintenance and Repair (BMAR) Model for purposes of this report. It is based on a white paper developed by Mr. Charles B. Pittinger, Jr., P.E., in NASA's headquarters office. The BMAR Model is based on parametric estimates and is intended to produce a macro-level estimate of deferred maintenance. The model is based on the following premises: (1) condition assessment surveys performed for systems (not individual components) and for the entire facility (overall system average); (2) generalized condition levels; (3) limited number of systems to assess; and (4) parametric estimating based on current replacement value (CRV).

In this approach, personnel knowledgeable in facility assessment would evaluate a building's condition using an inspection process that entailed, at a minimum, a walk through of a facility. The BMAR Model could be applied over an entire inventory of facilities by sampling of general type of building (i.e., office, warehouse) not on a building-by-building basis. Condition assessment levels and repair costs as a percentage of CRV could be applied as outlined below:

<b>Generalized Condition Level</b> <sup>17</sup>	<b>Repair Cost</b>
5 New; only normal preventive maintenance required.	1% of CRV
4 Some repairs needed; overall system generally functional.	20% of CRV
3 Many repairs needed; limited functionality or availability.	50% of CRV
2 May be functional but obsolete or does not meet codes.	100% of CRV
1 Not operational or unsafe.	100% of CRV

<b>Major Systems</b>	<b>Percentage of Facility CRV</b>
Architectural	5
Roof	10
Electrical	15
Plumbing	15
HVAC	25
Structural	<u>30</u>
	100
Site	100
Utility systems	100

The site and utility systems represent features outside the building line, that is, parking lots, curbs, and utilities, and would therefore be considered as separate systems.

To determine a dollar amount for maintenance and repair backlog, the major system percentage CRV is multiplied by the repair cost (as a percentage of CRV) as designated by the generalized condition level. These amounts are then summed, and the total is multiplied by the CRV of the building. Facility management can use this figure and may choose to include costs

<sup>17</sup> The condition levels and percentage of repair costs and the percentage of CRV would be determined on an agency-by-agency basis. This example is not intended to represent any system or industry standard now in use and is just an assumption for illustrative purposes. Development of standards around distribution of estimated costs would require further study. The standards would also vary by general class of facility, such as hospitals, office buildings, or warehouses.

for the site and utility system numbers in calculating the total amount of deferred maintenance and repair.

If the site and utility system numbers are not included, the following formula may apply:

$$\text{BMAR} = [\text{Sum (MS\%)*(RC\%)}] \text{ CRV}$$

Where: MS% = major system percentage of CRV; RC% = repair cost percentage of CRV, as designated by the generalized condition level; and CRV = current replacement value of the building.

If site and utility system numbers are included, the site percentage of facility CRV is multiplied by the repair cost (as a percentage of CRV), as designated by the generalized condition level. This number is then multiplied by the CRV of the site work. The utility system percentage of facility CRV is multiplied by the repair cost (as a percentage of CRV), as designated by the general condition level. This number is then multiplied by the CRV. The amounts for systems, site, and utility systems are summed. The final number is the dollar amount of deferred maintenance.

$$\text{BMAR} = [(\text{Sum (MS\%)*(RC\%)}) \text{ CRV}] + [(\text{RCS\%}) * (\text{SWCRV})] + [(\text{RCUS\%}) * (\text{RCUSCRV})]$$

Where: MS% = major system percentage of CRV; RC% = repair cost percentage of CRV, as designated by the generalized condition level; CRV = CRV of the building; RCS% = repair cost percentage of CRV, as designated by the generalized condition level of the site work; SWCRV = CRV of the site work; RCUS% = repair cost percentage of CRV, as designated by the generalized condition level of the utility systems; and USCRV = CRV of the utility systems.

### Hypothetical Example for One Facility

Office and laboratory facility – 15 years old. The building has a new roof and excellent interior finishes. The electrical systems, plumbing systems, and structure are adequate. The airconditioning and heating systems have been problematic since new, and the occupants are unhappy with the temperatures and air changes.

CRV = \$4,500,000 for the building

Exterior utility systems are considered as a separate facility.

Condition Assessment:

System	Level	% CRV	% Facility	
Architectural	5	(0.01)	(0.05)	0.0005
Roof	5	(0.01)	(0.10)	0.0010
Electrical	4	(0.20)	(0.15)	0.0300
Plumbing	4	(0.20)	(0.15)	0.0300
HVAC	3	(0.50)	(0.25)	0.1250
Structural	4	(0.20)	(0.30)	<u>0.0600</u>
				<u>0.2465</u>

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Site	4	(0.20)	(1)	0.2000
Utility systems (exterior)	Not Applicable in this Example			
	%	CRV		
Systems	0.2465 *	\$4,500,000 = \$1,109,250		
Site	0.2000 *	\$250,000 = <del>\$50,000</del>		
		\$1,159,250 for deferred maintenance		

In this methodology, condition levels are tied to a fixed percentage of a facility's current replacement value. Facility systems values are tied to a fixed percentage of the overall facility CRV, which would not exceed 100 percent. The intent is to provide a model for quickly generating information for deferred maintenance reporting.

### NASA Dryden Flight Research Center Statistical Model

This approach is based on a procedure developed by Mr. Gregory Spencer, Chief of the Maintenance, Operation and Logistics Branch at NASA's Dryden Flight Research Center in California (EMR, 2000). The methodology uses an updated facilities inventory and a recently completed baseline condition assessment of all facilities and equipment to develop simplified condition codes and current replacement costs for all inventory items. Condition information for all equipment is kept up-to-date during the scheduled maintenance process that requires technicians to annotate work orders with the condition observed during execution of the maintenance tasks. Because recurring maintenance is scheduled on a one year interval, or less, the status of equipment is considered "real time".

Implementation of a computerized maintenance management system (CMMS) is a requirement for this methodology. The CMMS database identifies all equipment and includes job plans, frequencies of maintenance, replacement costs, and condition data (a code from 1-5 is used identifying condition ranging from failed to excellent).

A random sample of inventory items in each of five standard condition codes is selected. A detailed estimate of repair costs is determined for each item; this cost is then divided by the item's replacement cost, providing a weighted factor for each item. The factors are then averaged for all selected inventory items in each condition code, and the average is multiplied by the total replacement cost for all inventory items in that condition code. This figure provides an approximation of the backlog of maintenance and repair (BMAR) costs for all items in that condition code; the figures for each condition code are then summed to give a total BMAR estimate for the entire physical plant.

For agencies with large inventories, using random sampling and extrapolation may be helpful in generating an approximation of the cost of the backlog of maintenance and repair. To use this method effectively, however, an agency's facilities condition inventory must be kept up to date; to do so in an efficient manner is resolved by noting condition by technicians performing maintenance versus the traditional "end to end" condition assessment.

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### BMAR Algorithm

For every condition code a statistical weight is assigned based on random sampling. BMAR is equal to the sum of all equipment replacement costs multiplied by respective statistical weights.

$$BMAR = \sum_{j=1,5} \{ \sum_{k=1,n} \{ (CCF)_j (RC)_k \} \}$$

where: SUM is the summation function

CCF is the condition code factor (weight)

RC is the replacement cost

n = the total pieces of equipment for the condition code

### Example Calculation of BMAR

Parameters: Assume a 300 item inventory; total replacement cost = \$1,000,000; 4 item statistical sample.

Inventory #	Repair Cost	Replace Cost	Repair/Replace
7	100	10000	0.10
43	500	2000	0.25
115	300	4000	0.075
267	200	3000	0.066

Total replacement cost = \$1,000,000

Condition Code Factor (CCF) =  $(0.1 + 0.25 + 0.075 + 0.066) / 4 = 0.123$

BMAR = (Total Replacement Cost)(CCF) =  $(\$1,000,000)(0.123) = \$123,000$

### NASA Simplified BMAR Model Using Real Property Data

The Dryden Flight Research Center has proposed a less complex model that does not require the use of a CMMS. Instead, it uses real property records common to all agencies. In this model, statistical sampling by facility type is used to determine the backlog of maintenance and repair. The backlog is determined by using a random sample of facilities in an agency's inventory and concentrating on a specified number of major systems, for example, structural, mechanical, and electrical. A weighted average is calculated for the net condition code, and the backlog is then assumed to be an exponential function of condition.

### Simplified BMAR Algorithm

A statistical weight (CCF) is assigned based on random facility sampling. BMAR is equal to the sum of all facility replacement costs multiplied by the CCF.

$$BMAR = \{ \sum_{k=1,n} \{ (CCF) (CRV)_k \} \}$$

where: SUM is the summation function

CCF is the condition code factor  
CRV is the replacement cost of the facility  
n = the number of facilities in the real property database

**Condition Code** <sup>18</sup>

5	Excellent; no work required.
4	Good; less than 10 percent of components need repair.
3	Fair; more than 10 percent of components need repair.
2	Poor; greater than 30 percent of components need repair.
1	Unserviceable; failed system overall.

**System Weights** <sup>19</sup>

- 40% Structural
- 30% Mechanical
- 30% Electrical

The condition code factor is assumed to be a decaying exponential function as the cost to repair increases dramatically with deteriorating condition:

$$CCF = k_1 e^{-k_2 (1 - NCC)}$$

Where: k<sub>1</sub>, k<sub>2</sub> = constants, assumed to be 1; exp = “e” or 2.718.

and

NCC= Net Condition Code (sum of condition codes times system weights for each sample facility averaged for sample size)

**Sample Calculation**

Parameters: Assume an inventory of 100 facilities, \$100M total current replacement value, and a 1 building sample.

Mechanical assessment: Failing heating units, aging unreliable chillers. Condition Code = 3

Electrical assessment: 2 systems need replacement. Condition Code = 4

$$\text{Net Condition Code (NCC)} = ((3 \times 0.4) + (4 \times 0.3) + (3 \times 0.3)) / 1 = 3.3$$

$$CCF = \exp(1 - 3.3) = 0.10 \text{ (10\%)}$$

Where: k<sub>1</sub>, k<sub>2</sub> are assumed 1 for this example

$$BMAR = (\$100M)(0.10) = \$10M$$

<sup>18</sup> The condition code factors and parametric weights are provided for illustrative purposes only. Each agency would need to develop its own set of condition code factors/parametric weights.

<sup>19</sup> The condition codes for system weights are provided for illustrative purposes only. Each agency would need to develop its own set of conditions codes.

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## SUMMARY

One objective of federal financial reporting is to produce uniform and consistent information that will be valuable to Congress, decision makers, agency officials and the public and to produce that information cost effectively. FASAB Standard Number 6, as amended, is intended to provide uniform and consistent information on property, plant, and equipment, including dollar amounts of deferred maintenance and repairs. The standard allows agency management some flexibility in determining how to calculate and report deferred maintenance by specifying that agencies can use condition assessment surveys, a total life-cycle cost method or other methods identical or similar to condition assessment surveys and total life-cycle costing.

Condition assessment surveys are recognized as a valid method for identifying and reporting maintenance and repair needs for facilities. The committee supports the inclusion of this methodology in FASAB Standard #6, as amended. However, concerns were raised that the standard implies or could be interpreted to imply that condition assessment survey information should be available for all facilities in an inventory and that such information should be updated annually. In practice, the availability of condition assessment survey data varies from agency to agency. Some agencies conduct condition assessments on a limited basis or for specific buildings in specific circumstances. Agencies that have instituted inventory-wide condition assessment programs typically reinspect facilities on cycle of every 3 to 5 years or longer.

Chapter 3 describes a number of methodologies for reporting deferred maintenance and repairs that are similar to condition assessment surveys and the total life-cycle cost method or combine elements of the two. Statistical approaches or methodologies for facilities renewal like those described for the Alabama Commission on Higher Education, Stanford University, the University of Virginia, and the Department of Defense are typically developed for planning and budgeting purposes. Dollar amounts for deferred maintenance are extrapolated by comparing forecasts for needed maintenance and repairs and actual expenditures; deferred maintenance is estimated as the difference between the two. As such, the methodologies are based on a time standard, not on specifically identified deficiencies. Backlog of maintenance and repair becomes a dollar figure that is the difference between a benchmark budget for maintenance and repair activities based on the projected life of systems and facilities and actual expenditures for maintenance and repair activities. However, as shown by the Stanford University model test, these types of methodologies can be effective in generating an estimated dollar amount for deferred maintenance and repairs. Allowing federal agencies greater flexibility in choosing methodologies, including statistical sampling, to report deferred maintenance for facilities may help to better align the objectives and methodologies of federal financial reporting.

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## 4

# Deferred Maintenance and Repairs as an Indicator of Facility Condition

FASAB Standard Number 6, as amended, is intended to help fulfill federal financial accounting standards for operating performance and stewardship. These objectives include addressing the efficiency and effectiveness of the government's management of its assets and identifying if the government's financial position improved or deteriorated over the period, among others. The accounting standards established to meet these objectives are intended to provide information to help assess the efficiency and effectiveness of asset management and report on asset condition.

FASAB Standard Number 6, as amended, implies that the dollar value of deferred maintenance is a surrogate (estimate) for management's ability to maintain facilities. As noted in [Chapter 1](#), the significance of the existence of deferred maintenance and repairs is that it may indicate that the quality and reliability of service provided by infrastructure are lower than they should be and that the infrastructure is not, or will not later be, adequately serving the public. However, a dollar figure alone does not indicate overall condition of facilities; it does not place the number in context with the size or value of an agency's facilities inventory; it does not allow comparisons across agencies because of the variation in size and composition of the inventories. For example, the Department of Defense (DoD) has reported \$37 billion in deferred maintenance and repairs, while the National Aeronautics and Space Administration (NASA) has reported \$1.4 billion.<sup>20</sup> Looking at these numbers, it is not possible to determine the overall condition of either agency's facilities inventory, whether DoD or NASA has a larger backlog in relation to the size of their respective inventories, whether the size of the backlog actually constitutes a problem or if it is of a size that might be expected given the number of facilities. A total dollar amount of deferred maintenance and repairs also does not indicate whether agencies are using the funds allocated to them efficiently or effectively. Finally, reporting a single annual number for deferred maintenance gives no indication whether the government's financial position has improved or deteriorated. To be meaningful, deferred maintenance and repair amounts need to be (1) used in conjunction

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<sup>20</sup> Deferred maintenance amounts reported in DoD and NASA 1998 accountability reports.

with other indicators, (2) derived by each agency in a consistent manner over time, and (3) tracked over a period of time so that trends can be observed.

Performance measures are critical elements of a comprehensive management system for facility maintenance and repairs. Determining how well the maintenance function is being performed or how effectively maintenance funds are being spent requires well-defined measures (NRC, 1998). A study by the National Research Council, *Measuring and Improving Infrastructure Performance*, found that “no adequate, single measure of performance has been identified, nor should there be an expectation that one will emerge. Infrastructure systems are built and operated to meet basic social needs, but those needs are varied and complex” (NRC, 1995). Therefore, the measures used to evaluate facilities and infrastructure performance should vary. The report goes on to state that “infrastructure performance is the degree to which infrastructure provides the services that the community expects of that infrastructure, and communities may choose to measure performance in terms of specific indicators reflecting their own objectives.”

The report concluded that these indicators generally fall into three broad categories, measuring performance as a function of *effectiveness*, *reliability*, and *cost*. “Infrastructure that reliably meets or exceeds broad community expectations, at an acceptably low cost is performing well.” Although this was a study of infrastructure systems at the community level, the principle that the performance of facilities maintenance and management functions can and should be measured by the condition of the facilities inventory as measured against cost and effect on agency mission is also applicable to the maintenance and repair of federal facilities (NRC, 1998).

The Department of Energy (DOE), in addition to dollar amounts for deferred maintenance, also collects at the assets level “annual required maintenance” and “annual actual maintenance,” and will be collecting “failure rate” and “availability.” The DOE uses replacement plant value with these other data elements, to calculate a Facility Condition Index to produce a more useful indicator of the health/status of a building or the agency's aggregate facilities inventory. These indicators will be tracked over time to help evaluate whether the condition of the entire inventory is improving or deteriorating.

NASA also tracks a series of measures related to facilities maintenance. These include backlog of maintenance and repairs as defined in NASA's facilities maintenance performance metrics. They also include unconstrained annual maintenance and repair requirement, initial operating plan for maintenance and repair, annual maintenance and repair funding, cost of scheduled work, number of predictive testing and inspection “finds,” preventive maintenance and predictive testing and inspection completed versus scheduled, breakdown repair costs versus total maintenance and repair costs, significant facilities and systems failure costs due to constrained resources, and significant facilities and systems failure costs avoided by using predictive testing and inspection.

Another indicator that might be used in conjunction with a dollar amount for deferred maintenance and repairs is deferred maintenance and repair as a percentage of current (or plant) replacement value of an agency's facilities inventory. This could be tracked over time to observe trends as long as an agency used a consistent methodology for calculating deferred maintenance and repair and current (or plant) replacement value. For example, using hypothetical numbers, if the current replacement value of DoD's facilities inventory is \$740 billion and the deferred maintenance backlog is \$37 billion, deferred maintenance would be equal to 5 percent of the current replacement value. If the

current replacement value were, instead, \$370 billion, deferred maintenance would equal 10 percent of current replacement value, which could indicate a more deteriorated condition. Similarly, using hypothetical numbers, if the current replacement value of NASA's inventory were \$18 billion, a backlog of \$1.4 billion would be equal to 7.8 percent of current replacement value and would appear to indicate that NASA's facilities might be in better overall condition than DoD's. However, these types of comparisons would still not be particularly meaningful unless and until they were tracked over time using consistent methodologies for calculating both deferred maintenance and repairs and current replacement value at each agency (i.e., the agencies would not have to use the same methodology). Over a 5-year period, if DoD's backlog of maintenance and repair as a percentage of current replacement value decreased while NASA's increased, it could indicate that the overall condition of DoD's inventory was improving while NASA's was declining. The factors underlying these trends could then be investigated.

Some federal agencies, such as the U.S. Army, track the condition of their facilities using a rating system (i.e., excellent, good, fair, unsatisfactory) and a computerized database. From the rating information contained in the database, agencies could generate a report identifying the percentage of their facilities falling into the lowest category—for example, 15 percent of facilities have been rated unsatisfactory. This information would provide the percentage of an agency's facilities that are below a satisfactory condition and may be another approach for providing information regarding the condition of federal facilities. This approach could be useful for tracking trends over time and to review whether the condition of an agency's facilities has improved or declined.

The Federal Facilities Council Standing Committee on Operations and Maintenance was not tasked with determining what combination of measures might best fulfill the objectives of federal financial accounting. Additional study and consideration of potential measures that could be used in conjunction with deferred maintenance and repairs to help evaluate the condition of federal assets are needed.

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## APPENDIX A

### Excerpts from Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets (pp. 13-18)

#### FACTORS CONTRIBUTING TO THE DETERIORATING CONDITION OF FEDERAL FACILITIES

Despite the historic, cultural, and architectural importance of, and economic investment in, federal facilities, evidence is mounting that the physical condition, functionality, and quality of the federal facilities portfolio is deteriorating. In response to Congressional inquiries, the General Accounting Office (GAO) has published a number of reports documenting the deterioration of federal facilities since 1990. These include *NASA Maintenance: Stronger Commitment Needed to Curb Facility Deterioration* (GAO, 1990), *Federal Buildings: Actions Needed to Prevent Further Deterioration and Obsolescence* (GAO, 1991), *Federal Research: Aging Federal Laboratories Need Repairs and Upgrades* (GAO, 1993), and *National Parks: Difficult Choices Need to be Made About the Future of the Parks* (GAO, 1995b). To cite only two examples from these reports, “at Ellis Island in New York, the nation's only museum devoted exclusively to immigration, 32 of 36 historic buildings have seriously deteriorated, and, according to park officials, about two-thirds of these buildings could be lost within 5 years if not stabilized.” In one building used for storing cultural artifacts, “much of the collection is covered with dirt and debris from crumbling walls and peeling paint, and leaky roofs have caused water damage to many artifacts” (GAO, 1995a). A number of factors that contribute to the deteriorating condition of federal facilities, are described below.

#### Focus on First Costs

The deteriorating condition of federal facilities is attributable, in part, to the federal government's failure to recognize the total costs of facility ownership. Although the “costs to operate and maintain a facility vary between 60 to 85 percent of its total ownership cost” (Christian and Pandeya, 1997), government budgeting practices have focused on the design and construction costs, or 5 to 10 percent of the total costs of

ownership, the so-called “first” costs. (The remaining 5 to 35 percent of the costs of ownership include land acquisition, planning, renewal/revitalization, and disposal.)

The full life cycle costs of new facilities are not considered in the current federal budget process. Instead, only the projected design and construction costs appear as a separate line item for congressional consideration. The costs of operating and maintaining the new facility are not considered separately but become part of the agency's total operations and maintenance budget request, which includes funding for all existing facilities. The costs of designing and constructing a new facility, then, may receive considerable scrutiny during budget hearings, but the budget process is so structured that the 60 to 85 percent of the total costs, the costs of operating and maintaining the facility, do not receive the same scrutiny. Thus, the federal budget process is not structured to consider the total costs of facilities ownership.

### **Inadequate Funding for Maintenance and Repair**

Inadequate funding for the maintenance and repair of public buildings at all levels of government and academia is a long-standing and well-documented problem. A report by the National Research Council in 1990, *Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings*, found that “Underfunding is a widespread and persistent problem that undermines maintenance and repair of public buildings” (NRC, 1990). A 1996 study by the Civil Engineering Research Foundation reconfirmed this finding, noting that “underfunding of facilities maintenance and repair projects appear to be a widespread problem in both the public and private sectors” (CERF, 1996). On the subject of federal facilities, GAO has reported that, “mounting evidence shows that the federal government must also face up to the long-term consequences of inadequate capital investment in existing federal buildings” (GAO, 1991). More recently, GAO has found that “despite reductions in DoD's [ U.S. Department of Defense] basing infrastructure, various DoD and service officials have continued to indicate that they still have excess, aging facilities and insufficient funding to maintain, repair, and update them” (GAO, 1997).

There is no single, agreed-upon guideline to determine how much money is adequate to maintain public buildings effectively. However, *Committing to the Cost of Ownership: Maintenance and Repair of Public Buildings* did recommend that, “An appropriate budget allocation for routine M&R [maintenance and repair] for a substantial inventory of facilities will typically be in the range of 2 to 4 percent of the aggregate current replacement value of those facilities” (NRC, 1990). This guideline has been widely quoted in the facilities management literature. During the course of this study, federal agency representatives who briefed the committee or completed questionnaires indicated that the funding they received annually for maintenance and repair was less than 2 percent of the aggregate current replacement value of their agencies' facilities inventories

<sup>1</sup>. The National Aeronautics and Space Administration (NASA), for example,

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<sup>1</sup> Agencies responding to the questionnaire included the U.S. Department of Energy, the Department of the Army/Installations, the International Broadcasting Bureau, the National Institute of Standards and Technology, the National Aeronautics and Space Administration, and the Office of the Air Force Civil Engineer.

reported the maintenance and repair funding it currently receives to be about 1.3 percent of the current replacement value of all its facilities, and the Architect of the Capitol's Office reported funding at a level of about 1.7 percent.

### Deferred Maintenance

If funds are not available to address identified maintenance and repair needs, these projects may be deferred or delayed indefinitely. Deferred maintenance, is defined in the Statement of Federal Financial Accounting Standards Number 6, Accounting for Property, Plant, and Equipment, as "maintenance that was not performed when it should have been or was scheduled to be, and which, therefore, is put off or delayed for a future period (GAO, 1998). Deferred maintenance, also called unfunded maintenance, backlog of maintenance and repair, or unaccomplished maintenance, is generally quantified as the estimated cost of the maintenance and repair needed to bring a facility up to a minimum acceptable condition. The significance of the existence of deferred maintenance is that it "implies that the quality and/or reliability of service provided by infrastructure on which maintenance has been deferred is lower than it should be and thus the infrastructure is not or will not later be adequately serving the public" (Urban Institute, 1994). A report by the American Public Works Association, Plan. Predict. Prevent. How to Reinvest in Public Buildings, found that "in the short-term, deferring maintenance will diminish the quality of building services. In the long-term, deferred maintenance can lead to shortened building life and reduced asset value" (APWA, 1992). In a series of reports, the GAO came to the following conclusions about the deferred maintenance of federal facilities:

The Pentagon is a classic example of the federal government's failure to invest adequately in federal buildings...Needed structural repairs and upgrades to the Pentagon were deferred for more than a decade, and the General Services Administration (GSA) now estimates that its renovation will cost more than \$1 billion and take at least 13 years to complete (GAO, 1991).

Other federal buildings have been neglected ... and now need major repairs and alterations to bring them up to acceptable quality, health and safety standards. The total number of federal buildings with deferred major repair and alteration requirements is unknown but our work suggests that the number may be substantial. Continuing to defer needed repairs and alterations accelerates deterioration and obsolescence and results in higher eventual costs to the government...(GAO, 1991).

Most federal research laboratories are experiencing common problems with aging facilities--leaking roofs and gutters, drafty window frames, power outages, and poor ventilating systems that do not meet industry standards for air circulation...the eight agencies GAO reviewed reported backlogs of more than \$3.8 billion in needed laboratory repairs (GAO, 1993).

The overall level of visitor services offered by the National Park Service is deteriorating. Visitor services are being cut back and the condition of many trails, campgrounds, exhibits, and other facilities is declining. The Park Service estimates that since 1988, the backlog of deferred maintenance has more than doubled to \$4 billion (GAO, 1995b).

The magnitude of the numbers cited by agencies indicates that significant needed maintenance and repairs have been deferred because of underfunding or other factors. Historically, public officials have not often found the arguments for maintenance and repair funding compelling and have called into question the methodologies used to define building deficiencies and to calculate the costs involved in repairing them<sup>2</sup>. One reason for this skepticism is that although “the amount of deferred maintenance is important in itself, without also including information on the implications of deferral, public officials and the public will have considerable difficulty in interpreting the deferred maintenance figures” (Urban Institute, 1994). A second reason relates to the lack of a standard methodology for defining and quantifying deferred maintenance. The concern has been that inappropriate items have been included in the maintenance backlog to increase the overall estimate and argue for larger budget appropriations.

Agencies have also used different formulas or standards to compute the costs of eliminating the backlog. This situation may not be improved significantly by new reporting requirements of Federal Financial Accounting Standard Number 6 because under this standard “it is management's responsibility to ...establish methods to estimate and report any material amounts of deferred maintenance” (GAO, 1998).

### Aging of Facilities

The federal facilities portfolio includes structures that span centuries of different planning, design, construction, maintenance, management, and mission requirements. The average age of the federal facilities portfolio by square footage or by current replacement value is not known because accurate data are not available. However, it is safe to say that a large proportion of the facilities in the federal portfolio are already 40 to 50 years old. More than half of the 8,000 office buildings managed by the General Services Administration are more than 50 years old, and the U.S. State Department estimates the average age of facilities to be 39 years. Even in a “space age” agency like NASA, the average age of the facilities inventory is approximately 40 years. As facilities age, wear and tear on building components increases, and electrical, mechanical, and other systems, begin to break down. The rate and onset of breakdowns increases if maintenance has been implemented haphazardly or not at all, and the operating condition deteriorates. Aging facilities require more, not less, maintenance and repair to keep them operating effectively.

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<sup>2</sup> Fiscal year 1998 is the first year in which federal agencies are required to report periodically on deferred maintenance by disclosing deferred maintenance in agency financial statements. Previously, some but not all federal agencies kept inventories of building deficiencies and the funding required to eliminate them; others provided maintenance needs estimates for budgetary purposes and ad hoc reports.

### **Lack of Information to Justify Maintenance and Repair Budgets**

In the federal budget and operations environment, facilities maintenance and repair is often deemed to be a low priority issue because facilities program managers do not have the information they need to present their case for funding to senior managers and public officials. “Interviews indicate that public officials, such as elected officials and chief administrative officers, find the most convincing and compelling information to be the future costs that can be avoided by undertaking early, preventive, or corrective maintenance activities” (Urban Institute, 1994). However, there is “very little study of the costs and implications of deferring maintenance... and cost avoidance information is lacking” (Urban Institute, 1994). Estimates of the implications of deferred maintenance on cost and quality of service are also lacking even though public officials “appear to believe such information to be of considerable use” (Urban Institute, 1994). Because information on maintenance and repair issues most convincing to public officials, particularly avoiding future costs, is not available, and because the information that is available, such as the backlog of deferred maintenance, is not compelling, facilities program managers have found it difficult to justify their maintenance and repair budget requests to senior executives and public officials.

### **Lack of Accountability for Stewardship**

Buildings are durable assets constructed to last at least 30 years; but they are composed of a number of components with service lives of less than 10 years. Buildings themselves seldom fail in an obvious, catastrophic sense. The deterioration of individual components generally occurs over time and may not be readily apparent: detecting the incipient deterioration of roofs, mechanical and electrical systems, pipes, and foundations requires regular inspections by trained personnel. Once detected through regular inspections or condition assessments, relatively small problems can be repaired before they develop into much more serious problems through an adequately planned and funded maintenance program.

Because facility deterioration occurs over a long period of time, it may appear to senior executives and public officials that the maintenance and repair of facilities can always be deferred one more year without serious consequences in favor of more urgent operations that have greater visibility. Unless a roof actually falls in, senior managers are not likely to be held accountable for the condition of a facility in any given year. Yet they are held accountable for current operations. Consequently, public officials and senior executives have few incentives to practice effective stewardship of the federal facilities portfolio and are subject to few penalties if they do not.

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## APPENDIX B

### Excerpts from FASAB Standard Number 6

#### Executive Summary

- a This statement contains accounting standards for Federally owned property, plant, and equipment (PP&E); deferred maintenance on PP&E; and cleanup costs. Each standard is summarized below.

#### Property, Plant, And Equipment

- b The Federal Government's investment in PP&E exceeds \$1 trillion [NOTE 1 Department of the Treasury, Financial Management Service, Consolidated Financial Statements of the United States Government prototype 1993, p. 23. The prototype statements provide gross historical cost investment amounts for all PP&E recorded by government entities. These amounts have not been audited.] PP&E used for many different purposes. "PP&E" is defined as follows:

Tangible assets that (1) have an estimated useful life of 2 or more years, (2) are not intended for sale in the ordinary course of business, and (3) are intended to be used or available for use by the entity.

- c The diversity among Federal PP&E creates a need for meaningful categories of PP&E with different accounting standards for each category. The Board identifies four categories of PP&E. The categories are:

- general PP&E are PP&E used to provide general government services or goods;
- Federal mission PP&E are PP&E exhibiting specific characteristics set by the Board;
- heritage assets are those assets possessing significant educational, cultural, or natural characteristics; and
- stewardship land [NOTE 2 Land acquired for or in connection with general PP&E would be included in that category. Land not associated

with general PP&E would be subject to supplementary stewardship reporting and is referred to throughout this document as stewardship land.] (i.e., land other than that included in general PP&E).

- d Complete accounting standards for general PP&E are included in this document.
- e Federal mission PP&E, heritage assets, and stewardship land are the subject of a project on “Supplementary Stewardship Reporting.” An exposure draft (ED) on this topic was issued in August 1995. The Supplementary Stewardship Reporting ED proposes accounting standards for these assets after their acquisition. The accounting standards in this document address (1) classification of PP&E in the categories, (2) accounting for the acquisition cost of PP&E falling into one of these three categories, and (3) implementation of these standards where it affects the basic financial statements. Because Federal mission PP&E, heritage assets, and stewardship land would be subject to supplementary stewardship reporting, they are referred to collectively as stewardship PP&E. This term is used for convenience only since each category has its own definition.

#### Deferred Maintenance

- x The deferred maintenance standard requires disclosures related to the condition and the estimated cost to remedy deferred maintenance of PP&E. These disclosures are made as a note to a line item on the statement of net costs--no dollar amount shall be recognized on the statement.
- y The standards recognize that there are many variables in estimating deferred maintenance amounts. The standards acknowledge that condition rating is a management function since different conditions might be considered acceptable by different entities as well as for different items of PP&E held by the same entity. In addition, management may use condition assessment surveys or life cycle cost plans to estimate the amount of deferred maintenance.
- z The deferred maintenance standard applies to all PP&E whether reported on the balance sheet or through supplementary stewardship reporting.

#### Chapter 3: Accounting Standard – Deferred Maintenance

##### Definition

- 77 “Deferred maintenance” is maintenance that was not performed when it should have been or was scheduled to be and which, therefore, is put off or delayed for a future period.
- 78 For purposes of this standard, maintenance is described as the act of keeping fixed assets in acceptable condition. It includes preventive maintenance, normal repairs, replacement of parts and structural components, and other activities needed to preserve the asset so that it continues to provide acceptable services and achieves its expected life. [NOTE 58 Acceptable services and condition may vary both

between entities and among sites within the same entity. Management shall determine what level of service and condition is acceptable.] Maintenance excludes activities aimed at expanding the capacity of an asset or otherwise upgrading it to serve needs different from, or significantly greater than, those originally intended.

### Recognition

- 79 A line item for “deferred maintenance amounts” [NOTE 59 This requirement applies to all four categories of PP&E.] shall be presented on the statement of net cost with a note reference in lieu of a dollar amount. [NOTE 60 If management determines that there are no material amounts of deferred maintenance, this line item need not appear.] No amounts shall be recognized for deferred maintenance.

### Disclosure Requirements - Measurement

- 80 Amounts disclosed for deferred maintenance may be measured using: - condition assessment surveys, or - life-cycle cost forecasts. [NOTE 61 Other methods may be used which are similar or identical to condition assessment survey or life-cycle costing. These methods would also be acceptable sources of information on deferred maintenance.]
- 81 Condition assessment surveys are periodic inspections of PP&E to determine their current condition and estimated cost to correct any deficiencies. It is desirable that condition assessment surveys be based on generally accepted methods and standards consistently applied. [NOTE 62 Management shall determine what methods and standards to apply. Once determined, it is desirable but not required that methods and standards be applied consistently from period to period.]
- 82 Life-cycle costing is an acquisition or procurement technique that considers operating, maintenance, and other costs in addition to the acquisition cost of assets. Since it results in a forecast of maintenance expense, these forecasts may serve as a basis against which to compare actual maintenance expense and estimate deferred maintenance.

### Disclosures

- 83 At a minimum, the following information shall be presented for all PP&E (each of the four categories established in the PP&E standard should be included). - Identification of each major class [NOTE 63 “Major classes” of general PP&E shall be determined by the entity. Examples of major class include, among others, buildings and structures, furniture and fixtures, equipment, vehicles, and land.] of asset for which maintenance has been deferred.

- Method of measuring deferred maintenance for each major class of PP&E.

- If the condition assessment survey method of measuring deferred maintenance is used, the following should be presented for each major class of PP&E:

- \* description of requirements or standards for acceptable operating condition,
- \* any changes in the condition requirements or standards, and
- \* asset condition [NOTE 64 Examples of condition information include, among others, (1) averages of standardized condition rating codes, (2) percentage of assets above, at or below acceptable condition, or (3) narrative information.] and a range estimate of the dollar amount of maintenance needed to return it to its acceptable operating condition.

- If the total life-cycle cost method is used the following should be presented for each major class of PP&E:

- \* the original date of the maintenance forecast and an explanation for any changes to the forecast,
- \* prior year balance of the cumulative deferred maintenance amount,
- \* the dollar amount of maintenance that was defined by the professionals who designed, built or manage the PP&E as required maintenance for the reporting period,
- \* the dollar amount of maintenance actually performed during the period,
- \* the difference between the forecast and actual maintenance,
- \* any adjustments to the scheduled amounts deemed necessary by the managers of the PP&E, [NOTE 65 Adjustments may be necessary because the cost of maintenance foregone may not be cumulative. For example, if periodic painting is skipped twice it is not necessarily true that the cost would be double the scheduled amount.] and
- \* the ending cumulative balance for the reporting period for each major class of asset experiencing deferred maintenance.

#### Optional Disclosures

- 84 Stratification between critical and noncritical amounts of maintenance needed to return each major class of asset to its acceptable operating condition. If management elects to disclose critical and noncritical amounts, the disclosure shall include management's definition of these categories. The provisions of this statement need not be applied to immaterial items.

## APPENDIX C

### Excerpts from Amendments to FASAB Standard Number 6

#### Statement of Federal Financial Accounting Standards Number 10, June 1998

##### Accounting for Internal Use Software

##### Executive Summary

This statement provides recommended accounting standards for internal use software. Under the provisions of this statement, internal use software is classified as “general property, plant, and equipment” (PP&E) as defined in Statement of Federal Financial Accounting Standards (SFFAS) No. 6, *Accounting for Property, Plant, and Equipment*. This statement includes software used to operate a federal entity's programs (e.g., financial and administrative software, including that used for project management) and software used to produce the entity's goods and services (e.g., air traffic control and loan servicing).

Internal use software can be purchased off-the-shelf from commercial vendors and can be developed by contractors with little technical supervision by the federal entity or developed internally by the federal entity. SFFAS No. 6 specified treatment for internally developed software different from that for commercial off-the-shelf (COTS) software and contractor-developed software. SFFAS No. 6 addressed COTS and contractor-developed software generally, providing that they were “subject to its provisions.” On the other hand, specific provision was made for internally developed software.

SFFAS No. 6 prohibited the capitalization of the cost of internally developed software unless management intended to recover the cost through user charges, and the software was to be used as general PP&E. For capitalizable software, capitalization would begin after the entity completed all planning, designing, coding, and testing activities that are necessary to establish that the software can meet the design specifications.

At the conclusion of the PP&E project the Federal Accounting Standards Advisory Board discussed whether the standard for internally developed software should also apply to contractor-developed software. Also, some users of SFFAS No. 6 were unsure how to apply it to COTS and contractor-developed software. The Board decided, in December 1996, to review the issue and develop a separate standard for internal use software.

This standard requires the capitalization of the cost of internal use software whether it is

COTS, contractor-developed, or internally developed. Such software serves the same purposes as other general PP&E and functions as a long-lived operating asset. This standard provides guidance regarding the types of cost elements to capitalize, the timing and thresholds of capitalization, amortization periods, accounting for impairment, and other guidance.

### **Statement of Federal Financial Accounting Standards No. 11, October 1998**

Amendments to Accounting for Property, Plant, and Equipment - Definitional Changes – Amending SFFAS No. 6 and SFFAS No. 8 *Accounting for Property, Plant, and Equipment And Supplementary Stewardship Reporting*

#### Executive Summary

- a The purpose of this Statement is to amend certain standards in Statement of Federal Financial Accounting Standards No. 6, Accounting for Property, Plant, and Equipment, (SFFAS No. 6), which was issued in November 1995; and, Statement of Federal Financial Accounting Standards No. 8, Supplementary Stewardship Reporting, (SFFAS No. 8), which was issued in June 1996. The amendments specifically affect the definition in the standards for Federal mission property, plant, and equipment (PP&E) and the classification of space exploration equipment as general PP&E in these two Statements.
- b Rather than specifying types of PP&E, the original standards defined Federal mission PP&E with a set of criteria. PP&E items that met those criteria would be reported as Federal mission PP&E. Those criteria, however, were subject to inconsistent interpretations and appeared to be resulting in a broader application of Federal mission PP&E than originally intended.
- c To resolve this problem, the amendments eliminated the category of Federal mission PP&E and created a new category for national defense PP&E, which consists of: (1) the PP&E components of weapons systems and support PP&E owned by the Department of Defense or its component entities for use in the performance of military missions, and (2) the vessels held in a preservation status by the Maritime Administration's National Defense Reserve Fleet. As a result space exploration equipment shall be treated as general PP&E.

### **Statement of Federal Financial Accounting Standards No. 14, April 1999**

Amendments To Deferred Maintenance Reporting  
Amending SFFAS No. 6 *Accounting for Property, Plant and Equipment* and SFFAS No. 8 *Supplementary Stewardship Reporting*

#### Executive Summary

- I. Deferred maintenance reporting is a required disclosure per Statement of Federal Financial Accounting Standards No. 6, *Accounting for Property, Plant, and Equipment* (SFFAS No. 6), and is referenced in SFFAS No. 8, *Supplementary Stewardship Reporting*. This amendment does not modify the information to be provided users of

federal financial statements. It does, however, modify the status of that information and thus the level of its review by financial statement auditors.

- II. When SFFAS No. 6 was issued, the Board indicated that deferred maintenance reporting would evolve as preparers gained experience. *The Board provided maximum flexibility to preparers noting that management would determine “acceptable condition” against which deferred maintenance would be assessed. (see SFFAS No. 6, par. 78, footnote 58)* In addition, the Board noted that acceptable condition might vary between entities **and** between sites within the same entity. To ensure that readers would understand the deferred maintenance disclosures, the Board required that management's method of measuring deferred maintenance and management's requirements for acceptable condition be disclosed with the estimated amounts.
- III. After the statement became effective, questions arose about whether this flexibility was appropriate given the status of the information as basic information (i.e., an integral part of the financial statements). The Board agreed that a change in status was warranted.
- IV. This statement amends SFFAS No. 6 and SFFAS No. 8 to define deferred *maintenance* information as required supplemental information (RSI) rather than within the financial statements and the notes thereto.
- V. As required supplementary information, the deferred maintenance information will be subject to the audit procedures prescribed in AU Section 558.07, *Codification of Statements on Auditing Standards*. These procedures include inquiries to management and comparisons of the information for consistency. In addition, the auditor should consider whether the RSI should be covered in management's representation letter. The auditor may need to apply additional procedures required by other guidance, and to make additional inquiries if necessary based on the outcome of the required procedures. Readers should refer to the most current auditing standards for relevant guidance.

### **Statement of Recommended Accounting Standards No. 16, July 1999**

Amendments to Accounting for Property, Plant, and Equipment  
Measurement and Reporting for Multi-Use Heritage Assets  
Amending SFFAS No. 6 and SFFAS No. 8 *Accounting for Property, Plant, and Equipment And  
Supplementary Stewardship Reporting*  
Executive Summary

- a The purpose of this Statement is to amend certain standards for heritage assets in Statement of Federal Financial Accounting Standards No. 6, Accounting for Property, Plant, and Equipment, (SFFAS No. 6), which was issued in November 1995; and, Statement of Federal Financial Accounting Standards No. 8, Supplementary Stewardship Reporting, (SFFAS No. 8), which was issued in June 1996. Specifically, the amendments affect accounting and reporting standards for heritage assets that serve a dual purpose; that is, heritage assets that 1) have a heritage characteristic, and 2) are used in general government operations.

- b In SFFAS No. 6 and SFFAS No. 8, these heritage assets were referred to as “multi-use heritage assets.” To clarify the meaning of the term “multi-use heritage assets,” the amendments define “multi-use heritage assets” as being heritage assets whose predominant use is general government operations. Heritage assets having incidental use in general government operations are not referred to as “multi-use heritage assets.” Rather, they are simply “heritage assets.”
- c In addition, the original standards required the cost of multi-use heritage assets that did not directly relate to operations be accounted for as an expense, while costs that directly support operations be accounted for as general property, plant, and equipment (PP&E). This treatment would have resulted in inconsistent cost measures between agencies using heritage office buildings and those using non-heritage office buildings.
- d To alleviate this inconsistency, the Board decided that the all acquisition, reconstruction, and betterment costs of multi-use heritage assets (i.e., heritage assets whose predominant use is general government operations) be capitalized as general PP&E and depreciated over their service life. This amendment should result in consistent accounting for the cost of PP&E predominantly used in general government operations.