Government/Industry Forum on Capital Facilities and Core Competencies: Summary Report

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Government/ Industry Forum on Capital Facilities and Core Competencies

SUMMARY REPORT

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Introduction

BACKGROUND

Private corporations and the federal government have invested hundreds of billions of dollars in the capital facilities and infrastructure needed to support their lines of business or missions. Until the 1980s, owners with large inventories of facilities maintained in-house facilities engineering programs staffed by hundreds, sometimes thousands, of architects and engineers responsible for designing, constructing, operating, and managing buildings, manufacturing and industrial plants, and other capital projects.

During the last 15 years, most U.S. corporations have transformed their approach to the engineering and management of their capital projects and facilities. Functions, including design, construction, and maintenance, have been contracted to other firms, or "outsourced." In-house facilities engineering programs have been downsized significantly in number of staff and scope of work. The transformation process and the results, however, have not always been smooth or successful. Many corporations have reorganized their facilities engineering programs more than once as they try to achieve an optimal mix of size, skills, and responsibilities to support their overall business needs.

Federal agencies face challenges similar to private corporations as they seek to reorganize their facilities engineering programs to support their missions. Reorganization and downsizing of the scope and size of in-house facilities engineering programs have taken place in the 1990s. Some federal agencies face further reorganization in the next 5 years.

PURPOSE OF THE FORUM

Government agencies and private-sector corporations today are facing a number of common challenges related to capital facilities planning and management. One of the challenges is to identify the essential technical and management skills, referred to in business management literature as "core

competencies," that need to be retained by the organization and those skills and functions that can be contracted to others. In a period of organizational downsizing and reengineering, the pressure is on facilities managers to reorganize and reinvent the structure of their facilities programs. With declining budgets, smaller staffs, and higher expectations, private companies and federal agencies alike are learning the value of identifying and building on core competencies as a strategy for more efficient facilities management.

Because the issue of capital facilities and core competencies is of great importance within government and for private companies, The Business Roundtable, the Naval Facilities Engineering Command and the Federal Facilities Council joined forces to cosponsor a forum on March 25, 1998, at the National Academy of Sciences in Washington, D.C. The purpose of the forum was to address shared concerns as well as lessons learned through the reengineering of in-house facilities management organizations. The forum was structured to provide two-way communication between leaders of industry and government on issues of capital facilities engineering and management, and on the core competencies necessary to perform those functions. There are many recognized differences between the financial bottom-line objectives and methods of operation of private corporations and the public service, mission-driven objectives and operating environment of the federal government. However, many issues of capital facilities engineering and management are common to both. This forum provided an opportunity to share experience-based knowledge in dealing with those issues.

ORGANIZATION OF THIS REPORT

The next two sections of this report describe the structure of the forum and summarize recurrent themes and identified issues that emerged during the course of the day. Narrative summaries of the speakers' presentations follow. Appendices A and B contain information about the forum's sponsors and biographical sketches of the speakers, respectively.

FORUM STRUCTURE

The Government/Industry Forum on Capital Facilities and Core Competencies drew highly experienced speakers and an audience of approximately 170 representatives from federal agencies, nonprofit organizations, trade associations, and private corporations. Attendees were welcomed by Jack E. Buffington, Director of the Mack-Blackwell National Rural Transportation Study Center of the Department of Civil Engineering at the University of Arkansas. The forum was launched and moderated by Rear Admiral (RADM) David J. Nash, Commander of the Naval Facilities Engineering Command (NAVFAC), Department of the Navy.

In opening remarks, Mr. Buffington and RADM Nash discussed the genesis of the forum and the three basic issues to be addressed by the speakers: (1) the role of facilities and engineering expertise in facilitating the "bottom line" or mission of an organization; (2) how engineering expertise can be best used by that organization; and (3) how organizations can determine what constitutes their specific core competencies, and, in so doing, determine which activities should be kept in-house and which should be considered for outsourcing to other firms.

RADM Nash noted the areas in which federal agencies and private companies share similarities, including capital investment, closure of facilities, environmental cleanup, cradle-to-grave management of facilities, and pressures from downsizing and reengineering. In many cases, the private sector had started to deal with these issues long before the federal government and has taken more and greater risks, focusing on the costs and efficiencies of what they do. RADM Nash described NAVFAC's effort to establish benchmarks for its design and construction processes against other agencies and private-sector corporations to identify where and how NAVFAC's processes can be improved. From this effort he discovered that there is much that federal facilities managers can learn from the private sector.

During the day long forum, eight prominent speakers offered their experiences and insights from the perspectives of facilities owners. They were John B. Goodman, Deputy Under Secretary of Defense for Industrial Affairs and Installations, Department of Defense; Ronald M. Howard, Director-Construction, The Business Roundtable; Gerry H. Greene, Manager, Global Product Supply Engineering, Procter and Gamble Company[1]; David A. Skiven, Executive Director, Worldwide Facilities Group, General Motors Corporation; Terry Brandt Wood, Manager of Project Development, Worldwide Engineering and Construction Division, Amoco Corporation; Robert B. Pirie, Jr., Assistant Secretary for Installations and Environment, Department of the Navy; Robert A. Peck, Commissioner of the Public Buildings Service, General Services Administration; and Myron H. Goldstein, Director of the Project Management Center of Expertise, General Services Administration.

Speakers at the morning session of the forum presented an overview of the pressures on infrastructure and capital projects in the federal government and how similar pressures affect private companies. Corporate facilities managers gave their perspectives on capital facilities engineering functions and core competencies from an owner's viewpoint. In the afternoon, a panel of federal representatives explored the same issues from a public agency's perspective. A plenary session also was held.

[1] A summary of Mr. Greene's presentation was not included in this report, at his request.

RECURRENT THEMES AND IDENTIFIED ISSUES

Over the course of the forum, neither the audience nor the speakers were asked to come to any consensus on the issues of capital facilities and core competencies or on recommendations for federal facilities program managers. However, a number of common themes emerged and were explored in the course of the day.

Downsizing and Reengineering Business Processes

All speakers emphasized the significant effects downsizing has had on their organizations. Most organizations are doing more with less-in terms of manpower and budget limits—and are seeking to establish clear savings in the way they are managing their facilities programs. In most cases, the downsizing was not a well-planned process and mistakes were made, necessitating further changes to rectify them.

The rapid change in engineering functions has resulted in a substantial loss of basic competencies in some organizations. Of particular concern is the loss of technical competency to assist businesses in defining the most appropriate projects to meet the businesses' needs and the competence to execute capital projects.

The Business Roundtable found that those organizations that have lost competence in capital projects delivery and management did not do so overnight. Instead, as their deeply experienced, critically skilled personnel retire, the organizations slowly lose the ability to define alternatives effectively. More immediate, they might become overly dependent on contractors, and find themselves in an increasingly poor bargaining position.

One speaker related how in his company, as functions were decentralized, a strong connection to discipline leadership was lost. Different units began developing their own missions and drifting away from overriding organizational goals. Organizational efforts to match people to a shifting workload were hampered. Business units developed a parochial mentality, as their success was measured on their own results as profit centers. They did not get credit for supporting other corporate objectives or other businesses. People began developing a deep understanding of one business without access to broadening assignments in other businesses and disciplines. The company was compromising its ability to nurture future leaders of the engineering discipline. In addition, the company lost the leverage of size and the use of standard designs and specifications because common work practices deteriorated as each unit developed its own version.

In a second company, the biggest challenge encountered by the organization in reengineering its processes following downsizing was in managing the change in culture. Over the years, people had developed different work processes, viewpoints, language, and acronyms — and ultimately a

different company identity. There was a division between those who were involved in developing business strategies and those who were involved in the technical work. In the reorganization, the layer that converted strategy into operations was taken out. Now, the company is seeking to improve communications and build business acumen in the organization.

The Business Roundtable found that successful companies all have downsized; the winners have changed the substance and process of their engineering functions, not just the number of people they employ. Companies that have succeeded in this new environment have fundamentally changed the way they view the business world and the capital project system. They now see capital projects as a principal way that the company's capital assets base is created. They also see technology and engineering as key elements in the supply chain resulting in competitive projects, not merely as nonintegrated functions.

Core Competencies

As both federal agencies and private corporations reorganized their facilities engineering programs and practices, they went through a process of identifying their core competencies, that is, the essential skill sets they should retain in-house to support the larger organization effectively. Attendees were cautioned that divestiture of engineering capabilities can lead to a future in which there might not be an appropriate person on staff ready with an appropriate answer to problems that arise—at great financial and management cost. Thus, even if a company is severely downsized, a necessary competency is having a "smart buyer" on staff, even if most of the work is outsourced. That smart buyer must be someone who understands the business, its requirements, its customer needs, and who can translate those needs and requirements into a corporate direction.

One corporate representative reported that because the company had changed so much, it was recognized that different skills and knowledge were going to be needed from the staff. The company profiled its top engineers, project managers, project engineers, team leaders, and technical specialists and identified a group of competencies for all individuals. The company established the competency levels needed at particular points in their careers, then tied employees' performance reviews, development, and salary increases to these competencies.

Outsourcing for Services

As part of the process of identifying core competencies, organizations must determine whether something being handled internally would be better done by an outside firm, or outsourced. One corporate speaker stated that when

a company provides a service in-house that others can provide more efficiently and effectively, the company sacrifices its competitive advantage.

To determine which functions or projects should be outsourced, one company focused on evaluating the value chain of in-house services. A value-to-cost ratio and matrix were developed to help staff decide which services and projects should be provided in-house and which should be outsourced or "broker managed." Looking at the value-to-cost ratio helped convince the staff members that although there were functions they were capable of doing, they should not continue to do them if an outside firm could do the same work more cost-effectively. The company was then able to focus its energy on the high-value leverage projects for which it had in-house expertise that could not be found elsewhere.

Alliances

Many owners have turned to alliances as a solution to the loss of in-house engineering staff. Alliances are long-term contractual relationships between owners and contractors intended to promote efficiency in capital projects. One of the speakers noted that at his company, a cadre of contractors has been developed who not only know the company's staff and operations, understand its technology and work processes, and provide continuity of personnel, but also adjust personnel as workloads shift from business to business.

The Business Roundtable found that there appears to be no correlation between the use of alliances and project results. It is not alliances but the substance of the process that drives the results. Alliances are good, but the owner must have an effective project system for them to work.

Characteristics of Best Capital Systems

The Business Roundtable found that the best capital project systems (1) use fully integrated cross-functional teams; (2) actively foster a business understanding of the capital project process; and (3) have managers who can distinguish between cost-effectiveness and predictability, a difference that requires sophisticated project controls and measurement systems. Business leaders are placed in an active role in their projects, helping the team make tradeoff decisions between competing objectives, always with the businesses' objectives in mind. The engineering and project managers are accountable to the business, not the plant management. There are continuous improvement efforts that are subject to real and effective metrics. The best capital project systems maintain the in-house resources necessary to develop and shape projects in the advance-planning phase and to bind the owner functions together to find the right project and prepare for efficient execution. Finally, they all maintain some

form of central organization responsible for preparing the work process for advance planning to provide the skills and resources to pull in critical core competencies and to provide the interpersonal organizational structure that binds the operations, business, engineering, maintenance, outside organizations, and affected project systems.

Advance Planning

The importance of advance planning, sometimes referred to as "front-end loading," to facilities projects was clear, as several speakers focused on how improvements in advance planning affects performance and project cost. An analysis for The Business Roundtable showed that 49 out of 50 projects that achieved best practices in advance planning met all of their objectives. This capability to plan effectively for projects and their delivery translates into a measurable value added to the overall process and organization.

Planning for Future Leadership

One corporate representative stated that for his facilities engineering group long-term benefits and survival lie not just in lower prices and improved performance but in adding value and strategic advantage to customers who might not immediately recognize them. An in-house facilities engineering group needs to provide competencies not found elsewhere that empower individual business units to adapt quickly to market opportunities. The group needs to know the external and internal forces that have an impact on the business and must be able to add value in the area of strategic facilities planning. Thus, a great deal of time is spent trying to understand where facilities should be located, what they should look like, and what incentive programs are available to support the effort.

One federal agency representative reported that his organization is seeking to enhance its capabilities for the future by continuing ongoing engineering work, providing specialized engineering services as appropriate, concentrating certain types of work in particular offices, altering division staff size and functions, and strengthening program management. Two agencies are developing focused "centers of expertise" to consolidate their capabilities and move toward becoming full project management organizations.

2

The Pressure on Infrastructure and Capital Projects in the Federal Government

Dr. John B. Goodman
Deputy Under Secretary of Defense for
Industrial Affairs and Installations
Department of Defense

Managing infrastructure and capital improvements presents an ongoing challenge for the Department of Defense (DoD). There is a need to set the right course, and to do so requires that a series of constraints within which DoD operates be addressed.

It is important to view infrastructure issues in the context of the mission that the infrastructure and capital improvements are designed to serve. The key elements of that mission have been defined by two important documents that have been issued in the past year, the *Quadrennial Defense Review* and the *Defense Reform Initiative*.

The *Quadrennial Defense Review* identifies three key missions or strategies for DoD. First is the need to take a more active role in shaping the international environment, to try to build a better, more peaceful international climate. Second is the need to respond to the full spectrum of crises threatening U.S. interests. The ability to respond has two components: ensuring the readiness of military forces and increasing procurement of the weapons systems needed in the field and getting them out to the forces more quickly.

The third element of the *Quadrennial Defense Review* strategy is to prepare now for an uncertain future. Also outlined in the document, *Joint Vision 2010*, this element of the strategy calls for significant new investments in technologies that will insure focused logistics, battlefield dominance, and state-of-the-art communication systems. This not only requires a large financial investment, but calls for a new method of systems integration.

The DoD FY 1999 budget request reflects these priorities by sustaining the readiness of U.S. forces and increasing funding for modernization to speed the revolution in military affairs. The department has allocated an unprecedented amount of resources for modernization without increasing the total budget request.

This shift in funding priorities and the revolution in military affairs requires a similar revolution in the department's business affairs. The *Defense Reform Initiative* of November 1997 identified four key implementation strategies: (1) adopting best business practices, that is, moving to a paperless contracting environment; (2) reengineering organizations, in particular, by reducing the size of headquarters organizations; (3) streamlining, by competing DoD commercial activities; and (4), of greatest concern, eliminating unneeded infrastructure. These strategies have very significant implications for DoD's management of installations and facilities. The *Defense Reform initiative* also strongly endorses efforts to revitalize military housing through privatization, using private-sector capital. It also directs the privatization of utilities, and puts a greater focus on energy management.

There is now a greater reliance on energy-savings performance contracts. The Navy and the Army Corps of Engineers have demonstrated how to implement the tenets of sustainable design, which involves the use of better designs and better materials to lower energy costs. It requires fundamental change in the philosophy of how DoD designs buildings. There is a commitment to making all new buildings designed after the year 2000 to be 30 to 50 percent more energy efficient compared with a 1996 baseline. The military services know how to do it and must be able to drive that change through their activities.

The last element of the last component of the *Defense Reform Initiative* is a request that Congress approve two additional rounds of military base closures in 2001 and 2005. This request is critical to DoD's ability to manage its infrastructure. Base closure activities have direct implications not only for the department's infrastructure, which is important, but also for the national military strategy, which is paramount.

The need for additional rounds of base closures is clear and compelling. First, the military still has more bases than needed to support military forces and future military strategy. This excess is enough to justify authorization of at least 2 additional rounds. The *Quadrennial Defense Review*, the *Defense Reform Initiative*, and the National Defense Panel created by Congress 1 year ago all concluded that the military base structure is larger than the force structure requires, even though over 100 major installations have already been closed.

Second, base closures save money. By 2001, DoD will have saved over $13.5 billion, with steady-state annual savings thereafter of about $5.6 billion per year. If the two rounds of base closures in 2001 and 2005 are the size of the last two conducted, it would save about $3 billion per year.

Third, the additional closures are needed now. Every year of delay in moving forward is a year when savings that are needed will not be realized. Three billion dollars in savings would come at a time when the next generation of major weapons systems will be going into production. Without the closures, there is the risk that the country's military strategy cannot be implemented. The

United States might need to make one of three difficult choices: reduce the force structure below its current level or its level at the end of the *Quadrennial Defense* Review; slow the modernization of weapons systems; or cut the infrastructure budget overall and allow the condition of buildings and housing to deteriorate. This last choice is a very undesirable option.

The bottom line for DoD is that it needs two more rounds of base closures. It is absolutely critical, though politically difficult. It is critical that continued communications emphasize why these base closures are so important to the department's work, to the national security strategy, and to the young men and women in uniform.

3

The Business Stake in Effective Project Systems

Mr. Ronald M. Howard
Director-Construction
The Business Roundtable

Two years ago, The Business Roundtable Construction Committee, which supports the Construction Cost Effectiveness Task Force of Roundtable Chief Executive Officers, was very concerned with the declining state of project execution capabilities. The committee launched a strategic initiative to define the business value of maintaining effective project systems and professional competency. In addition, the initiative acted as an alert that effective project systems are very important to business assets, and once they are dismantled, they are very difficult to restore.

The data presented were developed as part of a cooperative study with Independent Project Analysis (IPA) Corporation of Reston, Virginia. IPA's database contains 2,000 projects from a variety of industries, representing about $300 billion of investment. IPA has established benchmarks for over 60 companies, of which 30 companies' benchmarks are reevaluated on a continuous basis. The resulting report was entitled *The Business Stake in Effective Project Systems*.[2]

Over the past 15 years, most American manufacturers have transformed their approach to engineering management of their capital projects. Virtually every owner has reengineered, reorganized, restructured, downsized, and "right-sized." Sometimes this has been done many times, often without achieving satisfactory results.

When examining the relative importance of owner project systems, some trends appear. The best-performing company in the study can take an industry average of 15 percent return on an investment project and turn it into a 22.5 percent return. The poorest performer in the study started with a 15 percent average return on investment and drove it down to 9 percent. The difference between the best-and the poorest-performing companies, then, was a 13.5

[2] The full text of the report is available on the Internet at www.brtable.org.

percent return on investment. More important, the gap between the best and the poorest performing companies has been growing over the last 10 years.

The best-performing company in the study is spending 72 cents of the industry-average dollar for the same functional scope. The company with the shortest delivery time has taken only 70 percent as long as the industry average to bring a project from a business idea to an operating facility. The company with the best track record in start-up and operation achieves 6 percent more production from their assets. If these three companies could be taken together at their best, the return on investment for a capital project would increase from 15 to 25 percent.

THE CHANGING ROLE OF OWNER ENGINEERING

There is both good news and bad news about the changing role of owner engineering. The good news is that cost overruns on owner projects are significantly lower relative to the 1970s and early 1980s. Although cycle times are 20 percent faster, projects are considerably safer than 20 years ago.

On the other hand, costs remain very unpredictable. Start-up and operability of new assets have not improved in the past 20 years. Most distressing is the fact that more than two-thirds of all the major projects built by process industries over the past 10 years have failed to meet one or more of the key business objectives of the project.

Today, only a few companies in the process and allied industries maintain the ability to perform detailed engineering in-house, as was common in the 1970s. The outsourcing of detailed engineering began a process of downsizing in-house engineering staff, a continuing trend. The cyclical nature of capital programs in owner companies has meant that large, in-house forces carry substantial cost penalties when there are periods of minimal work. Engineering contractors can adjust to such periods because they have a large client base and are more flexible in adapting to the changing workload.

If businesses expected outsourcing to lead to a decline in engineering costs, they have been disappointed. Engineering costs for major projects continue to grow as the amount of work performed in-house has declined. The reasons are not all attributable to engineering cost alone, but include the costs of complying with more environmental regulations and the costs of increased automation.

Many owners have turned to alliances as a solution to the loss of in-house engineering facilities. Alliances are long-term contractual relationships between owners and contractors intended to promote efficiency in capital projects. There appears, however, to be no correlation between the use of alliances and project results. It is not alliances but the substance of the process that drives the results. Alliances are good, but the owner must have an effective project system for them to work. Alliances are not a single answer for downsizing and cost cutting.

The rapid change in engineering functions during the last decade has resulted in a substantial loss of basic competencies in some organizations. Of particular concern is the loss of technical competency to assist businesses in defining the most appropriate projects to meet the businesses' needs and the competence to execute those projects. Unfortunately, the long-term damage to the company's earnings by doing the wrong projects in the wrong way can be devastating.

The key difference between a successful or unsuccessful company is not downsizing. Successful companies all have downsized; the winners have changed the substance and process of their engineering and not just the number of people they employ. Those who have lost competence in capital projects did not do so overnight. Instead, as their deeply experienced, critically skilled personnel retire, they slowly lose the ability to define alternatives effectively. More immediate, they find themselves overly dependent on contractors, and in an increasingly poor bargaining position. New technology projects go awry very quickly; global projects become very risky when the owner does not have a good process, even doing small projects.

Finally, communication now takes place between business people and contractors, because the former middlemen — the engineering staff — are no longer there to bridge the gap.

SUCCEEDING IN A NEW ENVIRONMENT

Companies that have succeeded in this new environment have fundamentally changed the way they view the business world and the capital project system. They now see capital projects as a principal way that the company's capital-assets base is created. They also see technology and engineering as key elements in the supply chain resulting in competitive projects, not merely as nonintegrated functions.

The supply chain begins when the customer need is identified and translated into a business opportunity. Following this is the critical planning phase of the project. Business opportunity is explored in the first stage of the planning phase and alternate methods of meeting the defined needs are investigated, including some noncapital assets. The most successful companies are using their technical resources in this business development process.

As the business plan focuses on a capital project as a solution, the project management professionals are added to the team to work with the business leaders in the facility planning stage. This is the stage at which the broad project objectives are honed into a particular project at a particular site with a particular technology configuration and schedule. Different formulations of the project are usually explored and exceptions made. At the project planning stage, the details needed to bring the project to a point where detailed engineering can be mobilized to execute the project are filled in with hopefully little or no change.

The importance of the advance-planning process cannot be overstated. Analysis of the IPA database showed that 49 out of 50 projects that achieved best practices in advance planning met all of their objectives. The project supply chain requires an integration of the business, technical, and manufacturing functions into teams that can create a project that uniquely fills the business need.

There are four roles that an owner can take in project definition: the all-owner role, the all-contractor role, the contractor-lead role, and the integrated team role. The integrated-team approach generally dominated the best performance category of the study in terms of cost and schedule, and was almost equal to the all-owner projects in operability.

What are the characteristics of the best capital project systems? In addition to using fully integrated cross-functional teams, they actively foster a business understanding of the capital project process. Business leaders are placed in an active role in their projects, helping the team make tradeoff decisions between competing objectives, always with the business objectives in mind. The engineering and project managers are accountable to the business, not the plant management. There are continuous improvement efforts that are subject to real and effective metrics.

The best capital projects have managers who can distinguish between cost-effectiveness and predictability, a difference that requires sophisticated project controls and measurement systems. All maintain in-house resources necessary to develop and shape projects on the front end and to bind the owner functions together to find the right project and prepare for efficient execution.

Finally, the best capital project systems all maintained some form of central organization that is responsible for preparing the work process for advance planning. This provides the skills and resources to pull in critical core competencies and the interpersonal organizational glue that binds the operations, business, engineering, maintenance, outside organizations, and affected project systems.

4

Corporate Owners' Perspectives on Capital Facilities Engineering Functions and Core Competencies

GENERAL MOTORS CORPORATION'S WORLDWIDE FACILITIES GROUP

Mr. David A. Skiven
Executive Director

General Motors (GM) operates 387 facilities totaling over 400 million square feet of space in 37 countries. The company employs 650,000 people and produces over 8 million vehicles and component sets for sale in 190 countries. The company's core business is marketing vehicles. Within GM's structure is a multibillion dollar service organization called the Worldwide Facilities Group (WFG). WFG is not a core business: it provides the manufacturing facilities for those who build the vehicles that GM markets.

Formed in 1994, WFG consolidated over 20 organizations within GM, a number of which had central staffs. The company concluded it needed single-point management that would align itself with and report to the largest operating unit within GM. In reorganizing its functions, WFG began with the premise that core competencies:

- are skills and services the organization retains or performs to ensure its survival; the skills/services they are particularly good at are core competencies
- do not deteriorate over time—they are enhanced;
- are the glue that binds the business;
- transcend organizational boundaries;
- are built through a process of continuous improvement;
- once lost are very difficult to regain; and
- are what you need to be good at.

WFG's vision is to be "recognized as a premier integrated facilities support organization providing a full range of services to General Motors plants and facilities on a global basis." WFG settled on providing four primary services to the company: facilities management, utility services, environmental services,

and the execution of capital projects. As a support organization, WFG must meet the needs of its internal customers and must be competitive on a global basis.

Facilities Management

In facilities management, WFG is currently operating about 60 million square feet of space. WFG also manages closed plants. Once the operating unit is finished with a plant, it becomes part of the WFG portfolio, and is closed, cleaned, and redeveloped to maximize its value. Currently, the organization has 35 to 40 million square feet of closed facilities.

WFG is also responsible for asset-management programs, running a number of programs centrally, such as roofing, transformer replacement, and the like.

WFG manages large manufacturing mills that the company is trying to close. The core business has never been able to do this successfully, so it has turned these mills over to WFG to downsize and close:

Last, WFG manages the warehouse business for GM's non-product-related warehousing. Many closed plants are now converted into warehouses. As warehousing is consolidated, there is a significant reduction in the square footage needed. WFG handles from 5 to 6 million square feet in this area. Thus, in facilities management, WFG's core competencies are:

- management of building services;
- development and management of building asset programs;
- decommissioning or disposal of closed plants; and
- management of labor issues.

Utilities Services

WFG has a varied role when it comes to utilities services. GM currently has 65 powerhouses and 89 wastewater treatment plants that have been put into a single unit, which has resulted in significant savings from an operational standpoint. Powerhouse support staff has been downsized by 15 percent in the last year. WFG's core competencies here are:

- utility procurement;
- interfacing on regulations and legislation that have an impact on the utility business;
- development of utility-efficiency programs;
- management of powerhouse and wastewater treatment.

When it comes to full environmental services—including permit acquisition, remediation, regulatory support, and assessment of chemicals—WFG's Environmental Services Group provides companywide support. In this area, WFG defined its core competencies as:

- acquiring permits;
- interfacing on regulation and legislation that have an impact on the core business;
- remediation;
- developing compliance programs;
- providing corporate technical expertise (air, water, waste); and
- managing chemical-selection processes.

Execution of Capital Projects

WFG spends about $2 billion per year on facilities projects, and has developed a common project-delivery process that is being rolled out across GM. To be successful, in this business line, an organization needs to have project managers who can complete projects that meet the established quality, functional, and cost parameters. Such consolidation of services has allowed the organization to provide its in-company customers with a cross-functional approach to the business, permitting the customer to concentrate on producing a product. In addition, consolidation permits WFG to develop cross-functional teams to meet customer requirements. In summary, for capital projects, WFG's core competencies are:

- delivering new facilities;
- interfacing on regulation and legislation that have an impact on the construction business; and
- providing corporate technical expertise (architectural, structural, mechanical, civil, electrical).

Primary Service Areas

The four primary service areas share some common elements and systems, including the development of staff skills, treatment of financial issues, and the way in which information is handled. There are regional support offices with high concentrations of operations. Communication is critical, and advance planning and customer contact are handled with one project manager in each of the major divisions. The project manager becomes the single management point for all services being performed for the customer. (See Figure 1.) The project

manager is dependent upon the rest of the organization if he or she is to be successful, and is physically located at the customer's site. He or she comes to know and understand the customer's needs and direction, and then can translate those needs into service requirements and communicate that chosen direction and WFG's direction to the customer.

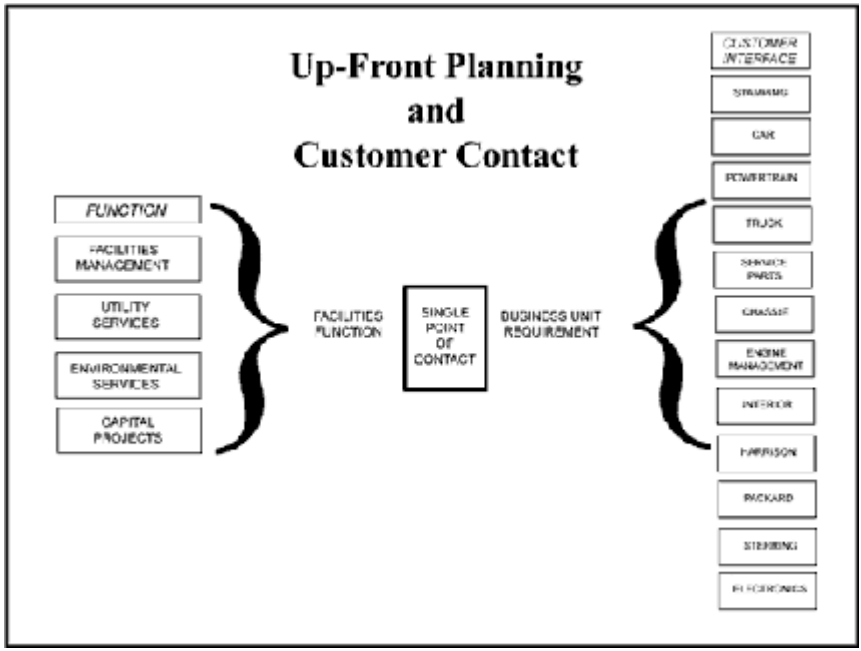

Figure 1
Project manager's responsibilities in advance planning and customer service.

The role of WFG, then, is to deliver those services in the most cost-effective way possible; to develop strategies to service the customer, now and in the future; to reach and maintain a leadership position; to push some corporate initiatives; and to manage services through either in-house or outside providers. However, you cannot always give customers what they want. There are times when corporate programs and solutions must override the individual customer's needs in the best interests of the company. Thus, the service sectors are also responsible for understanding what the leadership position is, which in turn relates to understanding the company's core competencies.

Short-Term Benefits

WFG operates from a short-term standpoint in three primary areas: programs, projects, and operations. Price and performance benefits have been significant. Helping to create these benefits have been program savings achieved by leveraging GM's size to reduce structural costs; project savings accrued through a common approach to future projects based on lessons learned from feedback; and continuous improvements of existing operations.

Long-Term Benefits

Long-term benefits lie not just in price and performance but in adding value and strategic advantage to customers who might not immediately recognize them. WFG needs to provide competencies not found elsewhere that empower individual businesses of GM to adapt quickly to market opportunities through implementation of strategies. WFG, then, needs to know the external and internal forces that have an impact on the business. It must be able to provide some real strategic advantage to business units as they go into the global marketplace. For example, with a highly unionized work force at GM, WFG has to work within certain parameters. Also, GM has workforce demographics that must be considered, such as the fact that the average age of employees is 42 years and aging. The company has to deal with changing culture, past practices, and with globalization.

Externally, regulation and deregulation of various industries—such as the electrical industry—have a major impact on GM's business. In addition, issues concerning global warming and new air-quality standards are among those that WFG must understand as well as their impact on the company's core business. Market conditions, supplier availability, and competitors are other external forces that must be taken into account.

Outsourcing

When it comes to outsourcing, companies must determine whether a service provided by in-house staff would be better done on the outside. When a company provides a service in-house that others can provide more efficiently and effectively, it sacrifices competitive advantage. However, a balance has to be maintained; a "smart buyer" must be kept on staff. That smart buyer must be someone who understands the business, its requirements, and customer needs, and who can translate those needs and requirements into a corporate direction.

Core Competencies in 2005

Today, WFG is trying to predict what core competencies will be needed in the year 2005. If the organization has the core competencies to support the business, it must do so across the entire business, from engineering and manufacturing to research and development. WFG, consequently, is becoming a facilities facilitator, bringing professionals together to solve problems. From the facilities management standpoint, core competencies in this business are really managing services.

Those at WFG believe that if it is going to be active in the year 2005, it must be able to add value in the area of strategic facilities planning. A great deal of time is spent in such planning, trying to understand where facilities should be located, what they should look like, and what incentive programs are available to support the effort.

Business units change on an ongoing basis, developing new technologies, new materials, and new processing. WFG must be prepared to match these changing needs. The services provided have to meet the needs of the customers and their future direction or else they will work around WFG. WFG must go beyond merely providing the services the customers know they need or know that they can acquire through outsourcing or develop themselves. If WFG limits itself to meeting current needs, then GM can potentially eliminate the need for an organization such as WFG. To remain relevant to GM's mission, WFG's objective, then, is creating services that customers need but have not yet imagined.

AMOCO CORPORATION'S WORLDWIDE ENGINEERING AND CONSTRUCTION DIVISION

Ms. Terry Brandt Wood
Manager of Project Development

Amoco began its first downsizing in 1986, starting with a "yo-yo dieting" approach. Amoco would cut its staff by 1,000 or 2,000 people in one location and then add them in another. A consistent, overall program controlling this effort did not then exist. In 1992, the company looked again at downsizing from a corporate basis, and reduced staff to 55,000 overall. Further cuts of 8,500 were made, and the company operated at this leaner state for 2 years. In 1994, the company went back and reduced the overall organization yet again by about 3,500 people. Today Amoco operates with 43,000 employees worldwide. Although losing staff, the company has increased revenues generated and, in turn, the number of capital projects that it manages.

The Worldwide Engineering and Construction (WEC) Division was designed as a result of the company's corporate self-examination. In a corporate reorganization, a level of management was taken out at the very top. Previously, there were separate construction groups to support the operating companies that were supposed to work together, but never really did. When the new organization was instituted, it represented a great cultural change. The centralized organization was brought together from four different divisions of the company: exploration and production, petroleum products, chemicals, and corporate. People in these divisions had different tools, processes, and viewpoints about how they did their work.

From a total of 1,100 engineers involved in engineering and construction, Amoco downsized to roughly 800. A careful evaluation was made of what the company really needed to do. The exploration and production group had initiated establishing some benchmarks and made major changes in how they managed projects. The journey to improvement led it to the realization that the best way to gain efficiency was to form integrated teams to work with outside contractors throughout a project.

The petroleum products division handled detailed design in-house, with some 50 draftsmen supporting the effort. It trained staff by getting them involved in detailed engineering and design on capital projects. The chemicals division was at the other end of the spectrum, with very little direct involvement in projects, using a lump-sum bidding approach. Close evaluation led Amoco to decide that all areas could be improved.

WEC was created to become a service provider. Perhaps the biggest challenge encountered by the organization was in managing the change in culture. Over the years, people had developed different work processes, viewpoints, language, and acronyms—and ultimately a different company identity.

Establishing a Mission and Vision

An important task was to immediately establish a mission and vision. WEC tried to align a partnership in which everyone had something to gain and to lose. It also wanted to create a more interesting and exciting workplace. WEC's mission became "We create strategic value for our partners by maximizing Amoco's return on all assets." Its vision is "A culture of excitement and relentless dedication to the growing success of our stakeholders as we provide the best in Engineering Services."

Initially, WEC took a quick assessment of its organization and discovered a number of niches where things were working well. The chemicals group had an outstanding safety record, and other groups had good cost and leadership processes and great tools. Another was well equipped to handle special projects.

The second step was a study of benchmarks of companies in both the same and other industries, which was conducted with Independent Project Analysis Corporation of Reston, Virginia. The assessment that came back left no room for argument: none of the company's groups was doing well compared with industry and none of its processes would likely drive WEC to world-class performance. Therefore, WEC needed to reevaluate those processes and needed all of its staff to pull together to do that.

Common Process for Capital Projects

A new framework was developed, called a "common process." A fivestage "gated" process was designed to manage capital projects. Projects are divided into stages, each of which corresponds to a key decision point. (See Figure 2.) Successful implementation requires behaviors that permit effective cross-functional teams. Although this process met with resistance at first, through training and management support, including support from the Chief Executive Officer, behaviors changed, as did the company culture.

Under this process, at the conclusion of each stage, the team documents its work and frames decisions in a Decision Support Package (DSP). The DSP is reviewed by the appropriate "gatekeeper" to allow the team to obtain approval and pass through the gate to the next stage. The DSP not only covers the information necessary for approval, but also includes a plan for the next stage. The plan includes capital and manpower resources. Having the right people on

the team during each stage is particularly important. The gatekeeper and the team then have a clear expectation of the next stage. The process can be applied at a macrolevel such as moving from an exploration discovery in the Appraise stage to the asset being produced in the Execute stage and products marketed in the Operate stage. It can also be applied at a microlevel, for instance, in the actual drilling of the exploration well, the acquisition of a seismic survey, or the evaluation of a prospect. Each of these items constitutes a project that will move from an Appraise stage to the Operate stage.

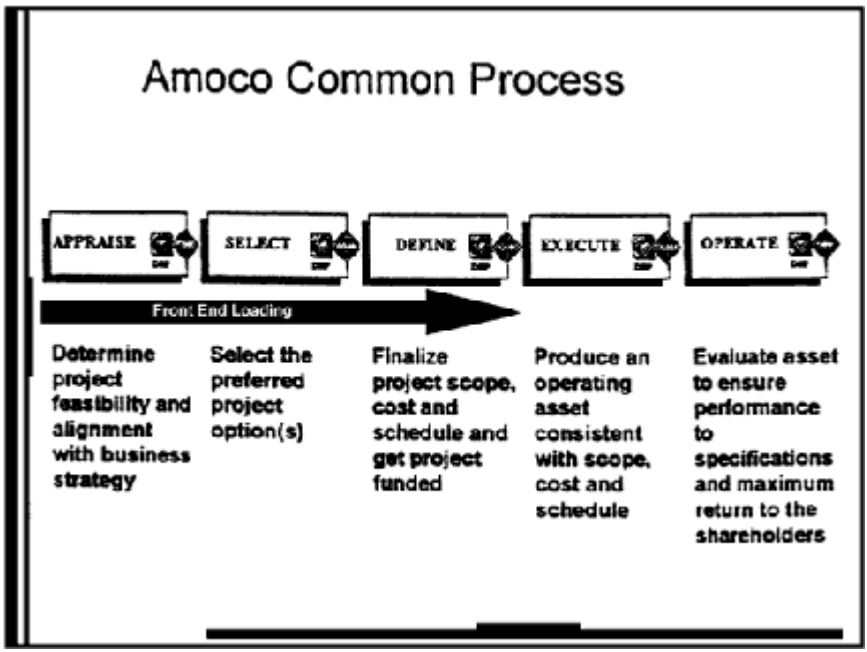

Figure 2
Amoco's common process.

One thing the corporation needed was improvement in its advance-planning process. WEC felt this was a function in which it could add measurable value through a process and organizational design. Under the common process, a "front-end loading" assessment is completed at the end of the Define stage.

Core Competencies and Outsourcing

In addition to project management, WEC took a close look at all of its services. As a provider of engineering services, the company found it was well integrated. By integrating two value chains—the creation of new assets and the ability to maintain those assets—the division discovered some synergies.

WEC has identified 27 services that the division provides. By evaluating the value chain, it has determined that some of these services are differentiated and that they provide the highest value. A value-to-cost ratio has been developed that is applied to services, and as part of the strategic-planning process, a matrix is then completed. This matrix helped staff decide which services and projects should be provided in-house and which should be outsourced or "broker managed." Looking at the value-to-cost ratio helped convince the staff members that although there were functions they were capable of performing, WEC should not continue to do so if someone else could do them more cost-effectively. The division is then able to focus its energy on the high-value leverage work for which WEC had in-house expertise that could not be found elsewhere. For example, WEC had in-house expertise in operating and maintaining international plants because those plants had been designed by people on the staff who not only understood the facilities themselves but also had a global perspective on how to resolve issues in foreign countries.

This type of evaluation matrix proved to be a good motivational tool. In the capital project area, WEC possessed the common process that everyone could rally around. In engineering services, WEC had the viewpoint that services could be differentiated and "broker managed." Under the broker management concept, WEC owns the problem. Its staff can look at the problem, determine if it can add value in resolving the problem or if the problem should be handled by one of its alliance companies. Broker management assures that someone on WEC's staff has the responsibility to follow a problem that is given out to a contractor. WEC has also needed to train staff to develop new skills so staff members can eventually be able to act effectively in the role of broker.

In restructuring WEC a number of levels were taken out of the organization, making it very flat. WEC basically has the management responsibility for capital projects—the project manager and his or her team. The staff is organized around the common process, so where someone is in the organization depends upon the stage of the project. This organizational structure results in quick communication, but with teams all over the world, everyone must work hard to remain integrated.

Core Competencies for Individuals

The company has done a great deal of work on core competencies. Because the company has changed so much, it was recognized that different things were going to be needed from the staff. An assessment was conducted of the competencies the successful employees had. Based on profiles of 50 top engineers, project managers, project engineers, team leaders, and technical specialists, a group of competencies were identified for all individuals. These have been incorporated as part of their performance reviews each year. The company established the competency levels needed at particular points in their

careers, then tied employees' performance reviews, development, and salary increases to these competencies.

Lessons Learned

One of the interesting mistakes made was in the area of strategic orientation. Historically, it has never been an engineer's job to understand business strategies nor had he been rewarded for it. There was a division between those who were involved in developing business strategies and those who were involved in the technical work. In the reorganization, the layer that converted strategy into operations was taken out. Now, the company is facing some challenges with improving communications and building business acumen in the organization.

If core competencies had been evaluated earlier, and the company had mapped where it stood, different organizational decisions might have been made about how projects are organized. Amoco WEC has gone back and established a few more key positions. These positions are filled by senior project directors who are heavily involved in coaching, mentoring, and teaching project managers during the project stages.

WEC also learned that in addition to a vision statement, engineers need signposts and measures, that is, quantifiable areas to help show that progress is being made. Now, WEC is continually benchmarking the numbers to see if it is really moving ahead.

5

Federal Owners' Perspectives on Capital Facilities Engineering Functions and Core Competencies

DEPARTMENT OF THE NAVY, INSTALLATIONS AND ENVIRONMENT

The Honorable Robert Pirie, Jr.
Assistant Secretary of the Navy for
Installations and Environment

There is a dramatic downsizing underway in the Department of the Navy. The top-line budget has been reduced 42 percent from the years of the Reagan Administration. The fact that the infrastructure budget has been reduced only 27 percent in this period makes the point that when an organization downsizes, the overhead is much more difficult to shed than the direct-labor segment. The challenge has been to accommodate downsizing without crippling the institution.

How does an organization like the Navy downsize without destroying its ability to carry out those tasks it is obligated to do to support the operating forces? It will require what can be called a revolution in business affairs, and will involve new concepts, technologies, organizational structures, doctrines, and programs.

Regionalization

Regionalization is one path the Navy is pursuing to save money. Military base-support functions will be regionalized rather than having each part of a base that responds to a different operating leader have its own accounting system, printing office, and contracts with maintenance crews for painting and the like. Not only will these services be aggregated within bases, but military bases themselves will be consolidated in major fleet concentration areas like Norfolk, Virginia; Jacksonville, Florida; and San Diego, California. This kind of regionalization is expected to save a considerable amount of money. A major fleet concentration area like Norfolk might have as many as 30 to 35 motor

repair shops or 20 calibration laboratories for ship and aircraft maintenance functions, for example. Consolidation of such functions will conserve considerable resources.

The Navy is also consolidating the number of major organizations from 18 different entities down to 8, which is expected to achieve standardization as well as consolidation.

Reliance on the Private Sector

In the future, the Navy will rely more on the private sector for commercial and off-the-shelf items, as well as services. By outsourcing some services, the Navy intends to reduce overhead costs through competition. In the next few years, studies will be conducted on more than 80,000 jobs in the Navy and Marine Corps to determine whether they can be done less expensively by the private sector. This process requires the government to change its internal organization to the most efficient configuration for that competition. About half the time, the studies show the private sector can provide these services more cost-effectively. The average savings have been considerable, at about 30 percent.

Technical Expertise

In principle, there are not many jobs that are so inherently governmental that they cannot be outsourced-including technical and scientific work, and even work that is highly military-specific and is classified.

The Navy's 215,000 civilians and 380,000 military staff make up an important national asset-technical expertise. Care must be taken in downsizing, consolidating, outsourcing, privatizing, and in otherwise making efficient use of all these people.

The dramatic growth of environmental law and regulation in the past two decades has profoundly influenced the structure and outlook of civil engineering organizations. The base closures of the past decade have also had a profound effect. Pressure on scientific and technical activities is likely to fall more heavily on activities such as civil engineering that do not appear to have a uniquely military focus.

The Navy buys many goods and services from the market in support of its infrastructure. It is occasionally required to build a bridge across an ice-clogged river in a faraway place on short notice and under fire or to comment on a plan to replace an existing air base with one on a floating iron platform 1 kilometer long by 200 meters wide in a part of the world renowned for its typhoons. Virtually any modification of an existing plant or movement of military units from one place to another requires the National Environmental Policy Act to be implemented and faithfully obeyed.

If the Navy precipitously divests itself of engineering capabilities in the facilities engineering area, there might not be an appropriate person ready with an appropriate answer to questions about problems that arise. The Navy must preserve its core competencies in important engineering disciplines and thus must remain uniquely and inherently a governmental function.

U.S. ARMY CORPS OF ENGINEERS

Lt. General Joe N. Ballard

Chief of Engineers

The U.S. Army Corps of Engineers is experiencing many of the same challenges facing other governmental agencies and companies in the private sector. Federal resources are diminishing at the same time as demands for services are increasing. Although the Corps has not downsized or outsourced its facilities engineering capability, it is refocusing its work in its core competencies.

The Corps builds facilities for two different clients. In its civil works program, it builds facilities that it will often operate and maintain, such as locks, dams, bridges, levies, and other infrastructure critical to the country. In addition, it provides the same design and construction service to the Army, Air Force, other Department of Defense customers, and federal, state, and international agencies. Because of its size and mix of skills, it often receives assignments that other engineering organizations cannot handle.

Although the Corps has not downsized, it has been affected by downsizing of other organizations. It has a declining construction budget for both military programs and civil works. Its civil work is shifting from new construction towards operations and maintenance. At the same time, the Corps is tightening percentage constraints on managerial funds. Congress has made it clear that the overhead for the Corps cannot be increased. Rather, it has to reduce costs while delivering the same products and services as in the past.

Two years ago, it was decided that a meaningful vision and a strategic plan had to be developed. The Corps is taking a two-prong approach, first by addressing short-term goals and objectives and then by addressing long-term goals and objectives.

A year ago, the Corps created a transition team consisting of about 30 senior leaders from within the Corps, customer organizations, the stakeholders, and the retiree community. Together, they developed a vision for the Corps, and wrote a set of strategic plans for achieving that vision. A series of campaign plans were also implemented as the team worked down through the organization to provide a set of operating plan initiatives for the districts to address a number of short-term goals.

A Vision with Three Goals

Since late 1997, the Corps has focused on a single vision as

> The world's premier engineering organization. Trained and ready to provide support anytime, anyplace. A full spectrum Engineer Force of high quality, dedicated soldiers and civilians. A vital part of the Army: the Engineer team of choice—responding to our Nation's needs in peace and war; a values-based organization—respected, responsive, and reliable. Changing today to meet tomorrow's challenges!

The Corps' vision has three corporate goals: to seek growth opportunities; to revolutionize effectiveness; and to invest in its people. To meet these corporate goals, the Corps established seven substrategies: serve the Army; align for success; satisfy the customer; build teams; reshape cultures; build strategic commitment; and build in-house capabilities. Thus, the focus is on complementing the Army's vision: meeting today's needs, and preparing for tomorrow's challenges.

The Corps defines its core competencies as "a set of interwoven skills tied to information systems and organizational values, a complex set of skills, capabilities and expertise that reside in employees working collaboratively within and across skill sets." To identify these core competencies, several questions had to be answered as part of a litmus test.

- Why do our customers and partners seek us out?
- What skills, functions, or qualities are unique to the Corps?
- Does the competency provide sustainable advantage over other alternative providers?
- Why is the Corps unique from other organizations providing the same kinds of services?
- Is that competency hard to replicate, imitate, or transfer?
- Is it a source of value to the customers and stakeholders?
- Does it cross multiple markets or product lines?
- Is it complex or diffused across a group of employees or does it reside in a small number of employees?

Through this process, the Corps identified a series of core competencies. The first is the ability to respond quickly through its worldwide organization—there are no other governmental engineering organizations with its nationwide and worldwide scope.

The second core competency is that the Corps can quickly and efficiently staff up to any size project with in-house and external resources. It can create a mixed team from the public and private sectors. Third, the Corps provides a structured, rational approach to problem solving and a process for "best fit" decisions, not just build-to-order. The Corps handles major projects in

a rational approach from cradle to grave; it can take a customer's specifications, help him or her determine his or her needs and budget, and then build the project.

In its fourth core competency, the Corps facilitates or brokers cooperative arrangements for its public and private constituencies that might have competing interests. Fifth, it offers full life-cycle project services. After it designs and builds a project for a customer, the Corps can operate it, maintain it, close it if necessary, and even clean up the remaining environmental problems. The final competency is the Corps' ability to implement public policy within the Army ethic. It diligently pursues the public good as it is directed, and safeguards the public interest in its areas of expertise.

The question is "How can the Corps enhance its capabilities for the future?" The answer is to continue ongoing engineering work; provide specialized engineering services, when and where appropriate; concentrate certain types of work in particular offices; alter division staff size and functions; and strengthen program management. The Corps has focused centers of expertise in certain locations. It has consolidated many of its capabilities within certain laboratories and field-operating agencies. It is moving toward becoming a full project management organization. Although the Corps expects to change, to develop new skills and capabilities, its core competencies will not change. The Corps cannot lose sight of its purpose, which is to deliver quality products to its customers, on time, and within budget.

GENERAL SERVICES ADMINISTRATION

Mr. Robert A. Peck
Commissioner of the Public Buildings Service
and
Mr. Myron H. Goldstein
Director, Project Management Center of Expertise

The Public Buildings Service (PBS) of the General Services Administration (GSA) is the federal government's real estate asset manager and is responsible for building, leasing, and operating federal workspace. With an annual budget of approximately $5.5 billion, PBS manages a facilities inventory of over 280 million square feet, accommodating over 1 million workers in more than 8,000 buildings.

The mission of GSA is to provide expertly managed space, products, services, and solutions at the best value and policy leadership to enable federal employees to accomplish their missions. PBS has four primary goals: to promote responsible asset management, compete effectively for the federal market, excel at customer service, and anticipate future workforce needs.

In the past several years, PBS has undergone fundamental change and has reorganized itself as a portfolio management organization. It has begun to look at capital projects as an asset base, not as a disaggregated series of discrete projects, but as an inventory as a whole. Each asset has its value and that value needs to be maintained. When new facilities are built—or it is decided that existing facilities will be renovated-it must be done in such a way that it adds value to the asset base.

The second goal is to compete effectively for the federal market. This goal resulted from the sense that the government itself should be run as a business, and that it can provide more value if it is organized efficiently. Thus, PBS two years ago told its federal clients that they no longer had to use its services if PBS did not have government-owned space available and it needed to lease in the private-sector market. That was one of the fundamental changes made in PBS, not simply in its advertising, but within its internal culture. It emphasized to PBS staff that they must win business from federal customers that previously was guaranteed.

The amount of space handled by PBS has remained relatively static for the last couple of years. Clearly, a part of the government is downsizing and that is reflected in part by PBS's space inventory and in the types of projects that it now undertakes. However, a large part of the government is expanding. The country is engaged in a court construction program unparalleled in any civilian

construction that this country has seen since the public works program of the Depression. Law enforcement agencies, including the Justice Department, Drug Enforcement Agency, Bureau of Alcohol, Tobacco, and Firearms, Federal Bureau of Investigation, and the Immigration and Naturalization Service are all expanding, which is creating a huge demand on GSA's inventory of space. Revenues to the Federal Building Fund are remaining about the same or increasing somewhat because they are tied to the size of the inventory.

Some things have changed, however. PBS employment is down 27 percent since the beginning of the Clinton Administration, from 10,000 to 7,300 employees. (Twenty years ago the staffing level was between 18,000 and 20,000). In FY 1999, about $2.6 billion, a little more than half of PBS's entire budget, will be contracted out.

When considering further downsizing and outsourcing, PBS conducted a series of analyses on each of its discrete functions to see if they measured up to those in the private sector. It found that in most cases they did. With respect to PBS's project management team, the Federal Organization Review Methodology (FORM) analysis indicated that PBS was as efficient in terms of overhead as private-sector project managers. The FORM analysis identified two areas in which PBS did not match up to the private sector: in the use of technology and in aligning its resources to the workload.

The Office of Portfolio Management has become a key function for the organization, and is one of the core competencies it intends to develop further. Specifically, greater business acumen is needed among in-house project managers. Although every project manager might not need the business acumen to figure out an internal rate of return on a project, he or she will need to be watchful of a project's bottom line.

Operating more like a business organization, PBS now provides all its staff, from the top down to the property-management level and individual facilities, with an anticipated budget and with a tracking system to tell them each quarter how they are doing within the system. This will eventually flow through to other items such as bonuses and promotions.

Centers of Expertise

PBS is organized into 11 regions and has decided that it does not make sense for every region to perform all tasks. The organization can no longer afford this redundancy due to downsizing. In addition, some staff have more experience than others and some simply do the job better than others. As PBS identifies the teams that are working the best, those teams will be assigned to do work on a national, rather than a regional, basis.

Last September, PBS announced its establishment of 12 centers of expertise, which are not only doing hands-on work around the country, but are making sure that its core competencies are maintained as the work is performed. PBS's new construction projects, planned for delivery between 1998 and 2002,

are distributed around the country, another element impelling it toward organizing centers of expertise. But in some parts of the country there will be idle technical resources, another factor moving PBS toward these centers. The next step will be for the centers to assess and organize resources to make things happen. In this new experiment, PBS is creating a virtual organization, in which not every national function needs to be headquartered in Washington, D.C. About half will be in the Washington, D.C. region, and half around the country. Functions have been placed where technical competence was determined to reside.

Project Management Center of Expertise

One of the 12 centers is the Project Management Center of Expertise. The mission of this center is to assign GSA's best project managers to the new, most highly visible, most highly complex, high-dollar projects that GSA is building. Identifying the "best in class" project managers has not been easy. In part this is attributable to PBS's desire to find the best project managers, who might not be the best architects or engineers. Management is looking for people with business aptitude and with business degrees and "people skills," people who know how to organize staffs and drive them towards a common goal of delivering a project on time and within budget.

The Project Management Center of Expertise is also in the process of identifying those projects that require a heightened level of management. The center is going to select managers who best work with the type of projects being built. They will work in a virtual state from their existing locations through the use of computers, faxes, cell phones-all the different kinds of technology available today. They will be able to manage projects anywhere in the country while in another location. This will help align resources with the workload at times when more projects are being built in one region than in others.

GSA is also implementing a management information system "toolbox." This computer technology will allow everyone associated with a project, from regional project managers to national program directors, to have access to one data source regarding a project. Management plans, schedules, budgets, expenditures, and change orders will be tracked. This project managers' toolbox should allow GSA to meet its customers' and in-house needs more efficiently and accurately.

PBS is also attempting to create several new databases that can be used nationwide. One will be for architect-engineer (A-E) selection processes. Managers in every region complete evaluations of A-E firms that have contracts with GSA. These evaluations will be entered into a database so project managers anywhere in the country can tie into it and see how an A-E firm under consideration for a contract in one region actually performed on a contract in a different region. A-E firms working with PBS must understand that consistent,

quality performance by their various national branches will be important in the selection criteria for new projects.

The Project Management Center of Expertise is in the process of strengthening the PBS team concept. Project managers will be brought into projects at the concept stage. A team of experts from around the country, either project managers or directors of the other centers of expertise, together with representatives of those agencies for whom the project is being done, will be assembled.

Another team of project managers will be developed to deal with problems. A project manager will be able to call the Project Management Center of Expertise for help and will receive support from other people who have experience with the particular problem and who will help this person succeed.

Knowledge bases will be developed for procurement methods that will take advantage of new ways to make contractor selections based on best value for the government, not based on low bid only. A "lessons learned" database for project managers will be created. Also in the first year, current practices and processes will be reviewed to identify "best practices" that can help project managers succeed and those practices from within and from outside government that can be of benefit.

In the future, PBS plans to create a learning center where less-experienced project managers will have access to information and training. The organization will try to educate its managers through project management institute certification, an assurance that they have reached a certain level of education and know how to be business — and people — managers. A mentoring program is also planned, in which people who might be considering retirement might instead choose to stay on and become a mentor to the less-experienced employees.

All the above represent a change in old paradigms, the creation of new ones, and a change in culture that is intended to be enduring. The response thus far has been positive.

Appendix A

The Forum Sponsors

The Business Roundtable is an association of chief executive officers who examine public issues that affect the economy and develop positions that seek to reflect sound economic and social principles. Established in 1972, the Roundtable was founded in the belief that business executives should take an increased role in the continuing debates about public policy.

The Business Roundtable's construction function—its only industry-specific activity—fulfills a unique role in U.S. industry. It is the only organized effort by purchasers of construction that works to improve the industry's safety, efficiency, and cost-effectiveness. In doing so, it also serves as a balance wheel between major purchasers of construction services and the union and nonunion sectors of the industry. The size of Roundtable member companies, and the breadth of the industries they represent, make it possible for the Roundtable to perform this role. Further information on The Business Roundtable is available on the Internet at http://www.brtable.org.

The Naval Facilities Engineering Command (NAVFAC), manages the planning, design, and construction of facilities for U.S. Navy activities around the world. NAVFAC provides, manages, and maintains public works, family housing, and public utilities for the Department of the Navy. It also acquires and disposes of Department of the Navy real estate, and is the program manager for Navy bachelor housing. NAVFAC provides technical, engineering, and program management support to expedite the realignment, closure, and transfer of naval bases.

NAVFAC manages all shoreside environmental projects and programs, and through its field divisions and centers, provides technical expertise to support the Navy's environmental initiatives and to interface with numerous legislative and regulatory agencies. Further information on the Naval Facilities Engineering Command is available on the Internet at http://www.navy.mil/homepages/navfac.

The Federal Facilities Council (FFC) is a cooperative association of federal agencies having interests and responsibilities related to all aspects of federal facility design, construction, operation, and management. FFC's mission is to identify and advance technologies, processes, and management practices that improve the planning, design, construction, maintenance, management, operation, and evaluation of facilities. Established in 1953, FFC operates under the auspices of the Board on Infrastructure and the Constructed Environment of the National Research Council (NRC). NRC is the operating agency of the National Academy of Sciences and the National Academy of Engineering, congressionally chartered, private nonprofit corporations. Further information on FFC and its parent organizations is available on the Internet at http://www2.nas.edu/ffc.

Appendix B

Biographical Sketches of Speakers

LIEUTENANT GENERAL (Lt. Gen.) JOE N. BALLARD became the 49th Chief of Engineers and Commander of the U.S. Army Corps of Engineers on October 1, 1996. Prior to his selection as Chief of Engineers, Lt. Gen. Ballard served as the Chief of Staff, United States Army Training and Doctrine Command, Fort Monroe, VA, since July 1995.

The U.S. Army Corps of Engineers missions include construction and environmental restoration on military installations, and the Army's vast civil works program. The Corps also assists in the recovery from natural disasters, regulates work in the nation's waterways and wetlands, conducts research and development, serves as the Army's and Air Force's real estate agent, and provides engineering services to 30 other federal agencies. The chief of engineers is the senior staff engineer for the Army.

Lt. Gen. Ballard graduated from Southern University and A&M College in Baton Rouge, LA, in 1965 with a bachelor's degree in electrical engineering and was commissioned into the Corps of Engineers. He later earned his master's degree in engineering management from the University of Missouri. He is a graduate of the Engineer Officer Basic and Advanced Courses, the Army Command and General Staff College, and the Army War College. He is a registered professional engineer in civil engineering.

Lt. Gen. Ballard's awards and decorations include the Distinguished Service Medal, Legion of Merit (four awards), Bronze Star Medal (two awards), Defense Meritorious Service Medal, Meritorious Service Medal (three awards), Army Commendation Medal (two awards), and the Army Staff Identification Badge.

JACK E. BUFFINGTON was elected to the National Academy of Engineering in 1996. Rear Admiral (RADM) Buffington (CEC U.S. Navy, Retired) is a member of the Board on Infrastructure and the Constructed Environment and chair of the Federal Facilities Council. He currently heads the Mack-Blackwell National Rural Transportation Study Center at the University of Arkansas Department of Civil Engineering, where he is responsible for directing studies by professors and students to improve life in rural America through improvements in transportation systems. RADM Buffington served for 34 years with the Naval Facilities Engineering Command (NAVFAC), rising to Commander and Chief of Civil Engineers. In this position, he led a team of

22,000 NAVFAC employees with an annual workload of $7 billion in providing engineering and contract support for environmental, design, construction, and public works operations worldwide.

RADM Buffington is a past national president of the Society of American Military Engineers and was elected to the Board of Directors of the National Institute of Building Sciences in 1996. He holds B.S. and M.S. degrees in civil engineering from the University of Arkansas and the Georgia Institute of Technology, respectively.

MYRON H. GOLDSTEIN is Director of the Project Management Center of Expertise, Public Buildings Service (PBS) in the General Services Administration (GSA). As Director, Mr. Goldstein is responsible for the project management assignments of the largest, most complex, and politically sensitive design and construction projects managed by GSA across the nation.

Mr. Goldstein served as the Director, Property Development Division, PBS, in the Heartland Region for four years. Prior to that he served in various positions during 18 years in the division, including project manager on the new Thomas F. Eagleton Courthouse in St. Louis, Missouri. The Eagleton Courthouse will contain over 1 million gross square feet with a project budget of $230 million. Mr. Goldstein was also project manager for the Bob Dole Federal Building and U.S. Courthouse constructed in Kansas City, Kansas, at a project cost of $39 million. Prior to joining GSA, Mr. Goldstein worked for five years in the private sector. He graduated from the University of Oklahoma with a B.A. in architecture.

JOHN B. GOODMAN is the Deputy Under Secretary of Defense for Industrial Affairs and Installations. In this position, Dr. Goodman is responsible for directing the department's privatization and outsourcing initiatives; developing policies and programs affecting the defense industrial base; responding to industry restructuring, mergers, and acquisitions; and managing the department's infrastructure budget and policies, including housing base closure and reuse, and economic development. Prior to his appointment in 1996, Dr. Goodman served as Deputy Assistant Secretary of Defense for Industrial Affairs.

Before joining the Department of Defense, Dr. Goodman served as a Senior Director at the National Economic Council, the White House Office responsible for coordination of economic policy. Prior to this position, Dr. Goodman was Associate Professor at the Harvard Business School (HBS), where he taught, conducted research, and consulted in the area of business strategy, international business, and international economic policy. He is the author of *Monetary Sovereignty: The Politics of Central Banking in Western Europe*, and numerous articles, chapters, reports, and HBS case studies. Dr. Goodman received his B.A. summa cum laude from Middlebury College in

1979 and his M.A. and Ph.D. degrees from Harvard University in 1983 and 1987, respectively.

GERALD H. GREENE is the manager of Global Capital Management for the Procter & Gamble Company. He has been with the Procter & Gamble Company for 33 years, primarily in engineering assignments. He is currently responsible for Procter & Gamble's engineering and construction program, which has an annual spending program of over $2 billion. Mr. Greene is also the current chairman of the Construction Industry Institute, which is an organization of owners, contractors, and academics whose mission is to improve the safety, quality, schedule, and cost competitiveness of the construction industry. He holds B.S. and M.S. degrees in civil engineering from the University of Detroit and Purdue University, respectively.

RONALD M. HOWARD has been Director-Construction for The Business Roundtable since January 1994. He is the senior staff executive of the Roundtable's Construction Committee, serves on the Board of Advisors of the Construction Industry Institute and Board of Directors of the Construction Innovation Forum. Mr. Howard is also a member of the Constructor Certification Committee of the American Institute of Constructors, the National Construction Dispute Resolution Committee of the American Arbitration Association, the National Council for Civil Engineering Research, and the American National Standards Institute A-10 Construction Safety Committee.

Prior to joining the Roundtable, Mr. Howard completed 24 years of project and construction management with Air Products and Chemicals, Inc., in Allentown, PA. While at Air Products, he directed the design and construction of industrial gas and chemical facilities worldwide and served as the company representative for both the Roundtable's Construction Committee and Construction Industry Institute.

Mr. Howard served nine years as an officer in the U.S. Army. He is a graduate of the University of Notre Dame.

REAR ADMIRAL (RADM) DAVID J. NASH, Civil Engineer Corps, United States Navy, assumed command of the Naval Facilities Engineering Command (NAVFAC) and became Chief of Civil Engineers on September 15, 1995. Before coming to NAVFAC headquarters, RADM Nash had been the Commander of the Pacific Division, Naval Facilities Engineering Command and the Third Naval Construction Brigade at Pearl Harbor, HI.

Prior to RADM Nash's assignment at the Pacific Division, he served three years in the dual roles of Commanding Officer, Naval Construction Battalion Center, and Commander, 31st Naval Construction Regiment, both located at Port Hueneme, CA. RADM Nash was commissioned in the U.S. Navy

Civil Engineer Corps in 1966 after graduation from the Indiana Institute of Technology. In the mid-1970s, he attended the Naval Postgraduate School in Monterey, California, graduating with a master's degree in financial management.

RADM Nash has a Distinguished Service Medal, two Legion of Merit Awards, a Defense Meritorious Service Medal, three Meritorious Service Medals, three Navy Commendation Medals including one with a "V" for valor, and several other individual and unit awards.

ROBERT A. PECK is Commissioner of the Public Buildings Service (PBS) in the General Services Administration. As Commissioner, Mr. Peck leads PBS, which is the federal government's real estate asset manager, and is responsible for building, leasing, and operating federal workspace. PBS manages an owned and leased inventory of over 280 million square feet, accommodating over a million workers in more than 8,000 buildings. The PBS annual budget is approximately $5.5 billion.

Prior to joining PBS in 1995, Mr. Peck was Deputy Director of the Office of Legislative and Intergovernmental Affairs at the Federal Communications Commission (FCC). Before his work at FCC, Mr. Peck was Group Vice President of External Affairs at the American Institute of Architects. He has also served on the staff of U.S. Senator Daniel Patrick Moynihan (D-NY), first as associate counsel to the U.S. Senate Committee on Environmental and Public Works, then as Senator Moynihan's Administrative Assistant (chief of staff). Mr. Peck was Deputy Director of the Federal Council on the Arts and Humanities at the White House during the Carter Administration and has held positions at the National Endowment for the Arts and the Office of Management and Budget. Mr. Peck received a B.A. in economics from the University of Pennsylvania and a law degree from Yale Law School. He has been a visiting lecturer in art history at Yale University and a Loeb Fellow in Advanced Environmental Studies at Harvard University's Graduate School of Design. He is a member of the District of Columbia Bar.

ROBERT B. PIRIE, JR., was confirmed by the U.S. Senate as Assistant Secretary of the Navy (Installations and Environment) on March 15, 1994. Mr. Pirie has over 30 years experience in defense-related work in the armed services, the civil service, and in industry. A Naval Academy graduate, he was also a Rhodes Scholar, and attended Oxford University. He served 20 years as a naval officer, culminating his service with 3 years in command of a nuclear attack submarine.

Upon retirement from the Navy in 1975, Mr. Pirie joined the newly formed Congressional Budget Office as Deputy Assistant Director, National Security. In 1977, Mr. Pirie became Principal Deputy Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics). He was nominated to be

Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) by President Carter in December 1978, and served in that position until January 1981. After leaving government service, he held a variety of positions in the private sector, including that of president of Essex Corporation, Vice President of the Center for Naval Analyses, and Vice President of the Institute for Defense Analyses. He also directed the Chief of Naval Operations' Strategic Studies Group from 1989 to 1992.

DAVID A. SKIVEN currently serves as the executive director of General Motors Corporation's Worldwide Facilities Group(WFG). As GM's center of facilities expertise, WFG is responsible for providing global leadership in the facilities, utilities, construction, and environmental segments, which allows corporate clients to focus on their core business and results in structural cost savings and improved utilization of assets.

Since joining GM's Fisher Body Division in 1970, Mr. Skiven has worked in various engineering operations. He was plant engineer at the Fisher Guide-Trenton, NJ, plant from 1981–1985. Subsequently, he was named manager of Manufacturing Planning, Industrial Engineering and Facilities at the Fisher Guide Division's General Office. In 1985, he was appointed Manager of Facilities and Future Programs-Manufacturing Engineering for the Saturn Corporation. In 1992, Mr. Skiven was promoted to Director of Plant Environment and the Environmental Energy Staff; and in early 1993, Mr. Skiven was appointed Executive Director of WFG.

Mr. Skiven has a B.S. degree from General Motors Institute and an M.S. degree from Wayne State University. He is also a registered professional engineer.

TERRY BRANDT WOOD has been a member of the Worldwide Engineering and Construction (WEC) Leadership Team of the Amoco Corporation since July 1994. First she was Manager, Project and Engineering Services, in which she managed planning and business services, drafting interface, document management, technology tools, cost engineering, and resource management. Currently she is Manager of Project Development for WEC, in which her primary responsibility is for appraising and recommending projects in the refining, chemical feedstocks, and upstream areas. In this role, Ms. Brandt Wood oversaw over $1.5 billion in capital construction in 1997. She is also responsible for the Amoco Common Process support team. This process affects and is applicable to all capital projects in Amoco.

Ms. Brandt Wood is a graduate of the University of Missouri at Rolla and has a B.S. in chemical engineering. She began her career with Amoco as a facilities engineer for several West Texas plants in January 1981, transferring to exploration and production in December 1984. She worked on a number of major construction projects and developed two patented processes for carbon

dioxide removal. She became a supervisor in July 1991, and a member of the WEC leadership team in 1994. During 1993 and 1994, she was an active participant in the reorganization of Amoco's WEC efforts.

Ms. Brandt Wood has been involved in SPE, AICHE, API Committee 75, an industry standard for offshore safety, The Business Roundtable's Construction Committee, leading the task group on workforce availability, and is a member of the board for the Armand Bayou Nature Center.