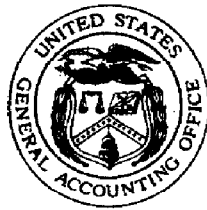


June 1994

# GENERAL SERVICES ADMINISTRATION

## Better Data and Oversight Needed to Improve Construction Management



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United States  
General Accounting Office  
Washington, D.C. 20548

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General Government Division

B-256291

June 27, 1994

The Honorable Roger W. Johnson  
Administrator  
General Services Administration

Dear Mr. Johnson:

The General Services Administration (GSA) spends millions to construct new buildings, modernize old ones, and repair and alter others. Mismanagement of this effort could result in significant costs to the taxpayers. GSA has issued many contract modifications that were potentially costly and increased GSA's vulnerability to waste and abuse. Consequently, we examined GSA's construction management efforts and assessed its use of contract modifications during the building construction process.

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## Results in Brief

GSA has had an active construction program over the last 4 years obligating nearly \$1.4 billion for major construction projects across the United States. But, GSA's construction program has experienced several significant problems. GSA data on substantially completed projects from fiscal year 1988 through the first half of fiscal year 1993 showed that over 50 percent of both 100 new construction contracts and 337 repair and alteration contracts had cost growth that exceeded the 5 percent and 7 percent, respectively, that GSA provides as a contingency for contract modifications. In fact, 43 percent of these 437 contracts had cost growth of 10 percent or more. Our detailed case studies of 12 construction contracts involving 7 projects that were substantially completed during this period showed that about 70 percent of the cost growth on these contracts—about \$8 million—was attributable to design and planning problems. A fundamental problem is that GSA lacks readily available management information for identifying potential problems and evaluating the reasons why changes occur.

More than a decade ago, we and GSA's internal auditors reported on problems related to ineffective project design and planning and the overall management of contract modifications. Although GSA has been working on these problems, it has been unable to fully resolve them. GSA recognizes that the construction program needs to be better managed and has either taken or has planned actions to improve oversight and reduce the number of costly contract changes. These initiatives appear to be steps in the right direction, but it is too early to gauge their effectiveness.

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## Background

Over the last 4 years, GSA has had an active construction program obligating nearly \$1.4 billion for 220 major projects across the United States. These projects included the construction of new federal office buildings and courthouses and the repair and alteration, or complete modernization, of older buildings. GSA's repair and alteration projects were carried out to restore building systems, materials, and equipment—such as windows and roofs—due to deterioration and malfunctions. Modernization projects were carried out to completely update, or modernize, a facility's operating systems, including new mechanical, electrical, and support systems and equipment.

Funding for major construction, modernization, or repair and alteration projects—those that cost more than \$1.65 million—must be specifically approved by Congress. Once approved, GSA contracts with private-sector firms for design and construction work. Under its construction program, GSA either hires an Architect/Engineer (A-E) firm to design the building and a general contractor to build it, or hires one contractor responsible for both design and construction. A construction management firm provides management and inspection services.<sup>1</sup>

GSA's Public Buildings Service's (PBS) Office of Design and Construction (D&C) has primary responsibility for the construction program, including project design, management and inspection, and technical services. Regional D&C staff are to (1) work with A-E contractors to develop plans, specifications, and drawings for construction; (2) examine the quantity and quality of materials and workmanship put in place by construction contractors at a construction site; and (3) generally provide technical services, including site inspections, surveys, preliminary planning, and scope development. D&C regional staff also are to work closely with contracting officers in PBS' Contracts Division. Contracting officers are responsible for the actual award and administration of contracts associated with each project.

D&C staff in PBS' Central Office are responsible for developing policy and procedural guidance, reviewing regional operations for compliance, and providing an ongoing liaison function with the regions to strengthen program management. Both Central Office and regional office D&C staff

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<sup>1</sup>The construction management firm supplements GSA's in-house construction management resources because GSA believes that contract construction managers provide specialized expertise to improve design and construction administration. For projects that exceed \$10 million, construction management contracts are negotiated separately. For smaller projects, the GSA regions have the option of using delivery orders against indefinite-quantity construction management contracts or of using other means of obtaining the required services.

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have access to GSA's Repairs and Alterations Construction Automated Tracking System (RACATS) to obtain information on construction projects.

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## Contract Modifications

While constructing, modernizing, or repairing and altering federal buildings, GSA encounters situations, such as design or engineering problems and changes in the planned use of the project, which may require that design or construction contracts be modified. When this occurs, GSA issues a written order, called a contract change order, which authorizes (1) an addition, deletion, or revision in the work and (2) associated adjustments in the contract price and/or the project's completion date. If the reason for a change appears to be a design deficiency—an error, omission, conflict, ambiguity, or other defect—GSA can assess the potential liability of the firm responsible for project design. If GSA believes the firm is liable for the deficiency, GSA can pursue recovery of cost.

Contract modifications can be initiated by any of the parties involved in the project—the construction management firm, the A-E firm, the construction contractor, or the GSA contracting officers. However, only GSA contracting officers, or their designated representatives, can approve contract changes. If a dispute arises over the scope and cost of any additional work resulting from the contract change, the contractor can seek relief through a claim which would be adjudicated by the contracting officer. If the contractor disagrees with the contracting officer's decision, the contractor can appeal the decision to the GSA Board of Contract Appeals and, beyond that, the federal courts. Contractors are required to continue work during the dispute process.

GSA does not have criteria that define an acceptable rate of cost growth on its construction contracts. However, when estimating construction costs, GSA includes a contingency to accommodate the unknown or unanticipated occurrences that can prompt contract modifications during construction. GSA's contingency is 5 percent of the estimated cost of new construction work and 7 percent of the estimated cost of repair and alteration work. The Director, Design and Construction Programs Division, told us that he did not know how GSA originally determined these contingency percentages. However, he said GSA's contingency percentages are in line with those used by other federal agencies and probably follow those used throughout the construction industry.

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## Objectives, Scope, and Methodology

Our specific objectives were to determine the number and associated costs of contract modifications, the reasons why they were issued, and whether any could have been avoided. To determine the number and costs of contract modifications, we analyzed GSA data on construction contracts for projects that were substantially completed between fiscal year 1988 and the first half of fiscal year 1993. According to GSA, a project is substantially complete when the facility can be occupied and GSA is ready to take ownership.

To determine why contract modifications were issued, we did detailed case studies of 12 construction contracts on 7 judgmentally selected, substantially completed projects in GSA's Fort Worth and New York regions. For these contracts, GSA issued 575 contract modifications, which authorized 1,117 contract changes. To determine whether any could have been avoided, we categorized the changes into four major categories—design problems, planning, upgrades, and no GAO basis to question (those that could not or should not have been anticipated). We reached agreement with regional officials on how each change was classified. We held extensive discussions with project and management officials in the two GSA regional offices and the Central Office and reviewed available documentation on the reasons for and management of contract modifications. Appendix I discusses our scope and methodology in greater detail.

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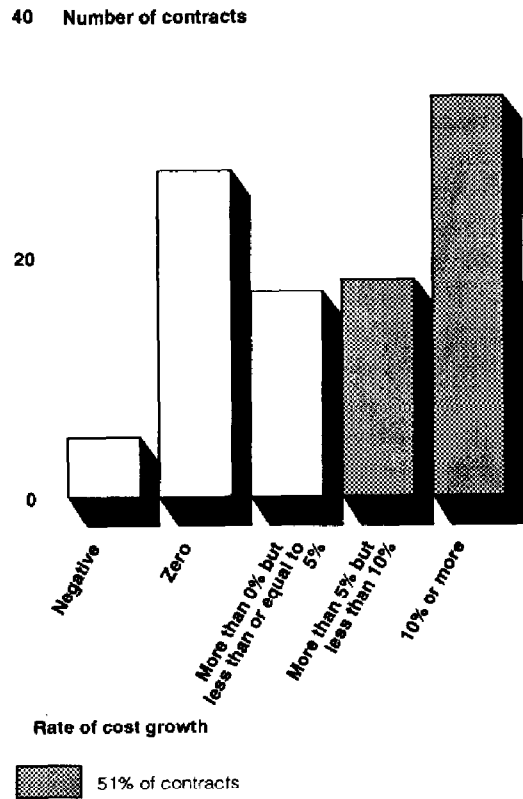
## Substantial Cost Growth on Construction Contracts

GSA's construction contract costs often grew in excess of the 5- and 7-percent contingencies for contract modifications that PBS uses when estimating the cost of new construction and repair and alteration contracts, respectively.<sup>2</sup> Our analysis of GSA data on 437 construction contracts showed that over half experienced such cost growth. Specifically, using GSA's contingencies as benchmarks, our analysis showed that (1) 51 percent of 100 new construction contracts had more than 5-percent cost growth and (2) 56 percent of 337 repair and alteration contracts had more than 7-percent cost growth. In fact, 43 percent of the 437 contracts had cost growth of 10 percent or more. Figures 1 and 2 show the extent of cost growth on new construction and repair and alteration contracts from fiscal year 1988 through the first half of fiscal year 1993.

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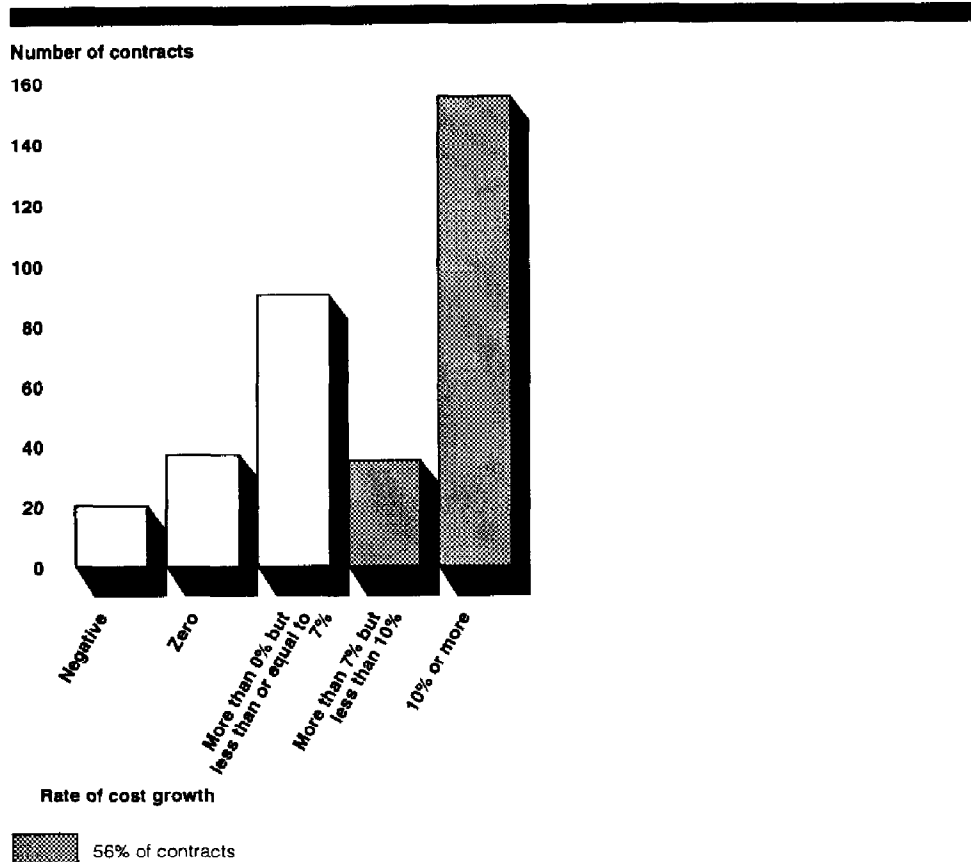
<sup>2</sup>This cost growth was measured above the actual contract award amounts and does not indicate costs exceeding authorized funds.

**Figure 1: Cost Growth on 100 New Construction Contracts**



Source: GAO analysis of GSA data.

**Figure 2: Cost Growth on 337 Repair and Alteration Contracts**



Source: GAO analysis of GSA data.

We analyzed GSA's data on the 437 contracts and found that, in the aggregate, they involved 10,807 contract modifications—8,679 that had been approved at a cost of about \$189 million and 2,128 that were awaiting approval at an expected cost of about \$43 million. Together, these modifications would increase the cost of the contracts by about \$232 million, from about \$1.42 billion to about \$1.65 billion—a 16.3 percent increase.

PBS officials said they recognized that cost growth occurs on GSA's construction contracts. However, the officials cautioned that growth can appear excessive because RACATS commingles modifications for



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unforeseen or unanticipated conditions that occur during construction and modifications to exercise contract options, which are included in the original contract and exercised at GSA's discretion. They added that exercising contract options can be expensive and may, in fact, constitute a sizable portion of the growth. However, the officials could not tell us the extent to which exercising contract options affected the rate of cost growth on our analysis.

After we discussed our analysis with PBS officials, they used the RACATS database to do their own analysis of construction contract cost growth attributable to contract modifications. PBS' analysis focused on construction contracts awarded for the 8-year period from fiscal years 1985 through 1992 for substantially completed projects and was done in response to a report by the GSA Office of Inspector General.<sup>3</sup> PBS data showed that contract modifications, including contract options that were exercised, increased the cost of GSA's construction contracts about 15.3 percent (from \$1.54 billion to \$1.77 billion)—a rate of increase consistent with the 16.3 percent increase obtained from our analysis. PBS officials told us that, in doing their analysis, they were able to identify contract options that were exercised, but only after they manually adjusted some of the data. PBS data showed that, excluding these options, contract changes increased the cost of GSA's construction contracts by about 12.4 percent.

We agree with GSA that cost growth on construction contracts is sometimes unavoidable because of the uncertainties associated with the construction process. We also recognize that it is difficult to determine if GSA's experiences related to cost growth differ from those experienced by nonfederal entities because of the different types of construction projects each do and the lack of readily available data to make such comparisons. Nonetheless, we believe that identifying the reasons why cost growth occurs, combined with efforts aimed at minimizing contract changes, are essential to sound management. Indeed, some research groups have addressed the need to control contract changes and identify their effects on cost growth. For example, in 1986, the Building Research Board of the

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<sup>3</sup>Audit of Public Buildings Service's Construction Management Program (Report Number A11047/P/6/R93017, Jan. 12, 1993). PBS' analysis focused on construction contracts that were awarded during the 8-year period for substantially completed major projects. In contrast, our analysis focused on construction contracts for major projects that were substantially completed during the 5-1/2-year period, irrespective of when the contracts were awarded.

National Research Council did a study to explore various issues related to contract modifications.<sup>4</sup> Among other things, the study concluded:

“Although it would be unrealistic and a waste of money to try to eliminate all modifications to federal construction contracts, reasonable efforts to control modifications are justified and appropriate. Two essential ingredients in an effective control effort are sensible criteria on what constitutes an acceptable contract modification rate and accurate data on actual contract modifications.”

In October 1991, the Cost/Schedule Task Force of the Construction Industry Institute sponsored a study, prepared by the University of California at Berkeley, to identify and discuss the impact of changes on projects and schedules, with a focus on the management of changes.<sup>5</sup> Among other things, this study concluded:

“Changes in the work cannot always be anticipated. New process technologies, for example, may require substantial modifications of a partially completed facility. But, many, if not most, changes could be prevented or mitigated by serious use of constructability studies, joint owner-engineer-constructor detailed review of designs before commencing construction, and aggressive in-process management of the work by the owner and contractor. A special effort should be made during project design to assure accuracy and completeness of the contract documents and information related to site conditions.”

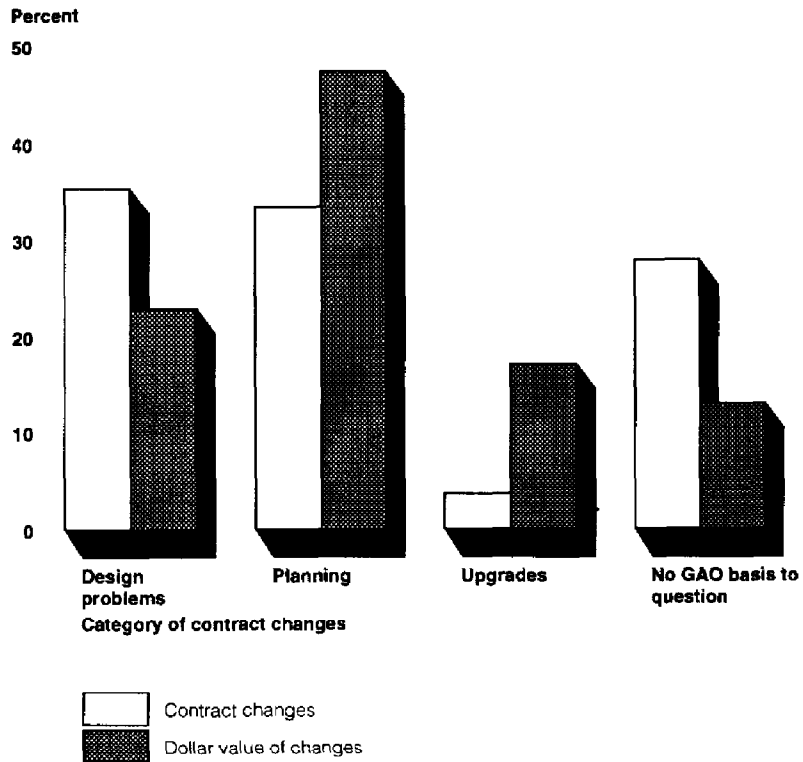
## Design and Planning Problems Major Contributor to Cost Growth

Our detailed case studies of 12 construction contracts for 7 major projects showed that contract changes to overcome design and planning problems were a major contributor to contract cost growth. The actual cost of the work for the 12 contracts exceeded the original contract award amount by a total of \$11.7 million, or about 13 percent. Of the 1,117 contract changes, 767 (about 69 percent) accounted for 70 percent of the cost growth and were authorized to overcome design problems or planning shortfalls—including changes to the building and changes prompted by tenant requests—that were not resolved until after construction started. Figure 3 shows the percentages of changes and their respective dollar value for each of the categories.

<sup>4</sup>Construction Contract Modifications: Comparing the Experience of Federal Agencies With Other Owners. Committee on Construction Change Orders, Building Research Board, National Research Council. Washington, D.C.: National Academy Press, 1986.

<sup>5</sup>Construction Changes and Change Orders: Their Magnitude and Impact (Source Document 66, issued Oct. 1991). The Construction Industry Institute contracted with the University of California at Berkeley (Weston T. Hester, John A. Kuprenas, and T. C. Chang) for the study. The Institute is a part of the Bureau of Engineering Research, University of Texas at Austin.

**Figure 3: Analysis of 1,117 Contract Changes and Their Respective Dollar Values by Category**



Note 1: The 1,117 contract changes have a dollar value totaling \$11.7 million.

Note 2: For the 12 contracts we analyzed, GSA exercised one contract option valued at about \$254,000. GSA officials agreed that this option should be classified in the No GAO basis to question category.

Source: GAO analysis of GSA contract files was based on agreement of GAO and GSA officials with categorizations.

As shown in figure 3, design problems accounted for about 35 percent of the contract changes and contributed to approximately 23 percent of the cost growth. These changes, which GSA officials agreed were attributable to design problems, were authorized to overcome errors and omissions in the original drawings and specifications. For example, GSA modified one contract at a cost of about \$267,000, to accommodate a change to the design and specifications of a chandelier in a courtroom that, if installed as originally designed, could have caused safety problems. In another

instance, GSA authorized a change, valued at about \$110,000, to add toilets to jail cells because the toilets were omitted from the original drawings. In another case, GSA had to authorize a change, valued at about \$22,000, to increase the amount of plaster used on bathroom walls because the original drawings did not call for plaster of sufficient thickness to hold the ceramic tiles that were called for in the drawings.

The need to overcome planning shortfalls accounted for about 34 percent of the changes and contributed to about 47 percent of the cost growth. GSA officials agreed that these changes were attributable to work that could have or should have been anticipated and included in the original scope of the project. They included GSA not fully considering basic building requirements or not fully resolving tenant needs before construction. For example, on one modernization project, GSA authorized numerous changes, valued at approximately \$1.1 million, for asbestos abatement because the entire building contained asbestos and GSA did not do thorough asbestos testing before the work started. On a new construction project, GSA issued a change, valued at about \$73,000, to raise the height of a basement ceiling after a tenant realized that the basement would not accommodate its vehicles equipped with emergency lights. In addition, on three separate courthouse projects, GSA modified construction contracts to change the type or placement of wood paneling, molding, benches, desks, and bookcases to accommodate requests by the Courts because the tenants changed their requirements after construction began. Together, these changes to courthouses were valued at about \$198,000.

GSA officials also agreed that upgrades accounted for about 4 percent of the changes and 17 percent of the cost growth. These changes were approved to upgrade space beyond that which GSA normally considers standard and, also, could have constituted a planning shortfall because they were not resolved before construction started. For example, in one new office building, GSA authorized a change, valued at about \$33,000, to accommodate a tenant request to upgrade ceramic tile to marble tile. On a modernization project, GSA authorized a change, valued at about \$495,000, to upgrade several floors of office space to accommodate the request of a tenant. Among other things, the change provided enhanced security, such as enclosed elevator lobbies and alarms, valued at about \$300,000.

Although we were able to identify the cost of particular changes, we were unable to fully quantify the portion of the costs, if any, attributable to cost exposure—the additional cost to the government above and beyond what the work would have cost had it been included in the original design.

However, GSA officials did estimate that the work prompted by 61 of the 767 contract changes for overcoming design and planning problems had a cost exposure of approximately \$302,000. Both GSA officials and some studies acknowledge that using contract modifications to do construction work is generally more expensive than including the work in the original contract. Contract modifications are essentially negotiated sole source procurements and do not benefit from full and open competition. Procurement procedures endorse full and open competition as the best means of getting the best price.

The existing records did not allow us to identify the specific causes for design and planning problems in our case analysis. However, according to GSA officials, design and planning problems can arise for a variety of reasons, including

- errors and omissions by A-E firms;
- ineffective communication among GSA, A-E firms, and tenants during the design and planning process;
- limited design reviews on the part of GSA project staff because GSA relies heavily on the professional integrity of A-E firms, which are supposed to provide design documents that are complete and accurate;
- needs and technology change over time—especially during the substantial lag time between a project's initial design and the start of construction (as much as 5 years)—and GSA does not always go back to tenant agencies for input before construction for fear it will increase project time; and
- tenants changing their requirements after construction begins; GSA officials told us that, in recent years, they have been more willing to accommodate tenant requests for changes because GSA has become more client-oriented.

GSA officials recognize that actions are needed to better plan projects and control changes on its new construction, modernization, and repair and alteration projects. The actions they anticipate taking have the potential for reducing contract modifications on GSA construction contracts. For instance, in January 1992, PBS' Office of Planning in GSA's Central Office reviewed PBS planning operations in GSA's Fort Worth region and identified concerns about the number of project changes that had resulted in increased cost estimates and schedule delays. In response, the region formed a task force, which, in January 1993, recommended that the region (1) involve clients and building managers in all phases of the planning process to improve the identification of project scope and (2) develop written guidance for PBS offices to help agencies understand why scope changes must be minimized. The task force also recommended that the

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region work to develop accurate project scope, estimates, and schedules and to clarify through a regional policy statement what GSA can and cannot do when a scope change arises.

In a memorandum to the region, the Assistant Commissioner for Planning expressed confidence in the measures put forth by the task force to address project scope changes. The Assistant Commissioner also pointed out that he recognized the many difficulties associated with the project development process, but added that "it is important that such changes be held to an absolute minimum." The Assistant Commissioner provided a copy of the task force report to the other GSA regions.

GSA has also taken a major step to refine the planning process through the Prospectus Development Study—a planning tool whereby GSA establishes the scope and budget for major construction and alteration projects. First introduced in 1989, this study is supposed to better define project requirements and, among other things, provide the basis for the design A-E's scope of work. In doing so, it is supposed to address such things as building system requirements, tenant agency needs, project opportunities and constraints, and design criteria and approach. It is also supposed to help uncover potential problem areas which can influence final scope and project budget.<sup>6</sup>

We could not evaluate whether these studies have affected the volume of contract changes on projects because, at the time of our review, no projects that had been the subject of a Prospectus Development Study had reached the point of substantial completion. However, the Prospectus Development Study appears to have potential as a valuable tool for reducing the number of contract changes. This is because it focuses attention on project requirements, such as tenant needs and design criteria, and could help GSA deal with the problems that precipitate contract changes during the construction process.

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## Construction Program Oversight Impeded

GSA is not in a very good position to effectively oversee and manage the construction program. Its RACATS management information system does not produce complete and readily available data to identify project cost growth so that D&C staff can identify or target potential problems, identify the changes to all contracts associated with individual projects, and

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<sup>6</sup>For alteration projects, GSA also does Building Engineering Reports, which are primary source documents for preparing Prospectus Development Studies. These reports are used to define the existing building conditions and establish work items to correct deficiencies. GSA is supposed to do a report on individual buildings every 5 years.

evaluate the reasons why such changes occur. Furthermore, our work showed that RACATS data contain discrepancies. In addition, GSA lacks criteria to measure cost growth and target areas needing immediate and continuing management attention.

Although RACATS does provide some data on construction contract changes and their associated costs, RACATS does not provide complete and readily available information for GSA to adequately troubleshoot and respond to problems as they occur. For instance, RACATS does not systematically provide data on why contract changes occur nor does it generate information on the changes to A-E and construction management contracts associated with the project—the type of information that is important for effective oversight. Some of this information could be developed from detailed project analysis and discussions with project officials, but it is time consuming to obtain information in this manner. Unless information on changes to all contracts associated with a project is available consistently and systematically, it is of little value.

In addition to the lack of complete and readily available data to help manage the program, we also noted instances where existing data were incomplete or inaccurate. For example, a construction contract on one of our seven projects was not originally included in the data provided to us on substantially completed projects by the Central Office. After some inquiry, Central Office officials told us that the contract for that particular project had been inadvertently purged from the RACATS system. Central Office staff subsequently provided records on that particular construction contract. In another instance, we noted that dollar amounts for some modifications on one contract were not entered into RACATS. GSA officials acknowledged the errors and said they would make corrections. Also, on one of our seven projects, the dollar amounts for modifications to one contract were entered twice into RACATS.

GSA officials were aware of problems with RACATS and had begun to take steps to replace the system with a new management information system. According to officials in PBS' Office of Public Buildings Service Information Systems, significant upfront planning has been done to address shortcomings in the current RACATS; and, until recently, GSA had planned to develop a new system. A GSA official told us that the specific pieces of data in the new system related to contract modifications would not be known until a prototype was developed and agreed to. According to the Assistant Commissioner for Public Buildings Service Information Systems, the original plans called for a development project to begin on October 1,

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1993, and to be completed in 9 to 12 months. However, according to this official, because of reinvention, the approach to the replacement of RACATS and other PBS information systems was being reevaluated.

PBS' efforts to replace RACATS have the potential to enhance D&C's ability to manage and oversee PBS' construction program. However, it is important that any new system (1) contain enough information so that GSA can consistently and systematically identify all contract cost growth and determine why it is occurring, (2) be structured so that GSA has information sufficient to determine why a particular contract modification was needed, and (3) allow managers to evaluate modifications in relation to overall contract and project trends. Furthermore, it is essential to good management that PBS develop criteria or benchmarks for defining an acceptable level of cost growth on its contracts. As previously mentioned, we used GSA's 5- and 7-percent contingencies for unanticipated occurrences as our benchmarks for measuring cost growth because GSA had not established specific cost growth benchmarks. As part of developing criteria for what constitutes an acceptable level of cost growth, GSA could develop such benchmarks that would enable managers to consistently identify and measure excessive cost growth and target potential problem projects.

In our view, PBS would then be in a better position to (1) analyze contract modifications on an ongoing basis, (2) measure the types and reasons for contract modifications in relation to planning tools like the Prospectus Development Study, and (3) evaluate and measure the performance of PBS contractors and regions. PBS could then share this information with GSA officials in regional offices, alert them to the types of problems being encountered, and put them in a position to take steps to address them on future projects. Such measures would be consistent with the spirit of the Vice President's National Performance Review, which, among other things, calls for agencies to begin to develop and use performance monitoring systems and targets.

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## Problems With GSA Construction Contract Changes Not New

GSA's construction program has experienced similar problems for more than a decade. In 1981 we issued a report<sup>7</sup> that showed construction contract modifications, or change orders, had been a significant trouble area for GSA. In the report, we said that a high percentage of GSA construction change orders had been required because of design

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<sup>7</sup>What Has GSA Done to Resolve Previously Reported Problems In Its Construction Program? (GAO/PLRD-81-7, Mar. 27, 1981).



deficiencies and that inadequate or ineffective design reviews were at the root of the problem. The report recognized that GSA's internal auditors found similar problems. We also pointed out that communication breakdowns among GSA, design firms, tenant agencies, and construction contractors had been a serious problem. We said that failure to communicate effectively during the design phase of a project showed up in the construction phase as project delays, change orders, and cost increases.

Shortly thereafter, in 1982, the President's Council on Integrity and Efficiency (PCIE) sponsored a governmentwide audit of construction contract change orders that focused on the management and control of more than 2,000 change orders processed by 5 government construction agencies, including GSA. The PCIE pointed out that the large number of change orders was due, in part, to a general lack of emphasis on minimizing changes to contracts. Among other things, the PCIE said that about 80 percent of the change orders it reviewed were attributable to design and specification deficiencies, differing site conditions, and user requests.

GSA's Office of Inspector General (OIG) has also issued several reports that criticized GSA's management of construction contract changes. For example, in 1985, the OIG did a report on the administration of PBS' repair and alteration program for government-owned space that discussed, among other things, a contract modification that appeared to be authorized for work that was beyond the scope of a project.<sup>8</sup> In 1989 and again in 1990, the OIG criticized GSA's Kansas City Region for its administration of contract modifications.<sup>9</sup> More recently, in March 1993, the OIG found problems with the administration and control of contract modifications in the National Capital Region.<sup>10</sup>

GSA's Office of Acquisition Policy in the Office of the Administrator has also identified problems with contract modifications. In April 1993, the Office issued the results of a Special Emphasis Procurement Management Review of construction and A-E contract modifications. The review team

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<sup>8</sup>Review of Repair and Alterations of Government-Owned Space (Report Number A30184/P/W/R5091, June 24, 1985).

<sup>9</sup>Review of Region 6's Administration of Change Orders Under Contract No. GS06P88GYC0009 (Report Number A80790/P/6/R89090, Mar. 10, 1989) and Review of Region 6's Administration of Design Deficiencies (Report Number A90581/P/6/R90067, Mar. 12, 1990).

<sup>10</sup>Audit of the Administration of Major Repair and Alteration Contracts in the National Capital Region (Report Number A23048/P/R/R93028, Mar. 11, 1993).

found that there is very little adherence to existing policies and procedures regarding contract modifications. For instance, the team found numerous modifications for work that was either beyond or outside the scope of the original contract; A-ES were not being held accountable for their design deficiencies because contract modifications were not properly documented; and contracting officers were not obtaining necessary approvals, concurrences, and coordinations to enable informed decisions about issuing change orders.

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## Conclusions

GSA's construction program continues to have significant problems. Construction contracts experience substantial cost growth, many contract changes that contribute to cost growth are authorized to overcome design and planning problems, and incomplete and inaccurate data—combined with a lack of criteria for measuring and evaluating cost growth—impedes effective program oversight. These problems are not new and, in fact, GSA has faced recurring criticism because of problems associated with the management and administration of contract modifications.

GSA has initiated some steps that have the potential to improve the management of the construction program and help it avoid some of the design and planning problems that contribute to contract modifications. However, without sustained attention to better upfront design and planning and improved data to identify and monitor problems and better manage the program, GSA can expect to continue to experience substantial cost increases on its contracts and will not be in a good position to head off problems before they occur.

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## Recommendations

We recommend that GSA Administrator direct the Commissioner, Public Buildings Service, to

- improve construction program oversight by ensuring that any new management information system provides readily available, complete, and accurate information that will allow systematic analysis of contract cost growth and the reasons why cost growth occurs on all contracts associated with each construction project;
- develop criteria for defining an acceptable level of cost growth for all contracts related to new construction, modernization, and repair and alteration projects to measure cost growth, evaluate contract performance, and identify potential problem areas; and

- systematically and periodically evaluate contract changes to identify the causes for design and planning problems, implement approaches for resolving those problems, and develop strategies for strengthening the design and planning process so problems do not recur.

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## Agency Comments and Our Evaluation

GSA's written comments dated April 18, 1994, were concerned about the general thrust of the draft report. The primary concern seemed to center on the report's discussion of cost growth. GSA maintained that some degree of cost growth is to be expected on major construction contracts, especially since planning, design, and construction can span several years. Related to this, GSA said that case law on design deficiencies has established that contract documents are not expected to be perfect and that additive changes are often necessary to correct an acceptable level of design errors, omissions, and ambiguities. GSA also said that (1) the budgetary allowances they use when estimating the cost of construction contracts are consistent with those used by other federal construction agencies and (2) cost growth associated with exercising contract options and reimbursable work requested by agencies after contract award should not be included when measuring total cost growth against budgetary allowances. GSA's comments are presented in appendix II.

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## Cost Growth

We agree that limited cost growth is not unusual on major construction contracts. Our report recognizes this and says that cost growth on construction contracts is sometimes unavoidable because of the uncertainties associated with the construction process. More importantly, the report stresses the need for GSA to manage cost growth by reducing recurring design and planning problems, establishing benchmarks or criteria for measuring and targeting excessive cost growth, and improving readily available data to oversee and manage construction projects. A system to readily identify why cost growth occurs, combined with efforts to minimize contract changes, are critical to managing cost growth. This is especially true at GSA since (1) over 50 percent of the 437 new construction and repair and alteration contracts in our analysis exceeded the 5- and 7-percent budgetary allowances, or contingencies, for contract modifications that PBS uses when estimating construction contract costs; (2) design and planning problems contributed to 70 percent of the cost growth on the contracts in our case studies; and (3) design and planning problems have plagued GSA's construction program for more than a decade.

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Our review did not specifically address design deficiencies—a term used to describe errors, omissions, or ambiguities that result from professional negligence on the part of the A-E firm. It simply covered design problems in general. The determination of a design deficiency rests with the various contracting officers involved in the design and construction process, and our analysis was not fashioned to determine which of the design problems were design deficiencies. In doing our case studies, we collaborated with GSA officials who agreed with our characterization of design problems, which in the aggregate accounted for about 35 percent of the contract changes and approximately 23 percent of the cost growth. According to GSA officials, design problems occur for a variety of reasons including errors and omissions by A-E firms, limited design reviews on the part of GSA staff, and ineffective communication between GSA and A-E firms during the design process.

We recognize that some design errors, omissions, or ambiguities will occur and that contract changes and associated costs are a recognized reality in the construction industry. On the other hand, excessive contract changes to accommodate avoidable problems can be expensive and delay project completion. The incidence of design and planning problems in our case studies—combined with GSA's inability to readily detect these problems—raises questions about GSA's ability to effectively manage contract cost growth and identify actions to curtail costly contract changes before construction begins. This is especially pertinent given GSA's commitment to take a more businesslike approach to reduce costs as shown by the recent "time-out and review,"—a process intended to yield significant savings to the taxpayer.

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## Budgetary Allowances

We do not take issue with GSA's budgetary allowances. In fact, we point out that the Director of the Design and Construction Programs Division said that budgetary allowances are in-line with those used by other federal agencies and probably follow those used throughout the construction industry. We used GSA's budget allowances of 5 and 7 percent for new construction and repair and alteration contracts as benchmarks to gauge construction contract cost growth because GSA had not yet established criteria for targeting excessive cost growth. Our intent was not to criticize these budgetary allowances but simply to give some perspective to contract cost growth.

We also recognize that contract options, planned for in the original contract and exercised after award, should not be considered when

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determining excessive cost growth. In fact, our report gives GSA credit for trying to manually break out contract options in doing their own analysis of contract changes and associated cost growth. Unlike contract options, however, reimbursable work which is not reflected in the original contract and is approved after contract award does not benefit from full and open competition—the best means of getting the best price. Regardless of which agency pays for the change, any additional costs associated with these changes are still the responsibility of the government and, ultimately, the taxpayer.

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## Management Information System

GSA agreed that an improved management information system would enhance GSA's ability to manage and oversee its construction program, including the associated construction contract modifications that contribute to cost growth. GSA provided additional information on actions it is taking or considering to improve the project planning process and thus to reduce costly contract modifications.

GSA also made two clarifying comments. One of the comments proposed language changes to more accurately reflect a statement made by a GSA official and we made this change in the final report. The other comment was related to our second recommendation—develop criteria for defining an acceptable level of cost growth for all contracts related to new construction, modernization, and repair and alteration projects to measure cost growth, evaluate contract performance, and identify potential problem areas. GSA said that the recommendation was not entirely clear and their interpretation is that it applies only to individual construction contracts. This interpretation is too narrow. As previously mentioned, the recommendation refers to all contracts related to a construction project, such as A-E and construction management contracts, and not solely to construction contracts. We believe that the language we used conveys this meaning and therefore no change to the recommendation is needed. GSA did not comment on the other recommendations.

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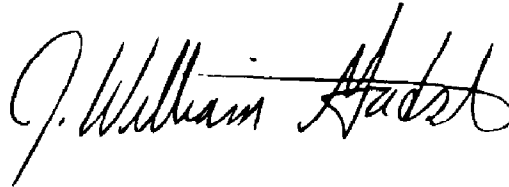
As you know, 31 U.S.C. 720 requires that the head of a federal agency submit a written statement of actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days

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after the date of the report. We would appreciate receiving a copy of this statement.

We are sending copies of this report to appropriate congressional committees and the Director of the Office of Management and Budget. We will also make copies available to other interested parties. This report was done under the direction of Michael E. Motley, Associate Director, Government Business Operations Issues. Major contributors to this report are listed in appendix III. If you have any questions or would like additional information, please contact me on (202) 512-8387.

Sincerely yours,

A handwritten signature in black ink, reading "J. William Gadsby". The signature is written in a cursive style with a large initial "J" and a long, sweeping underline.

J. William Gadsby  
Director, Government Business  
Operations Issues



# Objectives, Scope, and Methodology

The objectives of this assignment were to determine the number and associated costs of contract modifications, the reasons why they were issued, and whether any could have been avoided. To meet our objectives, we met with officials from GSA's Central Office and two of its regions—Fort Worth and New York—including the Office of Real Property Development, Office of Design and Construction and Office of Procurement. We selected these regions for detailed review because both had major construction projects that were substantially completed. According to GSA, a substantially completed project is one where the facility can be occupied and GSA is ready to take ownership.

To determine the number of contract modifications and their associated costs, we obtained and analyzed data from PBS' Repairs and Alterations Construction Automated Tracking System (RACATS). RACATS is the official management information system for managing and tracking repair and alteration and new construction projects in PBS. The data, which were generated during March and April 1993, listed new construction and repair and alteration contracts on major projects (projects that cost more than \$1.65 million) that were substantially completed between October 1988 and April 1993. For this period, GSA provided complete data on 435 contracts. In doing our field work, we noted 2 additional contracts that should have been included in this universe; thus, our analysis is based on 437 contracts. We did not validate the accuracy and reliability of the data GSA provided because of resource limitations and time constraints. However, when we found discrepancies, we made adjustments to our data.

To determine the reasons why contract modifications were issued and whether any could have been avoided, we analyzed the construction contracts on seven substantially completed projects. We judgmentally selected the seven projects representing three different types of construction projects—new construction, repair and alteration, and modernization—based on discussions with GSA officials, the dollar value of the projects, and the large volume of documents associated with GSA's construction projects that were available to review. The projects we selected in GSA's Region 2 (New York) were: J. W. McCormack Post Office and Courthouse, Boston; Abraham A. Ribicoff Federal Building and Courthouse Annex, Hartford; Martin Luther King, Jr., Federal Building and Courthouse, Newark, NJ; and Robert A. Roe Federal Building, Paterson, NJ. In GSA's Region 7 (Fort Worth, TX), we selected the Dennis Chavez Federal Building, Albuquerque, NM; F. Edward Hebert Federal Building, New Orleans; and U.S. Postal Service Terminal Annex, Dallas. The seven



projects reached the point of substantial completion between May 1988 and November 1992.

Once we selected the projects for review, we obtained and analyzed project and contract files, including files on contracts for design, construction, and, where applicable, construction management. For each of the seven substantially completed projects, we examined the GSA forms for processing, justifying, and approving construction contract modifications. We focused primarily on the 12 construction contracts where the award amount for each was greater than \$500,000. The cost growth on these contracts ranged from a low of 1 percent to a high of 40 percent.

In doing our analysis, we relied heavily on information recorded on two GSA forms—the Standard Form 30 and the GSA Form 2437. The Standard Form 30 (Amendment of Solicitation/Modification of Contract) is the official document completed by GSA procurement officials that, when dated and signed by a contracting officer, is issued to the contractor to formally modify the contract. Form 2437 (Finding for Contract Modification) is prepared before Form 30 to officially record the facts and circumstances surrounding the conditions that prompted the contract change.<sup>11</sup>

Form 2437, which is completed by GSA D&C officials, such as the contracting officer's representative, management and inspection officials, or construction manager requires that the responsible official (1) provide written justification for the change and (2) check off 1 of 10 reasons why the modification is needed. The reasons available for checking are: design deficiency, unforeseen/differing condition, agency request, value engineering/cost reduction, project acceleration, stop work/termination, liquidated damages, government furnished property, time extension for excusable delay, and other.

Our analysis of these forms focused primarily, but not exclusively, on (1) the reason for the change as recorded on the Form 2437 and (2) the corresponding narrative on both the Form 2437 and the Form 30. During the early stages of our work, we noted variations in how each of the two regions packaged and recorded their contract modifications on the Forms 30 and 2437. In Fort Worth, file documents for the three selected projects generally showed that one contract modification form was used to document one contract change. In contrast, the New York region usually

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<sup>11</sup>GSA revised the Form 2437 in September 1992. The form is not now identified by number.

consolidated, or bundled, unrelated changes on a single modification form. As a result, for the modifications we reviewed on the four New York projects, we unbundled a modification into its discrete changes. This gave us a common base for analyzing modifications for projects in both the Fort Worth and New York regions.

After initially reviewing file documents, we developed various categories for classifying contract changes. We then consulted with GSA regional officials to discuss our categories and to further refine our definitions. Table I.1 shows our categories and associated definitions.

**Table I.1: Definitions of Categories Used for Analysis**

Category	Definition
Design problems	Contract modifications which resulted from errors or omissions, as indicated by GSA officials and/or as indicated on the GSA Form 2437.
Planning	Contract modifications where one could reasonably expect that the work could or should have been anticipated and included in the project's scope of work. These modifications included (1) changes to the building such as exterior treatments, lighting, and common areas and (2) tenant requirements or tenant-changed requirements not made known prior to construction, for whatever reason.
Upgrades	Contract modifications which were authorized to add items above an agency's basic requirements, i.e., above standard items.
No GAO basis to question	Contract modifications which were authorized as a result of the need to satisfy a new mandate or requirement, an unforeseen site condition, or administrative changes. In other words, these modifications resulted from the need to address or correct a condition which reasonably could not or should not have been anticipated.

Using these categories, we then reviewed the file documents in detail and categorized individual changes. After doing so, we gave responsible GSA regional officials tables that showed how we categorized each contract change and asked them to review our work to determine if we appropriately placed each change in its appropriate category. These officials, including responsible contracting officers, contracting officers' representatives, D&C and Contracts Divisions' management, and the Assistant Regional Administrators for PBS, reviewed our tables and subsequently told us whether we had appropriately classified each change. GSA officials did not, in all cases, agree with our initial classification and where they disagreed, additional information was provided. At the end of this process, we reached agreement with regional officials in the two GSA regions on how each change was classified. Although our findings are not projectable to the universe of GSA's construction projects, the case study

approach provides specific illustrations of why contract modifications were issued and whether they could have been avoided.

In doing our work, we also did a literature search on the reasons for and management of contract modifications on public and private-sector construction projects. We also interviewed GSA officials to get their views about why design and planning problems occur on GSA projects, in general, and on the seven projects we selected, in particular. During our interviews, we also discussed efforts that GSA is taking to improve the overall management of construction projects, particularly construction contract modifications, and obtained information about those efforts. Furthermore, we obtained and reviewed reports prepared by GSA's Office of Inspector General and the Office of Acquisition Policy related to the construction program.

We did our audit work between October 1992 and November 1993, in accordance with generally accepted government auditing standards. We have included GSA's written comments on a draft of this report in appendix II and summarized them at the end of the report.

# Comments From the General Services Administration



Administrator  
General Services Administration  
Washington, DC 20405

April 18, 1994

The Honorable Charles A. Bowsher  
Comptroller General  
of the United States  
General Accounting Office  
Washington, DC 20548

Dear Mr. Bowsher:

Thank you for the opportunity to respond to the General Accounting Office's report entitled "Better Data and Oversight Needed to Improve Construction Management." The report addresses the issue of cost growth on the General Services Administration's (GSA's) major construction and rehabilitation projects due to contract modifications during the construction process.

Effective management of our major construction and rehabilitation project costs is a primary concern for GSA. We are concerned not only with controlling cost growth during construction, but also with critical review of initial project requirements and associated budgets. Our commitment to reducing costs is evidenced by our recent "time-out and review" of all projects not yet in construction, which is yielding significant savings to the taxpayers.

On the other hand, we maintain that some degree of cost growth is to be expected on major construction projects, and that some of this cost growth is necessary as the least-cost method of meeting the government's requirements. Given the span of time for project design and construction and the dynamic nature of our customer agencies' housing needs, it is inevitable that changes will occur after contracts are placed.

Accordingly, we have a number of concerns about the general thrust of the draft report, as well as some specific comments on its content. These matters are summarized in an enclosure.

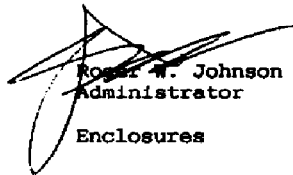


Appendix II  
Comments From the General Services  
Administration

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GSA appreciates the time and effort that the General Accounting Office has expended in developing this report on our construction management process. This agency looks forward to working with your staff on further improving the management of GSA.

Sincerely,

  
Roger W. Johnson  
Administrator  
Enclosures

COMMENTS ON DRAFT REPORT

**"Better Data and Oversight Needed  
to  
Improve Construction Management"**

Limited cost growth is normal and expected on major construction contracts. The planning, design and construction may span several years. The government's requirements, and especially the tenant agencies, cannot be expected to remain static during this time. In some cases, our bid sheets include unit pricing for tenant buildout work to accommodate some of these anticipated changes. As a separate issue, case law on design deficiencies has established that contract documents are not expected to be perfect. Additive changes are often necessary to correct an acceptable level of design errors, omissions, or ambiguities. Thus, contract changes and the associated cost growth are a recognized reality in the construction industry. The budgetary allowances we provide for such cost growth are consistent with those used by other Federal construction agencies. (See the attached chart on results of a recent survey of other agencies.)

There are two categories of cost growth which these budgetary allowances do not cover - contract options exercised after award and reimbursable work requested by tenant agencies after award. The former are based on bid pricing factored into the basis of award and the latter are necessary for responsiveness to customer needs. Hence, we would not expect the total cost growth on contracts necessarily to be within the budgetary allowances.

Our prospectus development study (PDS) process is mentioned in the report, as a positive step GSA has undertaken to improve up-front planning and thereby reduce avoidable cost growth due to changes during construction. This process was adopted specifically to improve project scope and cost control, because of the kinds of problems documented in the report's findings. As indicated in the report, it is too early to fully document the results of this initiative. It is clear to our management that our project planning process has been significantly improved.

In addition, we are now enhancing the PDS process because we believe it can go further to ensure that the project requirements identified in the planning stage will hold up better through construction. Our enhanced process will provide for the design architect-engineer (A-E) to be brought on-board at the planning stage. The A-E will participate in developing requirements, scope, and budget, and will provide preliminary design concepts prior to project authorization and funding. After prospectus approval, the A-E will provide definitive design. We believe this approach will greatly improve continuity of project requirements, scope, and budget through planning and design and into construction.

Appendix II  
Comments From the General Services  
Administration

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Another measure we are using to curtail cost growth applies when favorable bids are received on a construction contract. When an award is made significantly below estimated cost, the project manager's working budget is reduced accordingly, to remove the excess balance available for additive change orders. This procedure is currently in place for our major rehabilitation projects. We are considering a similar arrangement for new construction projects, although these often entail the added complexity of multiple bid packages for succeeding phases within a single project budget.

Finally, we agree with the report's finding that an improved management information system would enhance our ability to manage and oversee our construction program, including the associated construction contract modifications. In response to the Vice President's National Performance Review, GSA is in the process of converting many of its functions, including capital project development, to a more competitive, business-oriented approach. In conjunction with revising our real estate development business practices, we are examining options for use of commercial, off-the-shelf software (COTS) to better support our management information needs in all related areas, including construction. For the interim until this conversion is complete, we plan to make accommodations insofar as possible within our existing system (RACATS) to improve management information on construction contract modifications.

We have two comments on specific text within the report, as follows:

1. Remarks by the GSA Assistant Commissioner for Public Buildings Service Information Systems (PBS/IS) are not correctly represented. Specifically, the last sentence of the middle paragraph on page 26 of the draft report should read: "Because of reinvention, the approach to the replacement of RACATS and other PBS information systems is being re-evaluated."

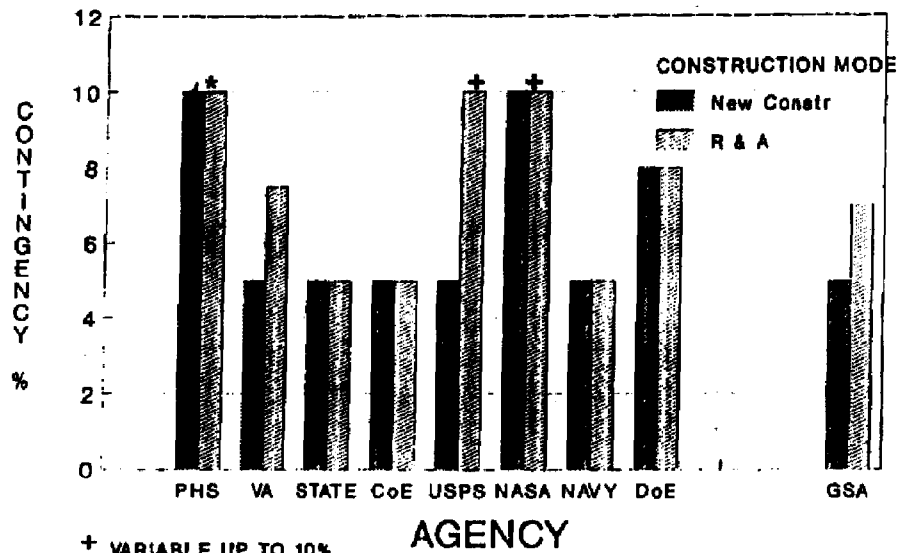
2. The meaning of the second recommendation appearing on page 32 is not entirely clear. We believe that the intent is for GSA to: (1) develop means for setting target levels of acceptable cost growth on individual construction contracts; and (2) establish program-level measurement and evaluation systems on actual versus target cost growth. The recommendation should be more clearly stated.

Now on p. 14.

Now on p. 16.

## AGENCY SURVEY

### POST CONSTR CONTRACT AWARD CONTINGENCIES



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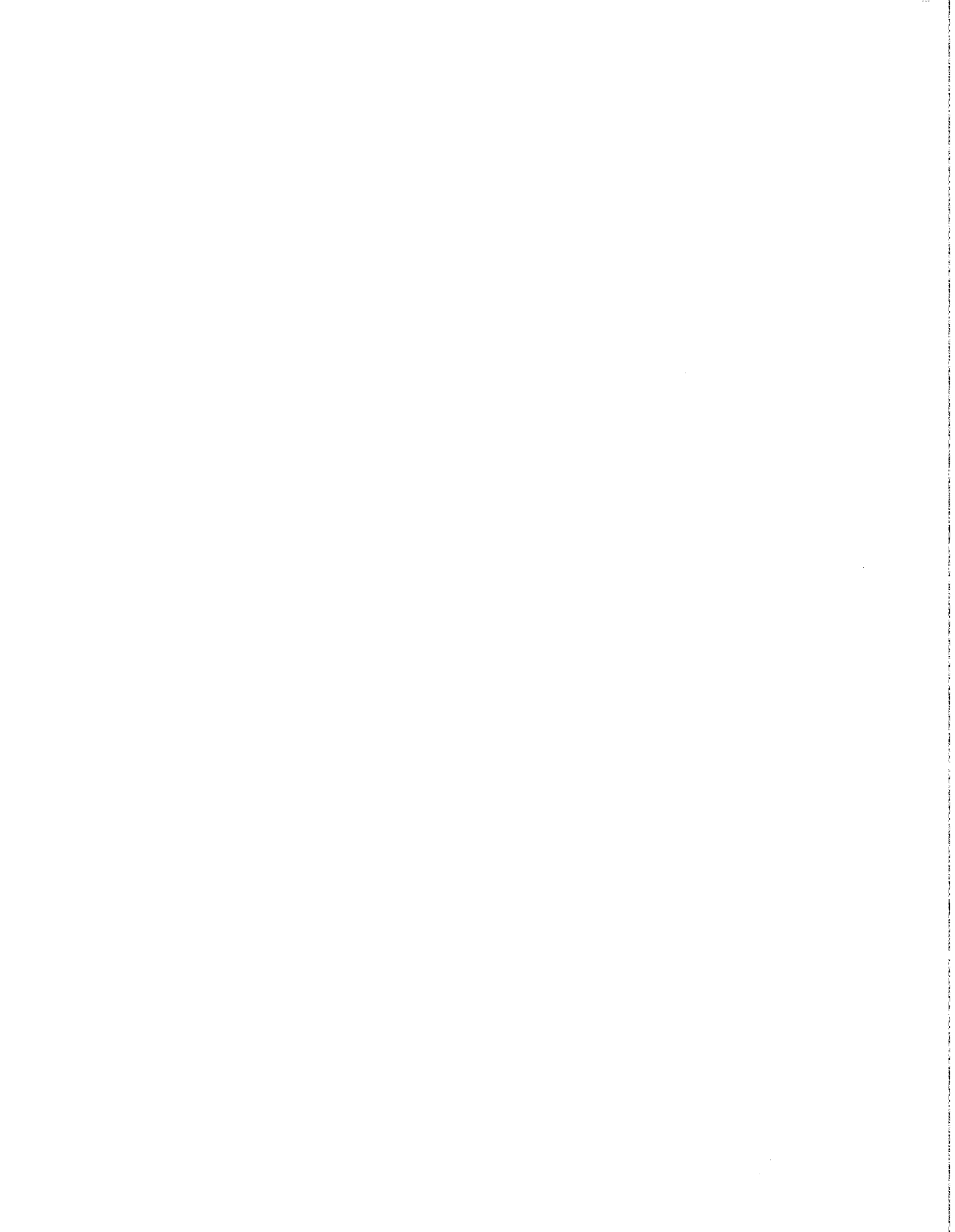
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