

**Joint Legislative Committee on Performance
Evaluation and Expenditure Review (PEER)**

Report to
the Mississippi Legislature



The Bureau of Building's Management of Construction Change Orders

The Department of Finance and Administration's Bureau of Building, Grounds, and Real Property Management is responsible for the construction, repair, and renovation of most state buildings. PEER reviewed the bureau's selection of the architectural and engineering contract professionals who assist in construction project management. PEER also reviewed the bureau's management of project change orders, which are the legal agreements to alter the work set forth in original construction contracts.

Because the bureau usually compensates the general contractor for change orders without a competitive bidding process, the bureau should scrutinize change orders and ensure that they protect the state's interest. However, the bureau's oversight of change orders is incomplete, inconsistent, and fails to assure that cost changes to building construction projects are reasonable. PEER found that the bureau:

- does not ensure consistent use of pre-determined selection criteria in selecting contract professionals nor does it ensure documentation of the basis of contract awards;
- does not contractually require its contract professionals to analyze the reasonableness of change order costs;
- has not developed an internal oversight process for analyzing the costs of change orders presented by contract professionals; and,
- has not developed an information system for managing change order and contract evaluation data for future decisionmaking.

PEER: The Mississippi Legislature's Oversight Agency

The Mississippi Legislature created the Joint Legislative Committee on Performance Evaluation and Expenditure Review (PEER Committee) by statute in 1973. A standing joint committee, the PEER Committee is composed of five members of the House of Representatives appointed by the Speaker and five members of the Senate appointed by the Lieutenant Governor. Appointments are made for four-year terms with one Senator and one Representative appointed from each of the U. S. Congressional Districts. Committee officers are elected by the membership with officers alternating annually between the two houses. All Committee actions by statute require a majority vote of three Representatives and three Senators voting in the affirmative.

Mississippi's constitution gives the Legislature broad power to conduct examinations and investigations. PEER is authorized by law to review any public entity, including contractors supported in whole or in part by public funds, and to address any issues that may require legislative action. PEER has statutory access to all state and local records and has subpoena power to compel testimony or the production of documents.

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The Committee assigns top priority to written requests from individual legislators and legislative committees. The Committee also considers PEER staff proposals and written requests from state officials and others.

PEER Committee
Post Office Box 1204
Jackson, MS 39215-1204

(Tel.) 601-359-1226
(Fax) 601-359-1420
(Website) <http://www.peer.state.ms.us>

The Mississippi Legislature

Joint Committee on Performance Evaluation and Expenditure Review

PEER Committee

SENATORS
WILLIAM CANON
Chairman
HOB BRYAN
BOB M. DEARING
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Secretary
WILLIAM E. (BILLY) BOWLES
ALYCE G. CLARKE
Vice-Chairman
TOMMY HORNE

TELEPHONE:
(601) 359-1226

FAX:
(601) 359-1420

Post Office Box 1204
Jackson, Mississippi 39215-1204

Max K. Arinder, Ph. D.
Executive Director

OFFICES:
Woolfolk Building, Suite 301-A
501 North West Street
Jackson, Mississippi 39201

May 14, 2002

Honorable Ronnie Musgrove, Governor
Honorable Amy Tuck, Lieutenant Governor
Honorable Tim Ford, Speaker of the House
Members of the Mississippi State Legislature

On May 14, 2002, the PEER Committee authorized release of the report entitled **The Bureau of Building's Management of Construction Change Orders.**

A handwritten signature in cursive script, reading "William Canon", written over a horizontal line.

Senator William Canon, Chairman

This report does not recommend increased funding or additional staff.

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The Bureau of Building's Management of Construction Change Orders

Executive Summary

Introduction

State law designates the Department of Finance and Administration as the agency responsible for the erection, repair, and renovation of state buildings. The department's Bureau of Building, Grounds, and Real Property Management handles activities related to building construction.

PEER reviewed the bureau's management of cost changes to building construction contracts and its selection of professional architectural and engineering consultants for building construction. In conducting the review, PEER analyzed details of change order management on sixteen projects with dates of final acceptance between June 19, 2001, and December 19, 2001 (representing all projects with change orders totaling one percent or more of the original project budget).

Background

The Change Order Process

A change order is a written agreement between the bureau and the general contractor to change a building construction contract. Change orders add to, delete from, or otherwise alter the work set forth in the contract documents at the time that the construction contract was bid. As the legal means for changing contracts, change orders are standard in the construction industry.

The following are common reasons for change order initiations by various parties:

Common Types of Change Orders	Common Reasons for and Sources of Change Orders
Change in Scope	Tenant agency has requested a design change.
Unforeseen Conditions	Site conditions differ from the expected. Requested by contractor or professional.
Professional Errors and Omissions	Requested by contractor or professional.
<i>Errors</i>	Professional has incorrectly drawn the construction design plans and specifications.
<i>Omissions</i>	Professional has inadvertently omitted an item or element from the plans.

Roles of the Bureau of Building, Contract Professionals, and Other Parties Involved in Change Orders

As the entity responsible for construction of buildings that are funded with state money, the bureau is ultimately responsible for the approval and oversight of change orders. In the change order process, bureau staff review the change order documentation provided by the contract professional, determine that funds are available to pay for the change order, and sign final approval for the change. Although the original contract is obtained competitively, in order to expedite the project the bureau usually compensates the general contractor for contract changes without a competitive bidding process. This increases the possibility that a contractor could quote a price for a change order that is excessive and not competitive with what other contractors would offer. Therefore, it is important that the bureau assign responsibility for scrutinizing the cost of change orders during the life of the project and ensuring that change orders are reviewed and controlled to protect the state's interest.

Of the parties involved, the bureau's consulting architects and engineers (also referred to throughout this report as *contract professionals* or *professionals*) have the most hands-on role in project management, including planning, designing, pre-approval of contractor payments, change order preparation, and on-site inspections.

Other parties in the state construction process involved in change orders are the general contractor, who provides cost proposals for change orders to the contract professional; the tenant agency, which often initiates change orders through the bureau; and, subcontractors, who are not legal parties to the construction contract, but may provide cost quotes to the general contractor.

Elements of a Model Change Order Management System

To ensure that changes to building construction contracts are justified and cost-efficient, the oversight process should include certain important elements:

Selection of a professional to oversee construction based on objective evaluation of qualifications and experience
Assessment of the reasoning for and cost efficiency of the change order, including:
<ul style="list-style-type: none"> • determining the identity of the requestor and why the request was made;
<ul style="list-style-type: none"> • obtaining an accurate and complete itemization of costs;
<ul style="list-style-type: none"> • requiring the contract professional to review costs and certify the reasonableness of costs;
<ul style="list-style-type: none"> • executing a formal internal process to analyze the professionals' cost determinations;
<ul style="list-style-type: none"> • training bureau personnel to ensure proper assessment of change order proposals and costs; and,
<ul style="list-style-type: none"> • determining whether an error or omission occurred by engaging in a formal process to identify and investigate design errors or omissions.
Retention and use of experience data in future decisionmaking through:
<ul style="list-style-type: none"> • accurate capture of change order data and reflection of change order costs in total project costs; and,
<ul style="list-style-type: none"> • formal evaluation of contract professionals at project's end for use in selecting contract professionals for future projects.

Problems with the Bureau's Change Order Management Process

The bureau's oversight of cost changes to building construction contracts is incomplete, inconsistent, and fails to assure that cost changes to building construction projects are reasonable.

Process for Selecting Contract Professionals to Manage Construction Projects

The bureau has not established a structure for selecting contract professionals that ensures consistent use of pre-determined selection criteria or rating of the candidates on such criteria or that documents its basis of award.

The bureau's process does not require selection committees to use its evaluation form containing selection criteria. As a result, the bureau cannot demonstrate that contract professionals are selected objectively, that the most competent contract professional has been selected for the job, or that the state's interest is protected by obtaining a quality building at the least cost.

Also, the bureau does not have written policies or procedures designed to result in increased competition among contract professionals working with the state to administer construction projects. Without written policies, the bureau cannot ensure that its pursuit of competition is accomplished through objective means.

Assessment of the Reasoning for Change Order Requests

In at least half of the change orders PEER reviewed, the bureau's change order documentation did not identify the change order requestor.

Without understanding the source of the change order request, the bureau cannot fully understand the reasons for the change order (including whether the change was caused by error or omission on the part of the contract professional) and whether the change is necessary.

Cost Review Process Contracted to Professionals

Despite the state construction process's inherent conflict of interest for contract professionals (i.e., a personal financial incentive to approve change orders that result in additional costs versus ethical obligations to the state), the bureau has not developed a strong change order cost review process to protect the state's interest.

Contract professionals' fees are based on a percentage of total construction costs. In general, the higher the construction costs, the higher the professionals' fees. As part of this payment arrangement, professionals receive a fee when a change order is approved, calculated as a percentage of the amount of the cost of the change order. Therefore, the process is a financial incentive for contract professionals to approve change orders that result in additional costs.

The chart below illustrates how contract change orders increase total professional fees--e.g., \$44,701 in change orders to a project added \$3,058 in professional fees to the cost of the contract.

Example of a Contract Professional's Financial Benefit from Change Orders

	Original Contract Amount	Change Orders	Final Contract Amount
Amount of Contract and Change Orders	\$1,945,215	\$44,701	\$1,989,916
Amount of Contract Professional's Fee *	\$133,092	\$3,058	\$136,150

* Professional fees are based on a mathematical formula and usually vary between 6 and 9 percent of the contract price, depending upon the type of construction and the total amount of the contract. For this project, the fee was set at about 6.84% of the contract.

Despite the disincentive for professionals to scrutinize costs, the bureau's standard contracts do not require professionals to analyze the reasonableness of change order costs. Without clearly outlining the professionals' responsibilities, the bureau cannot assume that professionals are actually conducting cost reviews. Since the bureau relies heavily on the contract professional's expertise, if the review does not take place the bureau cannot ensure that the state is getting a fair price from the general contractor to perform the change order.

The bureau does not always require cost itemizations for change orders. In twenty-eight of thirty-one cases PEER reviewed, the bureau did not require that its professionals itemize all costs by quantities of material and labor hours as outlined by its policy. Without detail in change order requests, contract professionals and bureau staff cannot ensure that decisions are valid and defensible.

Also, in twenty-five of the thirty-one cases reviewed, the bureau did not require the contract professional to certify in writing that the cost of the change order had been analyzed and found to be reasonable. Because the bureau does not require its professionals to sign certification

statements in most cases, it cannot ensure that the professionals perform the cost reviews and that costs of change orders are actually reasonable. Project change order costs may be beyond the reasonable range and may unnecessarily escalate total project costs.

Bureau's Oversight Process for Analyzing and Controlling Costs

The bureau has no internal process in place for analyzing the costs of change orders presented by the contract professional for accuracy or reasonableness or for verifying that the change order is not already a part of the original contract.

No bureau policies require that staff confirm and document that they have verified change order costs. The bureau's management and staff told PEER that they rely heavily on the contract professionals to assure that costs are reasonable.

The bureau has not established a training curriculum or continuing education to assure that its staff construction administrators are adequately trained to review detailed change order costs and to oversee the work of contract professionals. After a one- to two-month observation period, new hires learn from on-the-job training and informal questions and answers. Without ongoing and sufficient training, the potential increases for the bureau's staff to be inconsistent in carrying out the bureau's policies and to fail to protect the interest of the state in paying reasonable costs for services.

The bureau also has no formal process to identify professional design errors and omissions. The bureau does not compile and retain documentation of the investigation and resolution of potential errors or omissions, thus increasing the possibility that the state will pay for changes that are the responsibility of the professional.

Lack of a System to Retain and Use Experience Data for Future Decisionmaking

Although in the past the bureau has used change order data for analysis, the bureau has not developed an information system to manage change orders--e.g., to identify types of projects associated with higher change order costs or routinely identify specific contract professionals with poor records of controlling change orders.

The bureau operates a management information system, the Project Accounting and Tracking System (PATS), which accounts for project budgets and maintains certain types of information regarding building projects, including data on specific change orders. However, the bureau has not

developed a system to record and evaluate the cause of change orders or a method of reviewing data to assist in determining the types of projects that might lead to higher change order costs, nor has it examined change orders as a percentage of original budgets for completed projects.

Also, the bureau does not formally evaluate the performance of contract professionals after they have performed their work, which could help to identify those with poor performance and a poor record of controlling change order costs.

Recommendations

Process for Selecting Contract Professionals to Oversee Change Orders

1. The bureau should require its selection committee members to rate contract professionals against pre-determined criteria for selection and complete evaluation forms documenting that process. The bureau should retain these forms as documentation of its selection process for a selected period, such as three years after the process has been completed. The evaluation forms should require that the professionals' record of managing changes to contracts be evaluated.
2. The bureau should develop policies and procedures to implement its goal of increasing competition among contract professionals who are awarded construction contracts. In doing so, the bureau should study other states' policies and consider their potential for application in Mississippi, including those that:
 - base a part of the selection process on consideration of the volume of work the firm has performed for the state (i.e., giving extra points to those who have not done work for the state recently);
 - include an element of cost competition in the criteria for selection.

Cost Review Process Contracted to Professionals

3. The bureau should revise its internal procedures to require that bureau staff construction administrators obtain complete cost itemizations (e.g., quantities of labor, materials, and equipment) from contract professionals before change orders can be approved.
4. The bureau should revise its standard professional contract to require that the contract professional obtain complete cost itemizations (e.g., type and

quantities of materials, hours of labor, and equipment rental rates) from both contractors and subcontractors in the preparation of change orders.

5. The bureau should revise the standard contract with the general contractor to require that the contractor *always* provide change order cost quotes to the contract professional that include quantities of labor, equipment, and materials (unless documentation in files gives a specific, legitimate reason for a waiver).
6. The bureau should inform the contractors in the pre-construction conferences that they will always be required to itemize their quotes into quantities of labor, equipment, and materials.
7. The bureau should revise its professional contracts to conform to policy by requiring the contract professional to:
 - analyze and document the reason for and cost of change orders before presenting them to the bureau; and,
 - certify in writing that the costs have been examined and documented and have been found to be reasonable. This could be accomplished in practice by revising the approval forms to require the statement.

Bureau's Oversight Process for Analyzing and Controlling Costs

8. The bureau should implement policies and procedures requiring its personnel to review change order proposal costs and document their review. The bureau's policy should also require its staff and the contract professional to verify and certify that the change order costs are not already included in the bureau's contract with the general contractor.
9. The bureau should determine the types of training that a staff construction administrator needs to analyze and determine the cost efficiency of proposals for change orders. The bureau should research ways to conduct training at minimal cost and develop a routine system of training for its administrators. To provide training at a reasonable cost, the bureau could consider requesting help from retired and active professionals, academics, and contract estimators without direct ties to the state contracting process who would train the staff at bureau offices.
10. The bureau should develop policies and procedures related to errors and omissions to give guidance to staff construction administrators in identifying, investigating, and resolving problems that might arise.

As part of such procedures, the bureau should revise its standard change order forms to require that bureau staff note whether a change order is caused by an error or omission, an unforeseen circumstance only, a scope change by the tenant agency, or for some other reason. This would require the construction administrator to address the question of potential errors and omissions directly and would require that the issue be discussed and resolved by bureau management.

11. In some cases, all or part of the increased costs due to errors and omissions may be owed to a third party such as a contractor, and the professional may elect to negotiate directly with the contractor and pay the contractor directly for the work. In those cases, the bureau should require that all work added to the project for the errors or omissions be reported to the bureau. As a result, the bureau would be able to monitor the total cost of the contract and the status of change orders and errors and omissions, information which is currently not recorded in the bureau's data.
12. The bureau should consider prohibiting construction oversight work on a given project by those professionals who perform design work on that project. This would help to avoid a conflict of interest on the part of an architect or engineer who might hide, during the construction oversight stage, an error or omission that he or she committed during the design stage.
13. The bureau should study its system of compensating contract professionals and also study the compensation systems and contract provisions of other state building agencies. The study should seek to find better and more cost-effective ways to provide financial incentives and disincentives to the contract professionals to encourage them to reduce change order costs.

In devising a new compensation system to improve cost effectiveness, the bureau should consider revising the standard professional contract as follows (see page 33 of the report for additional details):

- a. eliminate the practice of reducing the contract professionals' fees when change orders reduce the contract cost, but offset the costs of this with a decrease in overall fees paid to professionals. Thus, professionals who are successful in keeping costs down would not be directly penalized, as is currently the case.

- b. require an *automatic* denial of a change order fee if the bureau determines an error or omission was committed.
- c. require the professional to pay the bureau or contractor for the portion of change order costs caused by an error or omission, unless all or a portion is waived by the bureau.
- d. require a reduction in the final payment to the professional by a specified amount (determined by the bureau) if final change order costs (excluding agency changes) are 2% or more above the original contract amount.

Lack of a System to Retain and Use Experience Data for Future Decisionmaking

- 14. The bureau should begin to collect and analyze information and develop reports to help in the overall management of change orders. For example, the bureau should develop a system to classify change orders by type, such as requesting entity (bureau, professional, tenant agency, contractor) and reason (error, omission, scope change).
- 15. Bureau personnel should comply with the bureau's policy of evaluating architects and engineers on their performance twice during a project. The bureau should document this evaluation, compile the information in a management information system, and use the data to assist during the selection process in rating contract professionals on their experience working for the state.

For More Information or Clarification, Contact:

PEER Committee

P.O. Box 1204

Jackson, MS 39215-1204

(601) 359-1226

<http://www.peer.state.ms.us>

Senator Bill Canon, Chairman

Columbus, MS 662-328-3018

Representative Alyce Clarke, Vice Chairman

Jackson, MS 601-354-5453

Representative Mary Ann Stevens

West, MS 662-967-2473

The Bureau of Building's Management of Construction Change Orders

Introduction

Authority

The PEER Committee authorized a review of the management of construction change orders by the Department of Finance and Administration's Bureau of Building, Grounds, and Real Property Management (hereafter referred to as the bureau) pursuant to the authority granted by MISS. CODE ANN. Section 5-3-57 et seq. (1972).

Purpose and Scope

For twenty-nine projects completed and accepted by the Bureau of Building, Grounds, and Real Property Management from June 19, 2001, to December 19, 2001, original project budgets totaled \$35,457,935 and subsequent change orders to the contracts totaled \$1,998,449. Final construction costs for those projects totaled \$37,456,384.

The amount spent on change orders included:

- \$1,492,612 (4.2% of the original project budgets) for change orders that were already competitively obtained as separate components of the original contract bidding process (these separately bid components are known as alternates); and,
- \$505,837 in costs (1.4% of the original project budgets) that were not contemplated during the bid process and thus were not competitively bid.

This PEER Committee report is primarily concerned with the bureau's oversight of costs that are not competitively bid.

PEER reviewed the bureau's management of cost changes to building construction contracts and its selection and oversight of professional architectural and engineering consultants for building construction. During the review, PEER examined:

- the process by which change orders are requested, considered and approved;
- the distribution of authority and responsibility between participants (the bureau, the tenant agency, the general contractor, and the professional architects and engineers on contract);
- the causes of change orders; and,
- the requirements for bidding of professional services for architects and engineers.

PEER reviewed details of change order management on sixteen projects with dates of final acceptance between June 19, 2001, and December 19, 2001 (representing all projects with change orders totaling one percent or more of the original project budget).

Method

In conducting this review, PEER:

- reviewed the statutes related to duties of the bureau;
- reviewed and analyzed policies, procedures, and reports generated by the bureau;
- reviewed change order data in the bureau's computer database of building projects;
- reviewed a sample of the bureau's building construction project files;
- interviewed bureau management and staff, professional contract consultants to the bureau, and staff of agencies administering building construction programs in other states;
- reviewed policies and procedures of agencies administering building construction programs in other states; and,

- reviewed industry and academic literature and textbooks on the management of building projects and change orders and the selection of contract professionals.

Background

The Change Order Process: Its Purpose and Roles of Parties Involved

Purpose of Change Orders in the Building Construction Process

Change Orders Are the Legal Means for Changing the Construction Contract

Change orders are a standard means of altering the work set forth in the original construction contract.

A change order is a written agreement between the bureau and the general contractor (the company primarily responsible for constructing buildings) to change a building construction contract. Executed on standard bureau forms, change orders add to, delete from, or otherwise alter the work set forth in the contract documents at the time that the construction contract was awarded.

As the legal means for changing contracts, change orders are standard in the construction industry. As stated in the textbook, *Construction Project Administration*, by Edward R. Fisk:

It is standard practice in construction contracts to allow the owner the right to make changes in the work after the contract has been signed and during the construction period. Depending upon the contract and its specific terms, such changes might involve additions to or deletions from the work, changes in the methods of construction or manner of work performance, changes in owner-furnished materials or facilities, or even changes in the contract time or order of the work. Changes may also be executed to correct errors in the plans or specifications, or they may be the direct result of contractor suggestions that are approved by the owner and the architect/engineer.

Common Reasons for Change Orders

The following are common reasons for change order initiations by various parties in the process of constructing state buildings:

Common Types of Change Orders	Common Reasons for and Sources of Change Orders
Change in Scope	Tenant agency has requested a design change.
Unforeseen Conditions	Site conditions differ from the expected. Requested by contractor or professional.
Professional Errors and Omissions	Requested by contractor or professional.
<i>Errors</i>	Professional has incorrectly drawn the construction design plans and specifications.
<i>Omissions</i>	Professional has inadvertently omitted an item or element from the plans.

SOURCES: *Construction Project Administration; Construction Project Management*

Roles of Parties Involved in Change Orders to State Building Contracts

The contract professional, general contractor, and bureau must sign off on all change orders to state building contracts.

Most parties to a construction contract have either an official or unofficial role in the preparation and approval of change orders. Any of the parties to a contract can request change orders. An official change order is prepared by the contract professional with the assistance of the general contractor and in consultation with the bureau. These three entities officially sign off on the change order documents. The tenant agency (the agency that will occupy the facility under construction) and subcontractors (who are not legal parties to the contract between the bureau and the general contractor) are also often involved in the change order process.

The Bureau's Staff is Ultimately Responsible for the Approval and Oversight of Change Orders

MISS. CODE ANN. Section 31-11-1 et seq. designates the Department of Finance and Administration (DFA) as the state agency responsible for the erection, repair, and renovation of state buildings. DFA's Bureau of Building, Grounds, and Real Property Management (hereafter

referred to as the bureau) conducts activities related to building construction.

In order to expedite projects, the general contractor usually handles the changes that occur throughout a project. Thus the costs of most change orders will not be determined through direct competition.

As the entity responsible for building construction for most state agencies,¹ the bureau oversees the process of making changes to building contracts. Although the original contract is obtained competitively (through cost competition between contractors), in order to expedite the project, the general contractor usually handles the changes that occur throughout a project. The costs of most change orders will therefore be determined through another method rather than direct competition between bidders. This increases the possibility that a contractor could quote a price for a change order that is excessive and not competitive with what other contractors would offer. Therefore, it is important that the bureau assign responsibility for scrutinizing the cost of change orders during the life of the project and ensuring that change orders are reviewed and controlled to protect the state's interest.

The bureau's staff construction administrators, director of accounting, and director all have responsibilities for approving the final change orders, as listed in the chart below:

Bureau Staff Who Sign Approval of the Change Order Document	Staff Duties in Reviewing Change Orders
Staff Construction Administrator Assigned to the Project	Reviews the change order documentation provided by the contract professional. Makes recommendations for approval or disapproval of the proposed contract changes to the bureau.
Director of Accounting	Determines that funds are available to pay for the change order.
Director	Reviews the change order documents and signs in general agreement with the change order.

SOURCE: Bureau staff interviews, records and written job descriptions

¹ The bureau does not administer every state building project. In general, the bureau administers those projects that are funded with state bonds or the general fund. For some projects funded with non-state monies, agencies may request that the bureau assist in administration. Also, the Legislature may specifically designate whether the bureau should administer a given project.

According to bureau staff, the bureau relies heavily on the contract professionals for determining the costs of change orders.

Bureau staff stated that the bureau's staff architects do not have regular duties in reviewing change orders, but are available to answer staff construction administrators' questions if necessary.

The written job description states that construction administrator duties include:

- overseeing contract professionals to ensure conformance of all construction components to meeting building code standards and to ensure compliance with approved plans and specifications;
- reviewing and approving all pay requests;
- conducting the owner's final inspection to determine contract compliance; and,
- attending monthly progress meetings with the professional, tenant agency, and contractor.

Although the bureau's staff construction administrators have responsibility for reviewing change orders, bureau management and staff state that the bureau relies heavily on the contract professionals for determining the costs of the change order.

The Contract Professional Prepares Change Order Documents Describing the Changes and Their Justification

The bureau contracts with an architect or engineer (also referred to throughout this report as the *contract professional* or *professional*) on construction projects that it administers. Of the parties involved in the bureau's building construction, these contract professionals have the most hands-on role in project management, including planning, designing, pre-approval of contractor payments, change order preparation, and on-site inspections. In a few instances, the bureau has hired construction program management contractors, who serve as an additional layer of oversight in the construction process. However, for purposes of this report, the term *contract professionals* will refer to those architectural or engineering consultants who represent the bureau and serve as liaisons between the general contractor and the bureau.

Contract professionals may determine that certain changes should be made to improve the design of the building under construction or to address unforeseen conditions. Sometimes these recommended changes are the result of errors in the original plans or of items omitted from the plans, which are the fault of the professional. Handling of these changes (known as errors and omissions) is described on page 25.

The contract professional prepares a document that describes and justifies the change order and includes cost proposals.

Once the bureau determines through discussion with the contract professional that a change order is warranted, the professional prepares a change order document describing the changes to be made and the justification for the changes. The professional obtains and reviews cost proposals from the general contractor and attaches them to the change order. Although the contract with the professional does not require it (see discussion on page 18), bureau procedures state that the professional should sign the original change orders, "*certifying that the Change Order has been examined and analyzed, found to be in order and the cost reasonable.*" Regardless of the level of cost review accomplished by the contract professional for a given project, the bureau relies heavily on the contract professionals for their review of change order costs.

The General Contractor Provides Cost Proposals for Change Orders to the Contract Professional

Contractors may determine during the project construction that changes should be made to remedy problems with the professional's drawings and plans, to address unforeseen conditions, or to address conditions that the contractor feels will be beneficial to the project or will be justified changes.

In practice, contractors comply with documentation requirements to varying degrees.

The general contractor prepares cost proposals and provides them to the contract professional. Bureau procedures require that the general contractor's cost proposal is documented with itemizations such as "quantities of product, labor and equipment; taxes, insurance and bonds; overhead and profit." As noted on page 20, in practice contractors comply with documentation requirements to varying degrees.

The Tenant Agency Often Initiates Change Orders through the Bureau

The bureau's policy requires that if a tenant agency initiates the change order, that agency should provide a letter to the bureau requesting that the change order be approved.

Tenant agencies may initiate change orders to address an unforeseen need or to accomplish a change in scope and needs for the building. Bureau personnel stated that tenant agencies may initiate contract changes because perceived needs change between the planning and construction stages of a project. The bureau's policy requires that if a tenant agency initiates the change order, the tenant agency should provide a letter to the bureau requesting that the change order be approved. Other than this requirement, the bureau's policy does not require additional involvement by the tenant agency. Contract professionals stated that involvement by the tenant agency in the change order process varies by project.

Subcontractors are Not Legal Parties to the Construction Contract, but May Provide Cost Quotes to the General Contractor

Subcontractors often provide quotes to general contractors to be included as part of change order cost documentation.

Subcontractors contract with the general contractor to perform special types of construction as needed to complete the construction project. According to bureau policy, subcontractors cannot initiate change orders because there is no contractual relationship between the bureau and the subcontractor. However, subcontractors often provide quotes to the general contractors to be included as part of the change order cost documentation. Conceivably, a subcontractor could suggest a change order to the general contractor, who could then initiate a change order with the contract professional.

Elements of a Model Change Order Management System

To ensure that changes to building construction contracts are justified and cost-efficient, the oversight process should include certain important elements.

The Exhibit, page 10, includes the elements of a model change order system as determined by PEER.

Exhibit: Elements of a Model Change Order Management System

Selection of a professional to oversee construction based on objective evaluation of qualifications and experience
Assessment of the reasoning for and cost efficiency of the change order, including:
<ul style="list-style-type: none"> • determining the identity of the requestor and why the request was made;
<ul style="list-style-type: none"> • obtaining an accurate and complete itemization of costs;
<ul style="list-style-type: none"> • requiring the contract professional to review costs and certify the reasonableness of costs;
<ul style="list-style-type: none"> • executing a formal internal process to analyze the professionals' cost determinations;
<ul style="list-style-type: none"> • training bureau personnel to ensure proper assessment of change order proposals and costs; and,
<ul style="list-style-type: none"> • determining whether an error or omission occurred by engaging in a formal process to identify and investigate design errors or omissions.
Retention and use of experience data in future decisionmaking through:
<ul style="list-style-type: none"> • accurate capture of change order data and reflection of change order costs in total project costs; and,
<ul style="list-style-type: none"> • formal evaluation of contract professionals at project's end for use in selecting contract professionals for future projects.

SOURCE: PEER analysis of procedures of Mississippi's Bureau of Building, Grounds, and Real Property Management; procedures of the building management agencies of eleven other states; and, industry and academic literature and textbooks on the management of building projects, change orders, and professional selection.

Problems with the Bureau's Change Order Management Process

The bureau's oversight of cost changes to building construction contracts is incomplete, inconsistent, and fails to assure that cost changes to building construction projects are reasonable.

To understand the bureau's administration of change orders, PEER reviewed the bureau's process for and documentation of its selection of professionals and reviewed actual change order documentation in the files of sixteen recent bureau projects.

The document files reviewed included 100% of those projects with a final acceptance date from June 19, 2001, to December 19, 2001, and with change order costs exceeding 1% of the total original budget for the project. (Final acceptance date is the date when the bureau accepts the final work product--i.e., the warranty period has begun, the contract work is fully complete, and additional change orders are not expected.)

From review of the bureau's procedures and files, PEER found:

- weaknesses in the bureau's process for selecting contract professionals to manage construction projects;
- weaknesses in the bureau's assessment of the reasoning for and cost efficiency of the change order requests;
- weaknesses in the cost review process contracted to professionals;
- a weak oversight process within the bureau to analyze and control costs; and,
- lack of a system to retain and use experience data for future decisionmaking.

Process for Selecting Contract Professionals to Manage Construction Projects

The bureau has not established a structure for selecting contract professionals that ensures consistent use of pre-determined selection criteria or rating of the candidates on such criteria or that documents its basis of award.

Bureau policies include two processes for selecting contract professionals--those for projects less than \$1 million and those for projects more than \$1 million.

For projects below \$1 million, the tenant agency recommends three professionals to perform the change order work and the bureau generally selects the agency's first choice.

For projects below \$1 million, the tenant agency (the agency that will occupy the facility under construction) selects three professionals for recommendation to the bureau. The bureau is responsible for selecting one of the contract professionals to receive the contract award. In practice, the bureau selects the first choice of the tenant agency, unless it is aware of a reason that this firm or individual will not be a good choice for the tenant agency's project.

For projects above \$1 million, the bureau contacts prospective firms by direct mail. Bureau and agency representatives choose a short list of candidates for interviews or presentations and select a professional by secret ballot.

For projects above \$1 million, the bureau must advertise the project. The bureau's chosen form of advertisement includes a direct mailing to architectural and engineering firms who have asked to be on the mailing list and who have completed a questionnaire (M54 form) relating general firm information. Firms interested in a specific advertised project must respond by writing a letter of interest and completing another questionnaire (M55 form) to provide detailed information about how they would conduct a given project.

The bureau uses two committees in its process of selecting professionals (known as the pre-selection and the selection committees). After reviewing the project-related questionnaires, the pre-selection committee (consisting of tenant agency and bureau representatives) chooses three to five professionals for a short list that will be reviewed by the selection committee. The selection committee, also consisting of bureau staff and tenant agency members, conducts interviews by phone or sets a meeting for the short list candidates to give oral presentations. The selection committee casts secret ballots for its choice of candidate ranked in order of preference. Bureau personnel state that they usually try to choose the candidate that is the selection of the tenant agency, unless they are aware of a reason that the tenant agency favorite would not be a good choice for a given project.

PEER researched public purchasing literature and concluded that proper evaluation procedures for consultant selection should include:

- *Evaluation performed by a committee*—Use of a selection committee (including membership from the tenant agency and the procurement agency) rather than a single selection judge would help to avoid the appearance of impropriety and dissipate pressure on selection personnel from contract candidates.
- *Determination of criteria prior to the evaluation process*—The criteria should include requirements for the position that will help to ensure that the contractor is competent to perform the work, such as types of experience, training, and other qualifications.
- *Application of a formal rating system during the evaluation phase*—The rating system should include a process to apply points to determine how well the candidate has met the predetermined criteria. If the rating system weights those factors (i.e., applies points based on the importance of the various factors), the final ratings will produce a point spread which better defines differences between candidates for the contract.
- *Documentation of the procedures used to select the service contractor*—The selection committee should maintain records sufficient for an audit trail (for a third party to follow the course of the committee's method of evaluation and basis of award).

PEER reviewed professional selection procedures in other states and found that other states have adopted formal evaluation procedures. South Carolina, Arkansas, and Utah, among other states, use formal rating systems in which points are applied to criteria for selection.

Selection Based on Competency

As recommended by procurement experts, the bureau uses committees rather than one individual in selecting contract architects and engineers to design and manage its construction projects. However, the bureau's process does not require these selection committees to use its evaluation form containing selection criteria.

As recommended in the literature on proper professional selection, the bureau uses selection committees composed of individuals from both the tenant agency and the bureau to choose contract architects and engineers. This helps to avoid the appearance of impropriety and any potential pressure on any one individual.

However, the bureau's professional selection process does not require its selection committees to demonstrate that they have chosen professional candidates who meet predetermined criteria for selection based on an objective evaluation of qualifications, experience, past performance, and other critical factors.

Pre-determined selection criteria are important to ensure that professionals are selected on the basis of objective criteria.

Pre-determined selection criteria are important to ensure that professionals are selected on the basis of objective criteria and that the best contract for the state is obtained. The bureau has developed an evaluation form containing selection criteria that could be used to rate respondents to the request for proposals. However, according to the selection files and bureau personnel, the selection committees generally do not use these evaluation forms. If used by individual members, they are not necessarily shared with the committee and are not retained for documentation.

The selection criteria on the bureau's form include rating the candidates on quality of recent projects previously undertaken, past success and/or failure in estimating and budgeting, and past performance in meeting schedules. Because the bureau does not complete written performance evaluations of its contract professionals' work (see page 29), the bureau's ability to judge candidates based on these criteria is made more difficult.

Also, the bureau's selection criteria include rating the candidates on the selection committee members' general professional impression of the firm and the firm's proximity to geographic location of the project, use of other consultants to work on the project, similar project experience within recent years, grasp of the project requirements, ability and capacity to perform the work, proposed time schedule, and understanding and ability to work within the available budget.

The selection processes are basically oral, although for projects over \$1 million the bureau sometimes saves copies of the ballots and tally sheets (for the anonymous final ranking of choices for a project).

Because the bureau discards copies of the proposals of consultants who did not win contract awards, the bureau has no documentation of this stage of the process if the selection is questioned.

Also, the bureau discards copies of the proposals of consultants who did not win contract awards (after the planning process for a particular project has commenced), reportedly due to lack of file space. Thus the bureau has no documentation of this stage of the process if the selection is questioned.

The bureau's policy is to select architects and engineers based solely on their qualifications, including the state's experience with their work. (See the Appendix, page 37, for a discussion of regulatory restrictions on cost

competition for engineers in Mississippi and the national regulatory environment that discourages cost competition among architects and engineers.) Since determinations of non-cost qualifications can be subjective, in order to best serve the state the bureau should craft a process that is as objective as possible under the circumstances and does not give the appearance of impropriety. However, the bureau has not ensured that an objective process is implemented for selection of professionals because it does not ensure that pre-determined selection criteria are used or that the committee's basis of award is documented.

As a result, the bureau cannot demonstrate that contract professionals are selected objectively, that the most competent contract professional has been selected for the job, or that the state's interest is protected by obtaining a quality building at the least cost.

Selection Based on Competition

The bureau does not have written policies or procedures designed to result in increased competition among contract professionals working with the state to administer construction projects.

PEER found no evidence of the bureau's restricting competition among contract professionals. However, the bureau has no written policies concerning this matter and no written procedures for accomplishing any related goals.

PEER's review of a list of professional contractors for projects completed from July to December 2001 showed no evidence of the bureau's restricting competition among contract professionals. Specifically, PEER found that of the twenty-nine projects that had been completed (as measured by final acceptance by the bureau and commencement of the one-year warranty period) in the six-month period ending December 19, 2001, the professional contract work had been performed by nineteen different architect/engineer firms.

Bureau personnel told PEER that the bureau's goal is to foster competition among contract professionals by seeking to contract with professionals new to the state's building construction process. However, the bureau has no written policies related to this goal and no written procedures for accomplishing this goal in an objective manner.

PEER reviewed other states' professional selection procedures and found that some states have developed specific procedures to address competition as part of the evaluation criteria and also as part of the actual rating process. For instance, policies and procedures of three such states are listed below:

- South Carolina requires that a person not be awarded a small contract (\$25,000 or less) if it results in the total fees awarded to that person or firm to exceed \$75,000 during the twenty-four-month period immediately preceding the date of the contract.
- After selecting the top three qualified firms using a rating system, Florida uses a mathematical formula to select the winning firm based on rewarding those firms that have not worked with the state recently.
- Missouri allows professionals to contract with the state for only one project at the time (for projects with budgets of less than \$2 million).

These states' policies are designed to result in increased competition among the contract professionals working with the state to administer construction projects.

Without written policies as found in these states, the bureau cannot ensure that its pursuit of encouraging competition is accomplished through objective means. All procedures for selecting contractors must be developed to produce the most objective method of reaching bureau goals, whether they be for attaining the highest competency of contractors or for fostering competition among contractors.

Assessment of the Reasoning for and Cost Efficiency of Change Order Requests

Review of the Reasoning for Change Order Requests

In at least half of the change orders PEER reviewed, the bureau's change order documentation did not identify the change order requestor. Without this information, bureau management cannot accurately assess the reasoning and justification for change orders.

PEER's review of files showed that the bureau's change order documentation identified the reason for the change orders in all cases, although the justification could have been stronger in some cases. (See page 25 for a discussion of errors and omissions.)

However, in at least nineteen of the thirty-eight change orders associated with the sixteen projects, the evaluator could not determine from the files the party that had requested the change order. In the remaining files, the documentation either stated clearly the requestor or the evaluator was able to assume to a reasonable degree from

reading the documentation that a given party had requested the change.

Without understanding the source of the change order request, the bureau cannot fully understand the reasons for the change order (including whether the change was caused by error or omission on the part of the contract professional) and whether the change is necessary.

PEER found that other states' building management agencies, including those of Kansas and North Carolina, regularly document which party requested a change order.

In the last year, the bureau revised its change order form to include check-off boxes for the purpose of identifying the entity responsible for the change order--i.e., the bureau, user agency, contractor, or contract professional. The director stated that, in the last five to six months, some bureau staff have begun to use the new form, but it is not always used. For the sixteen projects reviewed by PEER, in most cases the revised change order form was not used, and, if used, the requesting entity was not included on the form.

Conflict of Interest in the Cost Review Process

Despite the state construction process's inherent conflict of interest for contract professionals (i.e., a personal financial incentive to approve change orders that result in additional costs versus ethical obligations to the state), the bureau has not developed a strong change order cost review process to protect the state's interest.

The change order process is a financial incentive for contract professionals to approve change orders that result in additional costs.

Contract professionals' fees are based on a percentage of total construction costs. In general, the higher the construction costs, the higher the professionals' fees. As part of this payment arrangement, professionals receive a fee when a change order is approved, calculated as a percentage of the amount of the cost of the change order. Therefore, the process is a financial incentive for contract professionals to approve change orders that result in additional costs. The following chart illustrates how contract change orders increase total professional fees. As shown in the example of an actual change order, the original contract amount was \$1,945,215. The contract professional's fee was set at \$133,092, or approximately 6.84% of the contract amount. The change orders totaling \$44,701 increased fees by \$3,058. The final contract total was \$1,989,916 and the contract professional fees totaled \$136,150.

Example of a Contract Professional's Financial Benefit from Change Orders

	Original Contract Amount	Change Orders	Final Contract Amount
Amount of Contract and Change Orders	\$1,945,215	\$44,701	\$1,989,916
Amount of Contract Professional's Fee *	\$133,092	\$3,058	\$136,150

* Professional fees are based on a mathematical formula and usually vary between 6 and 9 percent of the contract price, depending upon the type of construction and the total amount of the contract. For this project, the fee was set at about 6.84% of the contract.

Monitoring the contract professional's management of change orders is especially important because of the inherent conflict of interest that exists in the process.

Monitoring the contract professional's management of change orders is especially important because of this inherent conflict of interest that exists in the process. The professionals have a natural desire to increase their incomes, but also have an ethical responsibility to reduce costs for state agencies.

The bureau has a policy that the contract professional should review change orders for the reasonableness of cost. However, the result is that if contract professionals follow the policy and contain costs, their fees will be reduced. The bureau needs strong oversight controls over approval of change orders to eliminate or reduce the conflict of interest if possible.

No Clear Assignment of Cost Review Responsibility to the Contract Professional

The bureau's standard contracts do not require professionals to analyze the reasonableness of change order costs. Without clearly outlining the professionals' responsibilities, the bureau cannot assure that professionals are conducting cost reviews.

The bureau's policy states that contract professionals should review the costs of change orders and sign the change order approval documents certifying that they have done so. Specifically, the policy states that:

...the Professional will sign all five (5) originals certifying the Change Order has been examined and analyzed, found to be in order and the cost reasonable.

However, the actual change order approval document used by the bureau does not include a certification statement. Also, the standard legal contract that the bureau uses to contract with architects and engineers does not comply with bureau policy because it does not require that the

professionals review the costs of change orders. The standard contract requires only that the contract professional "prepare the change orders." However, the contract could be written to include requirements that the professional review and document the reasonableness of the contract costs. Chances of holding the contractor accountable are better if the contract clearly outlines the contractor's duties and responsibilities to the state.

Other states, including Washington and Wisconsin, have included in their contracts with professionals that the professional must review change order costs. For instance, in the state of Washington, the contract states the professional shall:

Prepare necessary documents for changes in the Work including revision drawings, cost estimates and reasons for change, and secure, analyze in detail and recommend disposition of proposals from Contractor.

In Wisconsin, the professional must review a contractor's proposal for a change order and provide "a written recommendation regarding acceptance or rejection." Requirements for the professional's review are as follows:

The review shall consider the necessity for such change, the reasonableness of the proposed change, and an analysis of the cost proposed for effecting the change.

Neither the bureau's change order approval form nor the standard legal contract includes a cost review certification statement.

Until the bureau revises its contracts, it cannot ensure that the professional performs the cost review and may not be able to hold the professional legally accountable for doing so. Since the bureau relies heavily on the contract professional's expertise to perform the cost review (see discussion on page 21), the bureau cannot ensure that the state is getting a fair price from the contractor to perform the change order.

Incomplete and Inconsistent Cost Itemizations for Change Orders by Architects and Engineers (Contract Professionals)

In twenty-eight of thirty-one cases PEER reviewed, the bureau did not require that its professionals obtain complete itemized costs by quantities of material and labor hours as outlined by its policy. Without detail in change order requests, contract professionals and bureau staff cannot ensure that decisions are valid and defensible.

In reviewing bureau files, PEER sought to determine whether the contract professionals had obtained complete cost itemizations for the proposed change orders from the general contractors. A complete breakdown of costs

would include a detailed itemization of the types of material (e.g., 100 linear feet of wood trim at \$1.00 per foot) or hours of labor (e.g., eight hours of labor at \$30 per hour for a total labor cost of \$240).

PEER evaluated cost itemizations for thirty-one change orders of the sixteen projects reviewed. (Some change orders did not need a cost itemization. For instance, the cost of the change may already have been bid as an alternate to the construction contract in the original bidding process.) PEER found that the files did not include complete cost itemizations for twenty-eight of the thirty-one changes. For instance, costs were often shown as follows:

Material - \$3,000
Labor - \$7,000
Profit and Overhead - \$2,000

Specifically, for three change orders the contract professional had ensured that all labor costs were broken down into cost per hour and that contractors and subcontractors had quoted unit costs of specific materials. Of the remaining twenty-eight changes, files showed that for five change orders the professionals had included more detailed information on cost breakdowns for the majority of the costs. For twenty-three change orders, costs in almost all cases were not itemized further than material and labor costs and overhead for each contractor.

Bureau staff stated that PEER had reviewed all supporting documentation available to the bureau and to the contract professional, since in practice professionals provided their supporting cost documentation to the bureau. In order to test this assertion, PEER reviewed cost documentation at the offices of three contract professionals (specifically, a review of twelve change orders on three of the sixteen projects which PEER had found to include incomplete and/or insufficient cost documentation). The files of the professionals did not include additional documentation other than that found in the bureau's files. Bureau and professional documentation reviewed did not provide assurance that professionals were consistently reviewing costs in detail.

The bureau's internal policies require that, when preparing change orders, the contract professional include detailed costs from the general contractor, to include "quantities of product, labor and equipment." This is in line with requirements of building management agencies in other states that require similar cost breakdowns, including South Carolina and Texas.

In practice, the bureau rarely requires its contract professionals to follow the policy of including detailed costs from the general contractor, such as "quantities of product, labor and equipment."

The bureau's contract professionals do not ensure that costs are itemized properly because in practice the bureau rarely requires its contract professionals to follow the policies. Also, the bureau has not included requirements for cost review and cost itemization in its standard contracts with professionals (see discussion below) or with general contractors. For instance, the contract with the general contractor includes only a conditional requirement that cost detail will be required. It states that "on request," the contractor will provide supporting cost data for quantities of labor and equipment when a change order is in process. Therefore, the contract with the general contractor does not mandate that detailed change order cost documentation will always be required.

Because the costs are often not itemized in a way that the actual type and detailed cost of work of contractors to complete change orders can be verified, the bureau cannot consistently assure that change order costs are minimized.

Inconsistent Certification of Cost Review by the Contract Professional

In twenty-five of thirty-one cases reviewed (81%), the bureau did not require the contract professional to certify in writing that the cost of the change order had been analyzed and found to be reasonable.

The bureau's policy states that contract professionals should review the costs of change orders and sign the change order approval documents certifying that they have done so. Specifically, the policy states that:

...the Professional will sign all five (5) originals certifying the Change Order has been examined and analyzed, found to be in order and the cost reasonable.

However, the actual change order approval document used by the bureau does not include a certification statement. As a result, the contract professionals are not specifically certifying that the costs of the change order have been found to be reasonable when they sign a change order document.

Because the bureau does not require its contract professionals to sign cost review certification statements, it cannot ensure that the professionals perform the cost reviews and that costs of change orders are actually reasonable.

Of thirty-one change orders that should have been reviewed for reasonableness of cost, PEER found that in six cases contract professionals had written letters stating the change order costs reviewed were "fair and reasonable" or had made similar statements. However, for twenty-five of thirty-one change orders (81%), the contract professional had not certified that he or she had reviewed costs for reasonableness. For the other six change orders, the contract professional had included some type of written statement of cost certification.

Other states require design professionals to certify to the reasonableness of costs. For instance, North Carolina requires its contract professional to certify on the change order form that he or she has:

. . . reviewed all aspects of this change order and have determined that it is in the best interest of the owner to have the work accomplished. I have also determined that the cost and time allotment are fair and equitable, and I recommend acceptance by the owner.

North Carolina's professional must also cite his or her own estimates of cost next to the contractor's estimate on the change order form. In Louisiana, the professional must attach to the change order a cover letter of recommendation stating that "costs are appropriate" and "back-up information is complete and justifies costs."

In Mississippi, however, the Bureau of Building has not ensured that its policy is enforced. Although the bureau's personnel told PEER that they ask contract professionals to review costs and certain professionals told PEER staff that they do review costs, the bureau cannot ensure that the policy is enforced unless it requires the professionals to sign certifying that they have indeed reviewed costs and to present supporting detail.

Because the bureau does not require its professionals to sign certification statements in most cases, it cannot ensure that the professionals perform the cost reviews and that costs of change orders are actually reasonable. Project change order costs may be beyond the reasonable range and unnecessarily escalate total project costs.

Bureau's Oversight Process for Analyzing and Controlling Costs

Weak Process Within the Bureau to Analyze the Contract Professionals' Cost Determinations

The bureau has no internal process in place for analyzing the costs of change orders presented by the contract professional for accuracy or reasonableness or for verifying that the change order is not already a part of the original contract.

Because the Legislature has designated the Bureau of Building, Grounds, and Real Property Management to administer building projects for state agencies, the bureau is obligated to have the proper oversight procedures in place for doing so. Because the cost proposals for change orders presented by contract professionals affect the cost of building projects, oversight should entail analysis of costs by bureau staff to verify reasonableness and accuracy and to verify that the change order is not already a part of the original contract for the building project (i.e., that the costs in the proposal presented are not already due to be paid by the state through the original contract).

Without exercising full oversight over costs of change orders, the bureau cannot assure that the costs of its change orders are reasonable and not excessive.

However, the bureau does not have a process to ensure that staff construction administrators review change order cost proposals. For instance, no internal bureau policies require that staff review change order costs. PEER's review of the bureau's files also demonstrated that its staff construction administrators are not required to confirm and document that they have verified costs in any way. Also, bureau management and staff told PEER that they rely heavily on contract professionals to assure that the costs are reasonable.

Effective administration requires creation of logical functions and procedures to assure accurate decision-making. Accordingly, good management principles require oversight on the part of state personnel. Other states require their personnel to verify change order costs. For instance, state of Louisiana staff must verify that the change order cost is not already included in the contract and that cost breakdowns are complete and accurate. Louisiana procedures outline ways that its staff may determine if costs are accurate, such as calling contractors and suppliers to verify wage rates and material costs. The Texas State Auditor's Office checks to see that the costs are not already included in the original contract and that cost analyses of change orders have been performed.

The bureau has not developed oversight procedures to ensure that staff personnel verify costs presented by the contract professionals. Without exercising full oversight over costs of change orders, the bureau cannot assure that

the costs of its change orders are reasonable and not excessive.

Weaknesses in the Training Process for Bureau Construction Administrators

The bureau has not established a training curriculum or continuing education to assure that its staff construction administrators are adequately trained to review detailed change order costs and to oversee the work of contract professionals.

According to the bureau's personnel, its process of training newly hired construction administrators includes requiring the new hire to accompany another construction administrator on all meetings outside the office for approximately one to two months. During this period the new hire is learning from on-the-job training. After that point, the new construction administrator is expected to be in a learning period for the next year and is expected to ask questions as needed to continue the learning process. The bureau does not provide any other type of continued training for the construction administrator staff (consisting of five employees as of March 2002) other than informal questions and answers. The bureau also has not established a schedule or curriculum of training to ensure that administrators are trained in particular skills.

Without ongoing and sufficient training, the potential increases for the bureau's staff to be inconsistent and to fail to protect the interests of the state.

Experts in human resource management in business and government have established that training of personnel is needed to increase employee motivation, as well as ensure accomplishment of organizational goals. For instance, the *Handbook of Human Resource Management in Government* states:

. . .the current notion guiding human resource development is to deploy personnel strategically, through not only initial training but also retraining and refocusing, and to change management style and systems. Training and education are more evenly spread through the entire career of the individual.

As an example of training goals in other states, Wisconsin's Bureau of Architecture and Project Management includes as part of its mission statement that it will:

Through various methods of continuing education keep our staff aware of state-of-the-art materials and methods in the construction of buildings and structures.

At the bureau, training is particularly needed to ensure that staff:

- are up-to-date on the latest costs of construction materials and labor in order to judge the appropriateness of contractors' cost proposals; and,
- understand policies and procedures and implement them consistently, e.g., for determining whether errors and omissions have occurred, whether the contract professional will be required to pay for a change order resulting from an error or omission, or whether denying payment of fees to the professional in event of an error or omission will be sufficient.

Without ongoing and sufficient training, the potential increases for the bureau's staff to be inconsistent in carrying out the bureau's policies and to fail to protect the interest of the state by paying reasonable costs for services.

No Formal Bureau Process to Identify and Investigate Whether Change Orders Were a Result of Design Errors or Omissions

The bureau has no formal process to identify professional design errors and omissions, thus increasing the possibility that the state pays for changes that are the responsibility of the contract professional.

In the building industry, mistakes made by the architect or engineer in designing the plans and specifications for construction projects are referred to as errors and omissions. Generally, both states and private entities require that the contract professional either pay for an error or omission that has occurred or they deny the contract professional the fee that he or she would normally accrue when a change order occurs (contract professionals typically are paid a specific percentage of a total change order amount).

The bureau's files show that the bureau does not compile and retain documentation of the investigation and resolution of potential errors or omissions. In eight of thirty-eight change orders (the bureau approved thirty-eight change orders in total for the sixteen projects reviewed), file documentation raised questions of whether errors or omissions might have occurred. For instance, the files had information on situations such as the following:

- a certain type of door lock was needed in order that the building code be met (which raises the question of why the professional did not draw the plans in accordance with the building code);
- asbestos was found that had to be removed (which raises the question of why the contract professional did not find it during the asbestos inspection and testing phase of the bureau contract); and,
- a contract did not require that an agency kitchen that was normally hosed down with water when cleaned to be equipped with appropriate grounding receptacles for safety against electrocution (which raises the question of why the contract professional did not address the tenant agency's needs during the design phase). Also, a letter in the file from the tenant agency stated that the agency believed the engineering professional should have anticipated the need for the receptacles in that location. The agency contended that the professional was responsible for the cost of the change because he should have included the appropriate receptacles in the contract documents.

In another instance in which additional drywall was added as a change order because it was omitted from the architectural plans, the bureau's database showed that the bureau did not pay the architect a fee for administering the change order. The database indicated that this was the only one of thirty-eight change orders approved in which professional fees were withheld.

The change order form used by the bureau does not require bureau personnel to certify that they have reviewed potential errors and admissions. Although a reasonable person reading a given project file would have questions about why certain change orders occurred and whether they were the fault of the contract professional, the files do not document whether the incidents were investigated and do not document the bureau's conclusions about whether the change orders are errors or omissions or how these conclusions have been reached.

Several states, including Texas, Kansas, North Carolina, and Louisiana, have procedures in place to require the staff construction administrator to document whether a change order is caused by an error or omission or for some other reason. Also, South Carolina uses an official form to document the specific errors and omissions and to explain the basis for the assessment of damages to the contract professional. Requiring documentation would require the construction administrator to focus on a review of the status of the change order and determine whether it was a problem for the state.

No bureau policy requires that errors and omissions be identified, investigated, or paid for by the professional if appropriate.

The bureau has not ensured that errors and omissions are proactively managed because it has no policies and procedures requiring that they be identified, investigated, or paid for by the professional if appropriate. The bureau's policy scarcely refers to errors and omissions, stating only that "[i]f an increase occurs to the Construction Contract as a direct result of the Professional's errors or omissions, the Owner may elect not to increase the fee." (The bureau's standard contract with the professional is similarly silent regarding errors and omissions. In addition to the clause stated in policy, the contract states only that the bureau is "the sole judge of whether the Change Order resulted from the Professional's error or omission" and that the professional must obtain errors and omissions insurance to "provide protection from claims resulting" from errors, omissions, or negligent acts of the professional.)

Because conflicts will naturally arise in determining whether a particular change order has been caused by the negligence of a professional, no incentive exists for staff personnel to address directly the question of whether an error or omission has occurred. Without a formal process to address whether an error or omission has occurred, it is less likely that potential errors or omissions by professionals will be scrutinized by the bureau. This increases the possibility that the state will pay for changes that are the responsibility of the professional.

Lack of a System to Retain and Use Experience Data for Future Decisionmaking

Weaknesses in Change Order Data Management for Cost Analysis

Although in the past the bureau has used change order data for analysis, the bureau has not developed an information system to manage change orders--e.g., to identify types of projects associated with higher change order costs or routinely identify specific contract professionals with poor records of controlling change orders.

The bureau operates a management information system, the Project Accounting and Tracking System (PATS), which accounts for project budgets and maintains certain types of information regarding building projects, including data on specific change orders. The bureau has used data from the system in the past to determine change orders as a percentage of original project budgets and for projects under construction as a whole. However, the bureau has

not managed its data to use in other forms of program oversight.

Specifically, the bureau has not:

- developed a system to record and evaluate the cause of change orders through accumulating data on the source of the request for the change order, the reason for the change order, and whether error or omission questions were resolved;
- developed a method of reviewing data to assist in determining the types of projects, such as repair and renovation or new construction, that might lead to higher change order costs; or,
- examined change orders as a percentage of original budgets for completed projects.

The bureau has not fully developed the use of its management information system as a tool in overseeing change orders. Thus, the potential that costly problems will not be addressed, identified, or corrected is increased.

Also, although the bureau has compiled reports in the past listing which contract professionals have the highest change orders as a percent of original budgets, the bureau does not regularly use this information to oversee the professionals. (Although this information could not be used in isolation without the benefit of knowing specific situations regarding the reasons certain projects would be more prone to change orders, this data could provide management with a starting point for reviewing performance of contract professionals on various projects over time.)

PEER also found in its review of recent change order files that there are two types of change orders--those that have already been included in the bid process as "alternate" additions to the construction project and those that were not contemplated during the bid process. During this review, PEER's primary concern was with changes not already bid through a competitive process. Because the bureau does not administratively separate its data collection of the two types of change orders, future efforts by the bureau to monitor change orders that need cost monitoring (those that have not been competitively bid) are hampered.

In a survey of other state agencies overseeing state building construction projects, PEER found that seven of eleven agencies categorize change order by type. Four of the eleven agencies conduct management oversight or periodic review of change order data by type. Two other agencies informally or occasionally review change orders by type and another plans to do so in the future.

The survey showed that states are moving toward analysis of data to assist them in management of the change order

process. For instance, Texas uses the information to determine whether an agency has required an excessive number of change orders. Washington generates monthly reports to improve awareness of the types of changes taking place in the field, especially for errors and omissions. Also, Louisiana generates reports that show annual trends in change order costs as a percentage of original contract amounts.

The bureau has not fully developed the potential for using its management information system as a tool in overseeing change orders. As a result, the potential that costly problems will not be addressed, identified, and/or corrected is increased.

Lack of Formal Evaluation of Contract Professionals at Project End for Use in Selecting Contract Professionals for Future Projects

The bureau does not formally evaluate the performance of contract professionals after they have performed their work, which could help to identify those with poor performance and a poor record of controlling change order costs.

In practice, the bureau does not formally evaluate the performance of its professional architects or engineers in implementing consulting contracts for oversight of building projects. Normally, the performance evaluations should be considered when firms compete for future contracts. The bureau's staff told PEER that they consider their perceptions of past performance of contract professionals during the selection process. However, previous performance is seldom, if ever, documented.

Although the bureau has had a policy since 1995 that requires evaluation of the performance of its contract professionals twice during a project, and the bureau has developed an evaluation form for this purpose, bureau staff state that they do not implement this policy.

Although the bureau has had a policy since 1995 that requires that the bureau evaluate the performance of its contract professionals twice during the lifespan of the project (once upon award of the construction contract and once at the completion of the construction contract), and the bureau has also developed an evaluation form for this purpose, bureau staff told PEER that they do not implement this policy.

Other states, including Kansas, Florida and Wisconsin, have implemented architect/engineer contract evaluation systems that generate information used in selecting contract professionals for future projects. For instance, Florida creates a Past Performance Index using performance data on file for the last five years. This past performance score is used as part of the rating system in its professional selection process.

Without evaluation procedures, the state is without a primary tool in ensuring consistent selection of contract professionals who perform their contracts satisfactorily.

The bureau's staff told PEER that the bureau has been considering the implementation of an evaluation process for internal use to help in assuring that the contract professionals perform their duties.

Recommendations

Process for Selecting Contract Professionals to Oversee Change Orders

1. The bureau should require its selection committee members to rate contract professionals against pre-determined criteria for selection and complete evaluation forms documenting that process. The bureau should retain these forms as documentation of its selection process for a selected period, such as three years after the process has been completed. The evaluation forms should require that the professionals' record of managing changes to contracts be evaluated.
2. The bureau should develop policies and procedures to implement its goal of increasing competition among contract professionals who are awarded construction contracts. In doing so, the bureau should study other states' policies and consider their potential for application in Mississippi, including those that:
 - base a part of the selection process on consideration of the volume of work the firm has performed for the state (i.e., giving extra points to those who have not done work for the state recently); and,
 - include an element of cost competition in the criteria for selection.

Cost Review Process Contracted to Professionals

3. The bureau should revise its internal procedures to require that bureau staff construction administrators obtain complete cost itemizations (e.g., quantities of labor, materials, and equipment) from contract professionals before change orders can be approved.
4. The bureau should revise its standard professional contract to require that the contract professional obtain complete cost itemizations (e.g., type and quantities of materials, hours of labor, and equipment rental rates) from both contractors and subcontractors in the preparation of change orders.

5. The bureau should revise the standard contract with the general contractor to require that the contractor *always* provide change order cost quotes to the contract professional that include quantities of labor, equipment, and materials (unless documentation in files gives a specific, legitimate reason for a waiver).
6. The bureau should inform the contractors in the pre-construction conferences that they will always be required to itemize their quotes into quantities of labor, equipment, and materials.
7. The bureau should revise its professional contracts to conform to policy by requiring the contract professional to:
 - analyze and document the reason for and cost of change orders before presenting them to the bureau; and,
 - certify in writing that the costs have been examined and documented and have been found to be reasonable. This could be accomplished in practice by revising the approval forms to require the statement.

Bureau's Oversight Process for Analyzing and Controlling Costs

8. The bureau should implement policies and procedures requiring its personnel to review change order proposal costs and document their review. The bureau's policy should also require its staff and the contract professional to verify and certify that the change order costs are not already included in the bureau's contract with the general contractor.
9. The bureau should determine the types of training that a staff construction administrator needs to analyze and determine the cost efficiency of proposals for change orders. The bureau should research ways to conduct training at minimal cost and develop a routine system of training for its administrators. To provide training at a reasonable cost, the bureau could consider requesting help from retired and active professionals, academics, and contract estimators without direct ties to the state contracting process who would train the staff at bureau offices.
10. The bureau should develop policies and procedures related to errors and omissions to give guidance to staff construction administrators in identifying, investigating, and resolving problems that might arise. As part of such procedures, the bureau should revise its standard change order forms to require that bureau staff note whether a change order is caused by an error

or omission, an unforeseen circumstance only, a scope change by the tenant agency, or for some other reason. This would require the construction administrator to address the question of potential errors and omissions directly and would require that the issue be discussed and resolved by bureau management.

11. In some cases, all or part of the increased costs due to errors and omissions may be owed to a third party such as a contractor, and the professional may elect to negotiate directly with the contractor and pay the contractor directly for the work. In those cases, the bureau should require that all work added to the project for the errors or omissions be reported to the bureau. As a result, the bureau would be able to monitor the total cost of the contract and the status of change orders and errors and omissions, information which is currently not recorded in the bureau's data.
12. The bureau should consider prohibiting construction oversight work on a given project by those professionals who perform design work on that project. This would help to avoid a conflict of interest on the part of an architect or engineer who might hide, during the construction oversight stage, an error or omission that he or she committed during the design stage.
13. The bureau should study its system of compensating contract professionals and also study the compensation systems and contract provisions of other states' building agencies. The study should seek to find better and more cost-effective ways to provide financial incentives and disincentives to the contract professionals to encourage them to reduce change order costs.

In devising a new compensation system to improve cost effectiveness, the bureau should consider revising the standard professional contract as follows:

- a. Currently, the bureau is in the practice of reducing the contract professionals' fees when it approves change orders that reduce the contract cost. This is a disincentive for the professional to seek ways to reduce total contract costs. The bureau should eliminate this practice but offset the costs of this change with a decrease in overall fees paid to professionals. Therefore, the overall amount paid to professionals would remain the same, but professionals who are successful in keeping costs down would not be directly penalized as is currently the case. (The bureau should study the history of change order

fees in its database to project the cost of the policy change and to calculate the amount by which overall fees should be decreased to offset the costs.) The bureau should also consult with the state of Washington to discuss its implementation of this policy.

- b. The bureau should revise its contracts to require an *automatic* denial of a change order fee if the bureau determines an error or omission was committed (the contract currently states that fees *may* be denied if the professional is found to be at fault).
- c. The current standard contract does not include a requirement that the professional pay for the cost of a change order resulting from an error or omission caused by the professional. The bureau should revise its contracts to require the professional to pay the bureau or contractor for the portion of change order costs caused by an error or omission, unless all or a portion is waived by the bureau. This would allow the bureau to determine if there are extenuating circumstances (which must be documented) in which a professional should not be required to help pay for a change order.
- d. The bureau should revise its contracts to require a reduction in the final payment to the professional by a specified amount (determined by the bureau) if final change order costs are 2% or more above the original contract amount. In order to be fair to the professional, the calculation of the final change order costs would exclude:
 - amounts resulting from a scope change by the agency (a letter from the agency would have to prove this); and,
 - an "alternate" included in the original contract bid (i.e., a bid for a specific item or part of the project which is optional).

Lack of a System to Retain and Use Experience Data for Future Decisionmaking

- 14. The bureau should begin to collect and analyze information and develop reports to help in the overall management of change orders. For example, the bureau should develop a system to classify change orders by type, such as requesting entity (bureau,

professional, tenant agency, contractor) and reason (error, omission, scope change).

15. Bureau personnel should comply with the bureau's policy of evaluating architects and engineers on their performance twice during the lifespan of a project. The bureau should document this evaluation, compile the information in a management information system, and use the data to assist during the selection process in rating contract professionals on their experience working for the state.

Appendix: Regulatory Environment that Discourages Cost Competition Among Architects and Engineers

Engineers

Professional regulations in the state of Mississippi restrict competitive bidding procedures in the selection of engineers for services. The restriction on competition is supported by Mississippi statutes that give the profession the authority to restrict competitive bidding. However, state regulations allow some price competition under certain restricted circumstances. Generally, engineers may submit sealed price proposals on a project after the client has:

- prepared a scope of work that has been certified as complete and adequate by a registered professional engineer (the client would usually hire the engineer to perform these services since the engineer is not allowed to submit a proposal on the project);
- solicited and reviewed project proposals; and,
- selected candidates based on qualifications and competency.

The national environment favoring restriction in competition is supported by the *Federal Acquisition Regulations* that require all federal executive agencies to select engineers based on qualifications and then negotiate the fees with the chosen firm.

Architects

Professional regulations in Mississippi do not restrict competitive bidding procedures in selecting architects to perform services. Also, the American Institute of Architects (the national association for the promotion and regulation of architects which sets codes of ethics standards, known as the AIA) does not prohibit competitive bidding in the profession. However, architects have not always competed on price. In fact, according to the AIA, approximately forty states currently require selection of architects based on qualifications (not price). The *Federal Acquisition Regulations* also require federal executive agencies to select architects based on qualifications and experience.

SOURCE: Mississippi State Board of Registration for Professional Engineers and Land Surveyors Rules and Regulations of Procedure ; Mississippi Board of Architecture Rules and Regulations; American Institute of Architects website; *Federal Acquisition Regulations*.

Agency Response



STATE OF MISSISSIPPI
DAVID RONALD MUSGROVE, GOVERNOR

DEPARTMENT OF FINANCE AND ADMINISTRATION

GARY ANDERSON
EXECUTIVE DIRECTOR

May 8, 2002

Dr. Max Arinder, Executive Director
Joint Committee for Performance Evaluation and Expenditure Review
501 N. West Street
Suite 301-A Woolfolk Building
Jackson, Mississippi 30201

VIA HAND MAIL

Dear Dr. Arinder:

We have reviewed a copy of the draft report regarding the way in which the Department of Finance and Administration manages the construction process within the Bureau of Building, Grounds and Real Property Management.

While we are always seeking to further refine the processes within the Bureau, we are greatly disappointed in the level of criticism levied by the PEER report regarding the management of the change order process. The criticism is unwarranted and does not accurately reflect the actions of the Bureau in the management of this process.

Since the beginning of the Musgrove Administration, the Bureau has been aggressive in eliminating unnecessary change orders in construction projects. For example, we have lowered the overall percentage of change orders from 5.2% to 4.2% during this period. We are initiating further changes including the revision of the 1995 edition of the Bureau's procedure manual to insure the best investment in facilities for the State of Mississippi. Unfortunately, these affirmative actions taken by the DFA are not noted in the report.

I understand that PEER staff have researched similar operations in eleven (11) other states across the country. We appreciate your efforts and would ask you to share any best practices being employed by other states for our consideration. While other states may approach their operations

Dr. Max Arinder

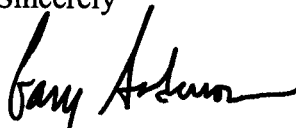
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differently than we do in the State of Mississippi, we would emphasize that the DFA Bureau of Building acts within its statutory authority in the selection of professionals, managing the construction program, and implementing the change order process.

As we engage in the process of reevaluation and revision of our procedures, we will evaluate the observations of the PEER committee and others in order to enhance our efforts to serve the people of the State.

Sincerely

A handwritten signature in black ink, appearing to read "Gary Anderson", written in a cursive style.

Gary Anderson

cc: Katherine Landrum

PEER Committee Staff

Max Arinder, Executive Director
James Barber, Deputy Director
Ted Booth, General Counsel

Evaluation

Sam Dawkins, Division Manager
Linda Triplett, Division Manager
Oona McKenzie
Pamela O. Carter
Kim Cummins
Barbara Hamilton
Karen Kerr
Joyce McCants
Charles H. Moore
David Pray
Lee Anne Robinson
Katherine Stark
Lynn Watkins
Sara Watson
Candice Whitfield
Larry Whiting

Editing and Records

Ava Welborn, Editor and Records Coordinator
Tracy Bobo
Sandra Haller

Administration

Mary McNeill, Accounting and Office Manager
Pat Lockett
Jean Spell
Gale Taylor

Data Processing

Larry Landrum, Systems Analyst

Corrections Audit

Louwill Davis, Corrections Auditor