



Johnson County Auditor
Johnson County, Kansas
PERFORMANCE AUDIT

June 2, 2005

**Processing Construction Contract
Change Orders**

*"Johnson County needs better quality control systems for
managing and approving construction contract change orders"*



Johnson County Audit Services

June 2, 2005

To: The Johnson County Board of County Commissioners
Director, Johnson County Public Works Department
Director, Johnson County Facilities Department
Administrator, Johnson County Wastewater Department

The County Auditor audited the County's management of construction contract change orders. The objectives of the audit were to ensure that change orders processed in conjunction with construction projects were accurate, complete and in the best interest of Johnson County.

Change orders are a normal and expected part of construction activities. Most change orders reviewed were necessary and unavoidable. In two of three departments reviewed, we determined management relies to a large extent on contracted construction management services. The contract managers (consultants) provide management services related to the construction process including recommending approval of change orders. Our audit focused on the County's oversight of the change order process.

Johnson County management of change orders needs improvement in several areas:

- There is a risk for errors, overcharges and fraud because the County lacks a quality control system designed to ensure that change orders are processed accurately and in the best interest of the County. (*See page 2*)
- Errors in change orders, although relatively low in dollar value, went undetected by consultants and the County. Neither the County nor the consultants had effective quality controls to detect and deter overcharges. (*See page 4*)

Recommendation: The report makes recommendations to the Directors, PWK, FAC and Administrator, JCW to (i) implement a quality control system that will ensure all change orders are properly processed, and (ii) require all consultants to maintain a quality control system.

The audit was conducted according to applicable standards contained in *Government Auditing Standards*, issued by the Comptroller General of the United States, except that Peer Review has not been performed, and included such tests of the procedures and records as considered appropriate.

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PROCESSING CONSTRUCTION CONTRACT CHANGE ORDERS

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RESULTS AND RECOMMENDATIONS

Johnson County Needs Quality Controls for Construction Contract Change Orders

The Departments of Public Works (PWK), Facilities (FAC), and Johnson County Wastewater (JCW) need better quality control procedures and practices to ensure contract change orders and resultant invoices for payment are proper. FAC and JCW relied on engineering and architectural firms' (consultants) expertise in recommending and evaluating change orders. Although department staff stated they reviewed change orders before approval, there was no documentation of the decisions made. The consultants' quality control systems for evaluating change orders varied from vendor to vendor, but even the best designed system was not applied consistently. Our audit determined most of the change orders in our sample were necessary and unavoidable. However, our review disclosed overcharges and billing errors which were not detected by the consultants or County staff. Although the dollar value of observed overcharges was small, the vulnerability continues to exist for errors, overcharges and fraud. Additionally, there is no assurance future overpayments will be prevented.

What are Change Orders?

FAC is responsible for construction and maintenance projects involving County buildings. JCW constructs and maintains sewer systems and sewage treatment facilities. PWK builds and maintains roads and bridges in the unincorporated areas of Johnson County. After construction has begun, any change in plans is managed by developing a change order – a change to the proposed and accepted bid obtained from the contractor.

A change order can occur from any number of conditions including:

- Changes in design requested by the County,
- Errors in designs which need to be corrected during construction, or
- Field conditions not described in the bid process or unknown to the County prior to bidding.

Some change orders do not result in additional costs. Some change orders result from under bidding or misunderstanding the bid requirements by the building contractor and are the responsibility of the building contractor. Assessing the cause for the change orders is critical to determining who is responsible for the change.

How Audit Services did the audit

Table 1 shows the number and dollar value of projects, managed by PWK, FAC and JCW, which were in progress during the review period and the number and dollar value of projects we selected for review of change orders – four from each department.

Table 1: Projects and Costs

	Reviewable Projects	Number Reviewed	% Reviewed
Projects	36	12	33%
Dollar Value	\$68.4M	\$16.6M	24%

Source: List of projects with change orders opened between 1/1/2003 through 1/1/2005 provided by departments.

We reviewed all change orders on the 12 selected projects. The reviewed change orders had a value of approximately \$594,000¹ and constituted approximately 3.6% of the \$16.6M project cost. We independently re-calculated the amount charged to the County for each of the selected change orders and reviewed the reasoning for the changes. Within that sample, we found approximately \$15,000 in questionable items. We discussed the selected change orders with the responsible representatives of the departments and documented their understanding of the change order management process.

We also met with consultants for three of the projects which had change orders. We discussed their change order management procedures and compared that information with the information provided by the departments.

We appreciate the time and effort expended by all County employees who assisted by participating in this process. We discussed the audit results with County management and department staff.

The County is at risk for errors, overcharges and fraud because it lacks quality controls

Our review of a sample of change orders disclosed most were necessary and unavoidable. However, we did not find any evidence the three department staffs had established quality control procedures for reviewing, approving, and documenting change orders. Some quality control features that can be used include:

- Identification of cause for change order
- Assessment of liability for change
- Independent estimate of cost for change
- Comparison of independent estimate to estimate provided by contractor
- Development of negotiation strategy
- Documentation of negotiations
- Review, approval and documentation of agreed upon costs
- Verification of accuracy of invoices submitted for payment

When consultants were used, Department staffs expected consultants to manage the change orders properly and effectively. However, the consultants did not share the same expectations, nor view their management role the same as department staff.

¹ The dollar amount of change orders reviewed includes both additions and reductions of contract amounts.

PWK had the best result in our review of the change order calculation. We did not note any errors in the final calculations. This is due, in part, to PWK's use of unit price contracts and the application of the unit price to change order work, and, in part, to their direct participation in the change order process. However, we did observe that there were significant delays in locating supporting information for the change orders we asked about although we were provided with complete files for review. We did not find any evidence in the contract files of price negotiations when the unit prices were changed, although additional information was provided subsequently.

The County relies on consultants to provide recommendations for change orders

The consultant is responsible for reviewing the change order and making recommendations as part of its management contract. In interviews, County staff generally agreed the County relies on the expertise of the consultants to accurately monitor the change order process although the extent of the reliance varied from department to department. The ultimate responsibility of the project remains with Johnson County staff. The consultants recommend the timing and cost of change orders to the County. County staff provides final approval before work on the change order can proceed.²

Managers at FAC and JCW have not developed a standard policy or procedure for reviewing and approving the work of the consultants or procedures for handling change orders. PWK, does not routinely use consultants. The departments relied on standard contract documents from the American Institute of Architects (FAC) or standard engineering contracts from the Engineers Joint Contract Documentation Committee (JCW and PWK), in conjunction with some Johnson County special provisions, and the general knowledge and experience of the consultants.

We interviewed staff at three firms providing consulting services on some of the contracts and change orders included in our review. The consultants viewed their role as "information processors" between the construction contractor and the County. They recommended approval or denial of change orders based on experience and general knowledge rather than the application of rigorous calculation and documented review.

One consultant stated they are "resident observers." This consultant stated they try to remain neutral to enable them to arbitrate conflicts between the contractor and the owner (the County). Another consultant described a very complete quality control system and explained their procedures in detail. However, they stated that after a number of years their staff has become so experienced that many of the described procedures are not followed. Our review of change orders with this consultant disclosed the contractor made a number of mathematical and contract errors that were not detected by the consultant or the County.

We were not able to confirm the statements of the consultants regarding their role or determine a level of confidence in the County's reliance on the consultants because of the lack of documentation. In general, we found no evidence in the County's records of the

² In some cases, work on the Change Order proceeds prior to County approval based on the urgency of the correction or construction constraints.

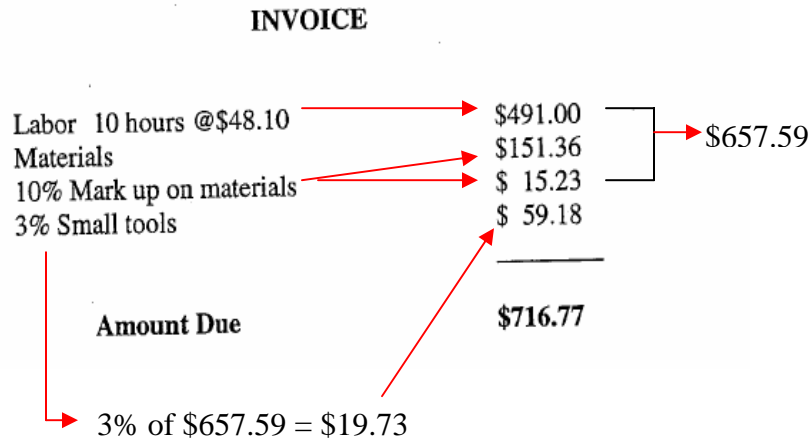
reasoning or support for the change orders we reviewed, although the consultant was generally able to provide some support.

Errors in change orders went undetected by consultants and the County

As part of our review, we recalculated the basic mathematics on contractor invoices submitted for payment in conjunction with a change order. The purpose for this review was to determine if errors slipped through because of the weaknesses we identified in the County's procedures and practices. We found relatively minor errors but they were undetected by any of the responsible parties in the change order process. Although the errors we found were minor, the vulnerability continues to exist. Some examples follow:

- We reviewed one contract which showed 5 of 31 line items on the 3 change orders had errors. The errors consisted of simple mathematical mistakes and misapplication of the contract provisions. These line items were approved by the consultant and by Johnson County staff with no comment. We reviewed these items with the consultant and they agreed to recover overcharges and repay the County.
- Figures 1.1 and 1.2 are extracts from invoices we reviewed on FAC projects. They show obvious errors in calculation of invoice amounts and contractor fees.

Figure 1.1: Erroneous Invoice Calculation



Note: As shown, none of the calculations are correct. In addition, this subcontractor's invoice was included in the contractor's change order with an additional percentage added (which would also be incorrect) for the contractor's fee on sub-contract work.

There is no standard process for determining the responsible party for change orders or correctly assigning the cost responsibility. The departments need to establish procedures to oversee the consultants' work, where applicable, and take measures to ensure all parties to a change order perform the necessary checks and balances to ensure the County is protected from errors, overcharges, and potential fraud. This issue is not merely a documentation problem. In fact, it is a management control weakness that undermines the confidence that the County is getting the most reasonable price for the work that is being done.

Recommendations

We recommend the Directors of Public Works, Facilities, and the Administrator of Wastewater:

- 1.1 Implement a quality control system that will ensure all change orders are properly processed. The quality control system should contain provisions for department staff and consultants to ensure the propriety of the change order, the reasonableness and accuracy of price for the change order and full documentation of the change order pricing process. This would include documentation of how the price was determined, reviewed, negotiated, and accepted.
- 1.2 Require all consultants to maintain a quality control system sufficient to ensure change orders for Johnson County projects are accurate, complete, in the best interest of Johnson County, and comply with contract provisions.
- 1.3 Ensure quality control procedures include provisions for recovering overcharges when appropriate.

Management Response

We appreciate working with you on the change order audit report. However, we believe your findings justify a much more positive report. From our perspective you found some small math errors and a lack of written procedures for change orders. Only two change orders were determined by you (and the main portion of which was not agreed to by the department) to be unnecessary. All other change orders were found to be necessary or unavoidable.

We have reviewed your recommendations and conclusions and have the following response.

1.1 Implement a quality control system. *We agree that a written quality control system for County staff should be implemented. We believe that the change order process is fairly well documented in the contract documents and procedures were generally followed. We could find no local governments that had a documented process in place. However, each department is developing procedures to comply with your recommendations.*

1.2 Require all consultants to maintain quality control system. *We agree that consultants should have a quality control system in place, and we will require them to follow the same procedures that we have developed.*

Finally, we believe the current multi-party (county and consultant), multi-level (consultant and county staff usually involve more than one person) process provides the county with some protection against problems with change orders, but does not eliminate the risk associated with this process.

Thank you for your cooperation and suggestions on this audit.

OBJECTIVES, SCOPE AND METHODOLOGY

Objectives

1. Determine if adequate procedures/controls exist to keep the costs of change orders related to construction contracts to a minimum.
2. Determine why change orders are occurring
3. Determine the extent to which change orders could have been avoided or minimized
4. Determine whether remedies for County reimbursement for avoidable change orders are pursued
5. Determine the extent of disclosure of change orders to the BOCC

Background

Change orders are a normal part of construction contracts. Johnson County manages over \$100M in construction projects each year. Change orders, although a small percentage of the total value of contract costs, are substantial in actual dollars spent.

We limited our review to the three departments that handle the bulk of the construction contracts. The Johnson County Library and Johnson County Parks and Recreation also do construction but their activities are less frequent.

Scope and Methodology

To accomplish the audit objectives the auditors:

- Selected a sample of change orders for detailed review
- Categorized change orders by reason for change
- Classified changes orders into avoidable and unavoidable
- Reviewed change orders for accuracy and completeness
- Reviewed quality control systems related to change orders
- Interviewed applicable Johnson County staff
- Interviewed contract management consultants

Based on the materials gathered and interviews, we analyzed the current change order quality control system and developed our conclusions about needed improvements.