



Program Evaluation and Audit

**Central Corridor Light Rail
Transit**
*Advanced Construction Contracts
Change Orders*

May 20, 2011

INTRODUCTION

Background

“Advanced” construction work on the Central Corridor Light Rail Transit (CCLRT) line began in the spring of 2010. Two contracts, funded with local (from the regional rail authorities and the Counties Transit Improvement Board) and state dollars, were issued under the authority of a “Letter of No Prejudice” (LONP) from the Federal Transit Administration (FTA). (The LONPs allowed the Metropolitan Council to incur costs and retain eligibility for future FTA grant assistance.) The Advanced Utility Relocation (AUR) contract awarded to Carl Bolander & Sons for \$12,501,162 on August 26, 2009, relocated existing underground public utilities along 4th St. in downtown Saint Paul to prepare for the major track and station work to come. The Advanced Traffic Improvements (ATI) contract, awarded to Graham Construction Services for \$3,616,440 on March 24, 2010, laid the groundwork for LRT construction activity in and around the University of Minnesota campus. It was necessary to complete the work on these contracts before work on the major construction contracts—Civil East, Civil West, and Systems—could begin in the fall of 2010.

Change orders—which authorize and establish a price for work not covered by the original construction plans and specifications—are a traditional source of risk for construction contracts. For the “owner,” the Council, the two most basic risks are that a change order may pay too much for work not covered in the original contract or that a change order may pay for work already covered in the original contract. Such risks are typically higher for “lump-sum” contracts, such as Civil East, Civil West, and Systems, but even for “unit-price” contracts like AUR and ATI, change orders bear scrutiny. They may be priced incorrectly, or they may estimate quantities—either the quantities that form the basis for the change or the quantities in the change order itself—incorrectly. The total number and dollar amounts of the change orders may also be concerns. A large number of change orders may indicate that the design specifications were incomplete, for example.

CCLRT’s Quality Assurance/Quality Control Manager recently completed an audit of the Central Corridor Project Office (CCPO) Change Order Procedure 630-01. His audit focused on the change order process, and found a need for greater consistency in Independent Cost Estimates (ICEs) and other forms and for more training in CCPO procedures. While this audit also surveyed the change order procedure, it more thoroughly examined the financial implications of each contract change. It tested if the change order is within the general scope of the contract, and asked if the pricing of the change order was reasonable and allocable to the contract scope.

Work on the AUR and ATI contracts is largely complete. Work on the larger CCLRT construction contracts began in earnest in spring 2011. Not only is a retrospective review of change orders on AUR and ATI in order, but such a review can also prompt adjustments—if any are needed—to the change order process for construction work to come.

Purpose

- To ensure that internal controls have been developed and maintained.
- To ensure that contract terms and best practices are being followed.
- To identify overcharges, if any, in the pricing of change orders.
- To identify opportunities, if any, to avoid costs associated with change orders.

Scope

Change orders over .1 percent of the total contract award amount were selected for audit. The AUR contract was awarded for \$12,501,162, so change orders over \$12,501 were sampled. Nineteen of 55 change orders on the AUR contract were sampled. The ATI contract was awarded for \$3,616,440, so change orders over \$3,616 were sampled. Twenty two of 46 change orders on the ATI contract were sampled.

Methodology

The process of executing a change order is fundamentally the same across construction contracts, whether the owner is public or private. The owner—for CCLRT, the Council—controls the process, determining (with the aid of the contractor) whether the proposed work is outside the scope of the contract, and thus requiring a change. The owner similarly determines, before the fact, whether the proposed work is reasonable and necessary. The owner estimates the cost of the work independently of the contractor's estimate for the work (if the contractor's estimate is required). Then the owner and contractor agree on a price for the work. That price may be determined by existing unit prices already in the contract (if the work is an extension of the kind of work already done), or it may be estimated from prevailing wage and supply costs and tracked on a time and materials basis, with a “do not exceed” amount to protect the owner from cost overruns.

In addition to these standard industry practices, there are some procedures that must be followed on the CCLRT project because it is a public works project funded with taxpayer money. The list of authorizers of a change order is longer than that for a private construction project. The Council itself must authorize the change if the cost of the change order, when added to the sum of the previously authorized changes, exceeds 5% of the original contract amount. If changes to the work are to be executed by subcontractors not part of the workforce with whom the prime contractor bid the job, they

are subject to the same Disadvantaged Business Enterprise (DBE) considerations as the original bidders. State and federal laws compel the Council to take the lowest bid that is offered to execute the change.

The criteria to evaluate change orders on these advanced construction contracts were taken from three sources: the General Conditions of the contracts themselves (standard across the contracts); the FTA's Best Practices Procurement Manual; and CCLRT's own change order procedure, 630-01. Before these criteria were used to review the change orders, the change order was categorized. The most common types of change orders are: scope changes requested by the owner, scope changes requested by the contractor, design errors and omissions, and unforeseen field conditions. If the change order was the result of a design error, or an "unforeseen" field condition that should have been foreseen, project managers were interviewed to determine the cost responsibility for the change order. Industry practice charges a design error to the party who made the error.

Change orders were examined using the following criteria:

(From the General Conditions of the construction contracts:)

- Is the contract price adjustment based on i) unit prices, ii) lump sum agreement, or iii) the contractor's actual cost of the work? (General Conditions 10.3.)
- Are improper costs not allowed? (10.5.)
- If the contract change is not priced using unit prices, has the contractor submitted cost or pricing data to substantiate the cost? (General Conditions 10.9 say that the contractor "may be required to submit this data," not that the contractor must, but it would be a recommended practice to submit it, to better evaluate the reasonableness of the cost.)

(From the *Best Practices Procurement Manual*:)

- Is the change order within the general scope of the contract? (BPPM 9.2.1.)
- Is there an Independent Cost Estimate (ICE)? (9.2.2.)
- If the change order is caused by unforeseen field conditions, has the contractor proven that site conditions differ materially from specifications? (9.2.3.1.)
- Is the cost negotiated reasonable and allocable? (9.2.3.3.)
- Does the overhead rate conform to federal cost principles? (9.2.3.3.)
- Is the profit reasonable and customary for the work performed? (9.2.3.3.)
- If the unit price is adjusted, is it adjusted only after quantities vary by more than 15% (up or down)? (9.2.3.4.)

(From CCPO Procedure 630-01, *Change Orders*.)

- Is the change order limited to one action? (6.2.a.)
- If the change order describes a design change, is the change documented by the CCLRT Design Manager? (6.2.e.)
- If the CO revises the plans or specifications, are appropriate references or attachments included? (6.2.f.)
- Is the change order properly initiated?
- Is the change order properly authorized?
- If the change order is in two parts, does part 1 contain (5.2):
 - The ICE?
 - The contractor's estimate?
 - A "not to exceed" amount from the Council's Authorized Representative (CAR)?
- If the final cost reported in part 2 exceeds the authority of the person who approved part 1, is part 2 approved by the proper authority?
- For two part change orders done on a time and materials basis, does part 2 document the time worked and the materials used?
- Has the CAR reviewed DBE participation on the change order, and checked the appropriate box describing that participation on the *DBE Statement for Change Orders funded by FTA Money*?

Assurances

This audit was conducted in accordance with the Institute of Internal Auditors' *International Standards for the Professional Practice of Internal Auditing* and the U. S. Government Accountability Office's *Government Auditing Standards*.

OBSERVATIONS

Control Environment

To strengthen the control environment for change orders, the CCPO *Change Order* procedure, 630-01, tasks a greater than usual number of people with change control responsibilities. The following is just a partial list of the persons described in the procedure and their duties:

- The *Project Director* chairs the Change Control Board and initiates and approves change orders “which impact major milestones,”
- The *Construction Manager* tracks the change order process in general, but specifically notifies the Project Director when changes have the potential to impact the project schedule,
- The *Office Engineer* assists the CAR in drawing up and documenting change orders,
- The *Estimator* develops ICEs for changes using the specifications provided in the General Conditions,
- The *Document Control Specialist* captures and catalogues change order records in the Project Management System.

To further strengthen the control environment, a number of these individuals regularly meet in groups unique to the project: the *Change Control Group*, which meets during the construction phase of the project to review and prepare changes; and the *Change Control Board*, a group of project managers that coordinates project changes with the FTA and other project partners.

As the procedure describes it, however, the primary responsibility for controlling the change order environment devolves onto two project principals: the Council’s Authorized Representative, or CAR; and the Project Controls Manager. The CAR is the liaison between the contractor and the Council, and the chief communicator of changes from the contractor to the change’s authorizers. According to 630-01, the CAR “has the authority to act on behalf of the . . . Council on a construction contract,” and initiates most change orders, prepares all the necessary documentation surrounding change orders, and approves those changes that he or she is authorized to do so. The Project Controls Manager coordinates the approval process of change orders, ensuring that proper procedures are followed, and keeps the project directors informed of the state of changes across all contracts, through Project Management Team (PMT) meetings and other venues. In sum, the CAR has the primary responsibility for controlling the change order process “in the field,” or on the construction site; the Project Controls Manager oversees the change control process back in CCPO.

Approvals and Authorizations

An important part of the change control environment is to carefully delineate the levels at which project managers are able to initiate and authorize changes to the contract. By Council action on April 14, 2010, the authorization levels were revised upward, to accommodate the size of the Civil East, Civil West, Systems, and Operations and Maintenance Facility contracts, but these new levels did not apply to the AUR and ATI contracts. For them, the initiation and authorization levels were consistent with the Metropolitan Council signature authority to initiate contracts. Those authorization levels are:

Signature Authority on the AUR and ATI Contracts

SIGNATOR	ADDITIVE CHANGE ORDERS	DEDUCTIVE CHANGE ORDERS
Council's Authorized Representative	up to \$3,000	up to \$5,000
Assistant Construction Manager	up to \$5,000	up to \$15,000
Construction Manager	up to \$15,000	up to \$35,000
Assistant Project Director, or Deputy Project Director, or Project Director	up to \$35,000	over \$35,000
General Manager	over \$35,000	N/A

Source: Change Order Authorizations memo, dated September 15, 2009.

Again, the cumulative value of change orders cannot exceed 5% of the original contract amount without authorization by the Council.

All change orders sampled, on both contracts, were properly initiated and authorized.

The cumulative value of change orders on both the AUR and ATI contracts exceeded the 5% threshold that requires Council action, but in all the change orders sampled, this cumulative amount was carefully tracked in a "Change Order Summary" sheet. The Council authorized a "supplemental adjustment" in the amount of \$650,000 to the AUR contract on July 28, 2010 and adjustments to the ATI contract of \$360,000 on July 14, 2010 and \$171,000 on July 28, 2010. These supplemental authorizations ensured that subsequent change orders did not exceed the 5% threshold. Similarly, Audit did not find an instance where the CCPO manager signing to authorize a change order did not have the requisite authority to approve it; or, for two part change orders where the final cost reported in part 2 exceeded the authority of the person who approved part 1, where part 2 was not approved by a proper authority.

The CAR initiates change orders under \$100,000. There were two change orders over \$100,000 on the ATI contract and one over \$100,000 on the AUR contract, and they were properly initiated by the General Manager.

Design changes were properly documented by the Design Manager or Design Services.

Some changes in these two contracts added or deleted additional work at existing unit prices. Some changes—like ATI Change Order 24, which added storm water management improvements underneath a street on the University of Minnesota campus—constituted actual design changes, perhaps to respond to field conditions that were unforeseen in the original contract specifications. For design changes, the CCPO procedure includes an additional oversight step to the usual approvals, requiring that they be documented by the CCPO Design Manager. The revision to the change order procedure tightened this requirement even further, directing design changes to be “developed through Design and Project Controls in conjunction with Project Controls Configuration Management procedures.” With these approvals in place, and given the nature of the process, it would be difficult to change a design in construction that Design Services was not informed of, and Audit did not find any.

Cost Responsibility

If a change order is the result of a design error, industry practice makes the party who made the error responsible for its cost. That could be the design consultant, or it could be the stakeholder who provided the specifications underlying the design to the consultant. At other times, a party other than the owner of a project may request a change and agree to pay for it. Determining cost responsibility is then a matter of negotiating over the work’s price and scope.

In a few instances, the rationale for the Council’s assuming the responsibility for “design errors” was unclear.

Audit found a few instances on these contracts where the costs arising from changes described in the documentation as design errors were assumed by the Council.

- AUR Change Order 17 for \$21,082.51 paid to reinstall water services to the First Bank Building in downtown St. Paul. The services had to be reinstalled after they were disrupted by the construction on 4th St. This was a contract change because the original design plans did not show water services entering the building from 4th St.
- ATI Change Order 15 for \$13,404 paid for a series of relatively minor revisions to the specifications to accommodate design changes requested by the University of Minnesota, among others. The University was not asked to pay for these changes because it asserted that the items had been conveyed to the Council during the design phase. Audit could find no documentation of that communication.
- ATI Change Order 24 for \$11,812 paid to jack a 30” storm sewer from one structure to another. The change order explains that the change was needed because “The ATI plans did not accurately depict the University of Minnesota's electrical duct bank.”

- ATI Change Order 22 for \$9,061 paid to relocate a storm sewer basin and pipe. According to the change order, this change was again the result of “the University of Minnesota electrical duct banks being depicted incorrectly in the plans.”

The question was asked why the Council assumed the costs for these design errors. On the ATI contract, Audit was told that project managers sought, and received, remuneration when it was feasible, and that the “give” in one part of a contract was offset by the “take” on another. On the AUR contract, Audit was unable to determine why the design plans did not show the correct location of the water services, or what party—Saint Paul Regional Water Services or the design consultant—would have been responsible for showing it correctly.

ATI Change Order 24 also illustrates that the real cost of a change order can be larger than the nominal amount of the change. The nominal amount of the change, the amount the change order was written for, was \$11,812. The real cost to the project, the amount that it took to actually jack the storm sewer, was \$96,000. The difference--all but the amount of the change order--was paid for with surplus funds from existing line items. When change orders were accounted for this way, the accounting was specifically detailed in the change order documentation.

Proper Costs

Sections 10.4 and 10.5 of the General Conditions of these construction contracts list the kinds of costs that the contractor can—and cannot—charge to the owner. Section 10.4 lists the actual “Costs of the Work,” and section 10.5 lists the “CONTRACTOR Costs Deemed Covered by Overhead and Profit Fee.”

Section 10.6 of the General Conditions also specifies the overhead and profit fees that the Contractor is allowed to charge the contract: 15 percent on the first \$50,000 worth of work and 10 percent on the work over that dollar amount. Subcontractors are allowed the same percentages for the work that they do directly, and the prime contractor is allowed to charge a markup of 5 percent for the work done by its subcontractors.

All costs charged to the sampled change orders were allowable, and the percentage markups for overhead and profit were in accord with the General Conditions of the contract.

Audit did not find any improper costs charged to the sampled change orders. In the rare instance where the cost of an officer or project manager was initially submitted on a contractor’s invoice, the CAR or Office Engineer had disallowed that cost.

The techniques for estimating labor costs for change orders varied, especially on the ATI contract.

Cost estimates, delivered before the change order is approved, are critical to ensuring a fair and reasonable price for change orders, and to minimize the risk of overpayment.

This is especially true of the estimates of labor costs associated with a change order. Unlike design engineering work, which takes place in a controlled environment by relatively stable labor forces, construction work happens in the field, where workers come and go (more often) and subcontractors may be brought in on the spur of the moment to perform a specialized task. The design consultant on the CCLRT project was required to submit a schedule of billing rates for individual employees as an appendix to the contract. The General Conditions of CCLRT construction contracts, however, only require construction contractors to submit “schedules of job classifications” with claims of payment for labor costs, not schedules of individual employees and their rates of pay. Similarly, when submitting a claim for payment on a change order after the work is done, the General Conditions say that the contractor “*may* be required to submit . . . Cost and Pricing Data to substantiate the reasonableness of CONTRACTOR's proposed adjustment,” not that they *must* submit such data. In sum, the primary control on the reasonableness of a contractor’s proposed change occurs before the change occurs, when the estimate is formulated, not afterwards when a submitted invoice is checked against a preapproved labor schedule and other cost data.

Audit found that the techniques for estimating labor costs for change orders varied across the AUR and ATI contracts. On the AUR contract, when a project stakeholder (primarily District Energy) was not footing the bill for the change and doing its own estimating, field office personnel usually relied on AECOM’s estimators, using Minnesota prevailing wage rates, to produce an independent cost estimate. Of the 19 AUR change orders sampled, two did not use either an AECOM or stakeholder’s estimate. The practice was different on the ATI contract. There, while the largest change orders in terms of dollar amounts continued to use CCPO estimates, nine of 22 change orders sampled relied on estimates produced by field staff attached to CCPO. Many of these obtained the prices used in the estimates from the contractors themselves--obviously not an objective source.

Cost or Pricing Data

As previously noted, the General Conditions of these construction contracts do not require contractors to submit cost or pricing data to support the reasonableness of their claims for payment on change orders. It is difficult to evaluate the reasonableness of a cost without such data, however. On the ATI contract, the documentation for Change Order 31 contains just the bill from the contractor: no information beyond the description on the bill about what the contractor did for the money. Change Order 22 contains some supporting documentation, but not the timesheets or other logs of the labor costs on the change. Change Order 24 contains documentation to support some but not all of the costs. Audit was told that field office personnel discussed the costs with the contractor, but there was no documentation of that discussion.

Independent Cost Estimates

The FTA's *Best Practices Procurement Manual* (drawing from FTA Circular 4220 and the Common Grant Rules) requires a grant recipient to perform a cost or price analysis in connection with every procurement action, including contract modifications. In essence, a contract modification or change order is a separate procurement, bound by the same regulations as governed the initial contract solicitation itself. The basis of a cost analysis is an independent cost estimate (ICE), "independent" of any input from the contractor, and prepared before the contractor submits its cost.

The ICEs of all sampled change orders on the AUR contract were independent and prepared before the change order was executed. Seven of the 22 change orders sampled on the ATI contract had ICEs that were not independent, prepared after the change order was executed, or both. The documentation for one change order did not include an ICE.

Specifically:

- ATI Change Order 39 paid for the labor to maintain and repair pedestrian fencing around the construction site at the University of Minnesota. The fencing had to be erected quickly to keep pedestrians away from the site and out of danger, but the ICE for the change was not independent, simply accepting the contractor's estimated time and labor costs as the price for the work.
- ATI Change Order 26 paid to haul contaminated soil from a previous disposal site to an industrial disposal facility. ATI Change Order 34 paid to remove and dispose of an unforeseen asbestos pipe disturbed by construction. The ICEs for both COs were prepared after the change order was executed, and the costs reflected therein were influenced by, if not precisely identical to, the contractor's invoice.
- ATI Change Order 40 paid to excavate a space for a water main to be lowered. ATI Change Order 33 paid to furnish a temporary electric generator at the ATI field office. The ICEs for both COs were prepared after the change order was executed, and simply accepted the contractor's invoice.
- ATI Change Order 28 paid to leave a widened roadway in place on the U of M campus to alleviate traffic congestion. ATI Change Order 30 paid to furnish and install nine stop signs around campus, to control traffic. The ICEs for both COs used existing unit prices to price the work, but were prepared after the change order was executed.
- ATI Change Order 19 altered some schedule milestones. An ICE could not be located for this change order.

The ICEs for some of these change orders were submitted on a form entitled "Metropolitan Council/Metro Transit Pricing Sheet." The sheet contains two check boxes at the top: one for an "independent cost estimate" and another for a "price verification." In all of these cases the ICE box was checked, but given the circumstances the work done by the project office to analyze these costs was a price verification, not an independent cost estimate. "Price verifications" are not mentioned in the original CCPO

change order procedure, but in the revised version it is explained that, if an ICE is *not* “prepared independently from the Contractor’s Change Proposal,” it must be “marked as a Price Verification.” Project Controls staff stated that this revision was not meant to imply that a price verification can substitute for an ICE.

Change Orders 34, 33, 28, and 30 included as part of their documentation the standard statement, “The ICE was prepared by an independent estimator in the CCPO who did not see the Contractor’s price proposal prior to preparing the ICE.” That statement should not have been included, because the ICEs were not independent. Change Orders 39 and 40 stated that they were prepared “using Contract unit prices,” but they paid for time and materials only, and the ATI contract does not price labor or materials apart from unit prices. Change Order 26 included the statement, “The ICE was prepared using the negotiated Contract Unit Price for Haul and Dispose of Contaminated Soil,” but the price for hauling contaminated soil negotiated in this change order was much lower than the contract price—a fact in the field office’s favor that should have been noted in the documentation.

Two Part Change Orders

As the revised CCPO change order procedure describes it, a two part change order “is issued where the exact scope of the extra work is unpredictable or the cost is indeterminate in nature at the time when the Contractor is directed to proceed with the work. . . . Part 1 of the Change Order authorizes the change in scope up to a not-to-exceed price. Part 2 of the Change Order authorizes the Change in Contract Price and/or Contract Time.” Two part change orders acknowledge that the work authorized by a change order must often be given a notice to proceed before it can be priced exactly: before the CAR and other field staff know how long it will take or how much it will cost. The key control on a two part change order is the not-to-exceed price. If the contractor suspects that the not-to-exceed price on a two part change order is going to be exceeded, the contractor is supposed to request another change order.

According to the CCPO change order procedure, the first part of a two part change order should include the ICE and the contractor’s estimate for the work in addition to the not-to-exceed amount established by the CAR, “to the extent possible with unpredictable scope and indeterminate cost.”

Contractor’s Estimate

Two of the eleven two part change orders sampled on the AUR contract did not include the contractor’s estimate in part 1 of the documentation. Among the 22 change orders sampled on the ATI contract, four were two part change orders, and they all included the contractor’s estimate. Two part change orders are often used when the exact scope of the extra work is unpredictable or the cost is indeterminate in nature. Contractors’ estimates are encouraged but not always possible in these instances.

Many of the contractor's estimates (before the work was done) and invoices (after the work was done) on the ATI contract could be mistaken for CCPO's own estimates.

Early in the ATI project, the prime contractor, Graham, was given the template that CCPO used to produce its independent cost estimates as an aid in estimating Graham's costs. Graham used this template to submit both estimates and final invoices to the project office. The estimates and bills were not labeled as coming from Graham, however, so they could be easily mistaken for CCPO estimates. This oversight can cause confusion for future reviewers of the file. For example, Change Orders 11, 8, and 5 are two part change orders that parse out different phases of a large change on the ATI contract, and they all rely on a contractor's estimate for the work that looks like an independent cost estimate.

Not-to-Exceed Amount

The not-to-exceed amount specified in part 1 of CO 19 on the ATI contract was exceeded by part 2. No documentation was found that the Council was "notified in advance and in writing" that the amount would be exceeded, as stipulated in part 1.

Part 1 of Change Order 19 on the ATI contract authorized premium labor time for three consecutive Saturdays in August 2010 to meet some schedule milestones. It quoted a not-to-exceed amount for the work of \$7,500. Part 2 of Change Order 19 includes labor documentation from the contractor supporting a premium time claim of \$13,454. That change order is still pending as of this writing, but clearly the claim in part 2 exceeds the not-to-exceed amount in part 1.

Timing

The timing of a change order is critical. A change order authorizes work outside the scope of the original contract. If that work commences before the change order is approved, the risk that the owner may pay too much for the work—either because there is no control on prices, or because there is no control on scope—increases. Alternatively, if the owner later rejects the contractor's claim of a change, the contractor may not be reimbursed for work already done.

Work on two of the 19 change orders sampled on the AUR contract commenced before the change order was approved.

- AUR Change Order 54 for \$26,006.37 paid to rework some pipes attached to a vault that did not match the original specifications. District Energy, a stakeholder on the AUR contract, realized that the vault as installed had to be reconfigured, and assumed responsibility for the cost. The work was performed in August and September of 2010. The change order was approved in December 2010.
- AUR Change Order 24 for \$13,000 paid to lower a chilled water pipe to avoid a water main. The primary work was performed in November 2009, and the

contractor requested payment in December 2009. District Cooling, an affiliate of District Energy--paying the cost--objected to the contractor's price for the work. After protracted negotiations, a price was agreed on, and a change order was signed in May 2010.

In the first case, the stakeholder that paid for the work closely monitored it and knew what it was paying for. In the second case, the price that the contractor submitted for the work was deemed too high. The risk associated with change order work—that disputes over prices may arise, and one party may be unhappy with the result—thus only materialized in the second case, but the risk could have been lessened if both these cases had been treated as two part change orders (as many similar situations on the AUR contract were treated), with the contractor and CCPO submitting independent estimates, and the field office establishing a not-to-exceed amount, before the work commenced.

DBE

Reviewing DBE participation is among the required steps before a change order is issued. The Serialized Record Memo (SRM), which summarizes in narrative form the negotiations on the change order, includes a checklist with several options for reviewing that participation. Using the checklist, the CAR or field office staff can note whether DBEs were solicited for the work. The main reason for not soliciting DBEs is that the contractor can perform the work with its existing workforce. If other (new) subcontractors must be solicited, then CCPO should be able to show that the project's DBE goals were considered. A note on the SRM states that a DBE box must be checked "to justify that a change order is fair and reasonable."

In all of the change orders sampled, the only DBE box that was checked was the first one: "This change order affects only the Contractor's workforce or its sub-contractor(s) currently working on the project." The box was checked even when new subcontractors were clearly engaged for the work. On AUR Change Order 13, for example, the same box was checked, even though the subcontractor was newly solicited for the project, and was not among those DBEs listed on the Information and Certifications form submitted with its bid.

The Project Controls Manager said that the CCLRT electronic project management system, eBuilder, was being modified to compel meaningful DBE consideration before a change order could move through the system.

CONCLUSIONS

1. *With the exceptions noted in the “Observations,” change orders on the AUR and ATI contracts were processed correctly.*

It might be assumed that the primary risk to the owner in issuing a change order is overpayment: paying too much for work not covered under the original contract. In fact, according to one of the principals interviewed for this audit, the primary risk to the owner in issuing a change order is not that the work might be priced incorrectly, but that it may be scoped incorrectly: that the change order may pay for work already covered in the original contract.

In this important sense, the change orders sampled on these two advanced construction contracts were processed correctly. Although obviously a “change,” all change orders were found to be within the general scope of the contract. In cases where unforeseen field conditions were found, the contractor and the Council proved that site conditions differed materially from the specifications. Change orders were limited to a single action or a group of related actions. Changes to specifications were properly noted. Design changes were properly documented. Time and materials work was properly documented in part 2 of two part change orders.

All change orders sampled were properly authorized. As described in the “Observations,” work on two of the 19 change orders sampled on the AUR contract commenced before the change order was approved, which can be considered an error of change order initiation.

2. *Cost estimation of change orders needs improvement.*

Although all sampled change orders on the AUR contract had cost estimates that were independent, several change orders on the ATI contract had cost estimates that were not independent or functioned as after-the-fact verifications of the contractor’s price rather than before-the-fact analyses of the contractor’s cost. A cost or price analysis is required of every procurement action, including change orders, and an independent cost estimate is foundational to such an analysis. In change order work where time is of the essence, a cost estimate must lead to a not-to-exceed amount specified in part 1 of a two part change order.

3. *Some estimates used the contractor as the sole source of data about labor rates.*

The professional estimators employed by CCPO use a cost estimating software program that analyzes the composition of the labor force employed on each contract and uses Minnesota prevailing wage rates as a basis for estimating the labor cost portion of change orders. Because they use data sources independent of the contractor they demonstrate objectivity. Estimates that use the contractor’s own wage schedule or

previous invoices as the sole source of data about labor rates are not objective. Objectivity and independence are essential to a cost estimate.

4. The wording of the CCPO change order procedure is ambiguous about two part change orders.

The CCPO change order procedure states that Part 1 of a two part change order “shall contain the CCPO’s ICE of the cost of labor, equipment, and material required and of any time adjustment as well as the Contractor’s estimate and a not-to-exceed amount (as determined by the CAR), to the extent possible with unpredictable scope and indeterminate cost.” While it may be difficult for the contractor to estimate work of “unpredictable scope and indeterminate cost,” it is critical that Part 1 of a two part change order contain the ICE and a not-to-exceed amount—both of which are the responsibility of CCPO. As presently worded, the procedure could be misconstrued to say that all three elements of a two part change order are simply encouraged, whereas the ICE and a not-to-exceed amount are required.

5. Incomplete documentation in some change order files did not fully describe cost responsibility and other elements of the approval process.

As noted in the “Observations,” there were a few instances among the change orders sampled where a change order was ascribed to a “design error” but the Council assumed the responsibility—and the cost—for the change. The reason for departing from industry practice in these instances was not explained in the documentation. Determining cost responsibility after the fact is more difficult than determining it at the time of the change, and certainly the CAR is the person best equipped and best positioned to make that call at the time. Nevertheless, these changes raised questions about cost responsibility that could have been answered with more complete documentation. Identification of the cost responsibility minimizes the Council’s risk of overpayment.

Beyond the issue of cost responsibility, there were other discrepancies in the sample that would raise questions for future reviewers of the files. Change Order 17 on the AUR contract, for example, paid \$21,082.51 to install water service off a new water main not shown in the original contract documents. The independent cost estimate that is included in the file, however, priced what appears to be the same amount of work for \$3,926.09. Often when the ICE is lower than the final change order price, a statement on the SRM will explain the discrepancy. When asked, the CAR explained that the final cost was so much higher because the scope of the work broadened from the time of the ICE, but, in this case, that explanation was not provided in the file.

More questions would be raised by change order prices that turn out to be higher than estimated, but sometimes documentation was lacking for prices that were lower than estimated. This was most evident on the four change orders written to excavate, haul, and dispose of contaminated soil on the AUR contract. An environmental consultant was hired to test the soil before construction, and a separate line item was included in the contract to remove it. That amount was soon exceeded when construction kept

uncovering more soil that needed to be disposed of. The cost of removing contaminated soil, on both contracts, was the main reason that the Council authorized additional funds in July 2010.

The documentation for the AUR change orders to dispose of contaminated soil—39, 25, 30, and 21--explains that the field office personnel negotiated a new unit price for its disposal that was “in addition” to contract prices for “Common Excavation” and “Duct Bank Removal.” It also includes several quotations from disposal sites that are higher than the eventual negotiated price. Interviews with field office personnel confirmed their diligence in driving the price down, but the documentation in the file—although extensive—did not readily reveal that fact.

RECOMMENDATIONS

Program Evaluation and Audit recommendations are categorized according to the level of risk they pose for the Council. The categories are:

- **Essential** – Steps must be taken to avoid the emergence of critical risks to the Council or to add great value to the Council and its programs. Essential recommendations are tracked through the Audit Database and status is reported twice annually to the Council’s Audit Committee.
- **Significant** – Adds value to programs or initiatives of the Council, but is not necessary to avoid major control risks or other critical risk exposures. Significant recommendations are also tracked with status reports to the Council’s Audit Committee.
- **Considerations** – Recommendation would be beneficial, but may be subject to being set aside in favor of higher priority activities for the Council, or may require collaboration with another program area or division. Considerations are not tracked or reported. Their implementation is solely at the hands of management.
- **Verbal Recommendation** – An issue was found that bears mentioning, but is not sufficient to constitute a control risk or other repercussions to warrant inclusion in the written report. Verbal recommendations are documented in the file, but are not tracked or reported regularly.

1. The CCPO change order procedure should be revised to include a review and signoff (not approval) by the Project Controls Manager (Essential).

At present, the CCPO change order procedure gives the Project Controls Manager oversight responsibility of the change control process and procedure. The Project Controls Manager reviews each change order and initials it before passing it along for the required approvals, but that review is not incorporated as a formal step in the procedure. Given the importance of a thorough, accurate, and consistently prepared cost estimate to the change order process (among other elements), the review of change orders by the Project Controls Manager should be incorporated in the change order procedure. During that review, Project Controls should verify the independence and proper timing of the cost estimate and that the change order is signed by both parties before work begins.

Management Response: *Agreed. Implemented.*

- 2. Whenever practical and cost effective, the professional estimators in CCPO should be used to prepare the independent cost estimates for change orders. All estimators should clearly cite the independent basis of labor, equipment, and materials rates used in their estimates (Essential).**

The cost estimates prepared by CCPO's professional estimators were consistent in approach and relied on the same source of data for labor rates. This was not always the case for cost estimates prepared by field office personnel, although such estimates were often produced under schedule pressures. While recognizing that preparing cost estimates represents a cost to the project in time and labor, Audit recommends the kind of consistency and objectivity that can be attained by channeling them through the project office. If a change order is too small in size to justify the expense of an estimate prepared by project office personnel, then project managers should ensure that field office estimators use labor, equipment, and materials rates that are independent of the contractor, and clearly cite the basis of the data used in the estimate. Additional training may be needed for field office estimators, stressing the need for clearly documented independent cost estimates.

Management Response: *Agreed. We believe that using a number of sources to inform the labor rates yields the most informed, accurate and fair independent cost estimates. We are prepared to take steps to ensure that rates are not pulled directly from the Contractor's payroll but are consistently informed with experience and judgment. We will cite the basis of the data used in the estimate.*

Person Responsible: *Chris Beckwith.*

Timeline: *Immediately.*

- 3. The CCPO change order procedure should be revised to remove the ambiguity about two part change orders (Essential).**

The CCPO change order procedure could be misconstrued to apply the phrase "to the extent possible" to the requirement that Part 1 of two part change orders contain the ICE and a not-to-exceed amount. The procedure should be revised to state more clearly that the ICE and a not-to-exceed amount are required in Part 1.

Management Response: *Agreed. Written revision is underway to address this ambiguity.*

Person Responsible: *Chris Beckwith.*

Timeline: *In progress, complete by July 2011.*

4. The Quality Assurance Manager should regularly audit change order documentation and return it for revision if the documentation is incomplete or unclear (Significant).

While Audit found change control documentation generally complete and clear, there were occasional gaps in the narrative that left important questions unanswered. If the negotiated price of a change order is higher than the independent cost estimate, for example, the reason for that difference needs to be explained to future reviewers. If a contractor's estimate can be mistaken for an ICE, as noted in the "Observations" about some contractor's estimates on the ATI contract, the estimate needs to be returned to the contractor and properly labeled. Audit by the Quality Assurance Manager, well versed in the change order procedure but less acquainted with the particulars of the change itself, may reveal gaps or points of confusion in the documentation that can be addressed before the documentation is filed or archived.

Management Response: *Agreed. The Quality Assurance Manager has performed spot checks on Change Orders since Construction has begun utilizing the Project Controls Manager's hard copy files. This audit process will be encouraged and accommodated.*

Persons Responsible: *Chris Beckwith, Ram Kimal.*

Timeline: *Ongoing.*

5. Cost responsibility should be explicitly addressed in change order documentation (Significant).

Change orders resulting from design errors raise the question of cost responsibility. At present, cost responsibility is not specifically addressed on any change order form. If the person documenting the change order in the field office—the CAR or the CAR's designate—chooses to address cost responsibility, it is often done in the "Reason for Change" field on the Serialized Record Memo form. The question of cost responsibility, however, is important enough to be explicitly addressed, perhaps with a dedicated field in the change order documentation. Because the Council is usually responsible for the cost of contract changes, this field will usually be left blank, but, if another party is responsible, naming that party and explaining how cost responsibility was determined will aid future reviewers of the file. A dedicated field prompts additional consideration of cost responsibility.

Management Response: *Agreed. Implemented.*