Managing Change Orders Without Breaking the Budget
07-25-2019
Background

Rory Roman
1996 Graduate of Univ. of Colorado – Boulder
B.S. in Civil Engineering –
Environmental Engineering emphasis

Senior Project Manager at Water Remediation
Technology for 13 years

Decommissioning Supervisor at Rocky Flats
until final closure in 2006
WRT Background

- WRT is a private company established in 2000
- Developed, engineered and brought to market innovative technologies for contaminant removal
- Obtained NSF Certification of Z-88® and Z-92®
- Have been issued 9 patents and have 3 patents pending for media and treatment processes
- Total solution provider – service work is handled under a Long Term Service Agreement
WRT Systems in Operation

- WRT has sold 184 systems in 20 states
- This represents a treatment capacity of more than 90,000 gallons per minute
  - OR -
- 130 million gallons per day
What is a Change Order

- **Wikipedia definition:**
  - In Project Management, a change order is work that is added or deleted from the original scope of work of a contract. However, depending on the magnitude of the change, it may or may not alter the original contract amount and/or completion date.
What is a change order?

- **How do I define a change order?**
  - During the planning and bidding/sales phases of contracted work, something was omitted or hastily processed that resulted in changes being made to completed product. This can be an increase or decrease in cost/time.

- **Biggest questions:**
  - How are we going to fix it?
  - Who is going to pay for it?
What drives a change order?

- **Scope of Supply**
- **Contractual Specification**
- **Has something been added or removed?**
  - Does the change involve just time, materials, or cost?
  - Does the change involve an entire process or philosophy change?
- **Has there been a weather event that impacted schedule?**
When do we take care of the Change Order?

- **Moral/ethical questions:**
  - **Wait until the end of the job and hope for the best**
    - Lose resolution of impact on project
    - Detail of why or what change was can be lost
  - **Begin ongoing discussions through life of project and resolve as needed**
    - When is the right time to negotiate each one or do you negotiate as a whole?
      - i.e. Is there some give and take on a project with change orders going both directions?
What goes into a change order?

- Define original scope and what was to be provided vs. what is now needed
  - Detailed submittal paperwork is a great reference
  - Was an External Kick Off Meeting set up to discuss contract

- Include all applicable costs:
  - Is travel required
  - Is the change time and materials based
  - Do you have a schedule of costs for non-contracted work?
    - Rates for all levels of personnel involved
    - Statement about travel costs and allowed expenses (i.e. travel paid at 1.15 times actual cost)
    - Are there any administrative or overhead costs (shipping, research, etc.)
BILLING RATES
Established January 1, 2014, valid for a period of one year
Charges for work performed on a time and materials basis for this project, including office and field time, will be calculated and billed on the basis of the staff category hourly rates shown below in U.S. currency. Work continuing beyond the above effective dates will be subject to the new rates that will be established for each new fiscal year. The following hourly rates are fully loaded with overhead and fee.

<table>
<thead>
<tr>
<th>Staff Category</th>
<th>Rate/Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal</td>
<td>$250</td>
</tr>
<tr>
<td>Department Head</td>
<td>$165</td>
</tr>
<tr>
<td>Process Specialist</td>
<td>$160</td>
</tr>
<tr>
<td>Project Manager</td>
<td>$105</td>
</tr>
<tr>
<td>Senior Engineer</td>
<td>$135</td>
</tr>
<tr>
<td>Design/CAD Engineer</td>
<td>$90</td>
</tr>
<tr>
<td>Lead Service Technician</td>
<td>$105</td>
</tr>
<tr>
<td>Service Technician</td>
<td>$70</td>
</tr>
<tr>
<td>Radiation Safety Officer</td>
<td>$170</td>
</tr>
<tr>
<td>Radiation Specialist</td>
<td>$90</td>
</tr>
<tr>
<td>Administrative/Clerical</td>
<td>$70</td>
</tr>
<tr>
<td>Other Support Staff</td>
<td>$70</td>
</tr>
</tbody>
</table>

All staff personnel have been classified in the above staff categories based on discipline skills, education and experience level. Time spent in either inter-city or local travel will be billed in accordance with the foregoing schedule, except that no more than eight hours of travel time will be charged in any single day.

Overtime and weekend hours will be charged at the above rates plus an additional 50%. Holidays will be charged at the above rates plus an additional 75%. (BLANK) Emergency call out will be charged at the above rates plus an additional 75%, with a 2 hour minimum.

All travel costs including vehicle mileage, hotel, meals and all travel related expenses are computed on the basis of actual cost plus 15%. Charges for Other Direct Costs and facilities furnished by (BLANK) are computed on the basis of actual cost plus 15%. This override covers the costs associated with cost of money, the risks associated with our responsibility for delivery on behalf of subcontractors, administrative costs, etc. Examples of such items which are directly attributable to the project include: shipping charges; printing; special fees; permits; special insurance and licenses; subcontracts; reproduction; equipment rental; and miscellaneous materials. Travel and travel-related expenses are also computed on the basis of actual cost plus 15%. Equipment and materials are always priced on a project specific basis.
How do we avoid change orders?

- Work your spec/scope of work into your customer’s specification
- Make sure your Scope of Supply is very clearly defined (detail it as much as possible)
- Insert clauses into contract so that change orders are discouraged (i.e. liquidated damages). Use your leverage early in the process.
- Be proactive and conduct a pre-submittal meeting to discuss – External Kick Off Meeting
- Set up a Site Readiness Form
Site Readiness Checklist

Site Preparation Validation
WRT Project:

This document shall serve as verification to Water Remediation Technology (WRT) that the customer's system installation responsibilities have been fulfilled per the contract. The customer (or customer's agent) shall sign in the spaces provided and return this document to WRT, certifying that the treatment system has been properly installed and the site has been readied for WRT personnel to proceed with media loading and/or system start-up.

<table>
<thead>
<tr>
<th>TASK</th>
<th>COMPLETED</th>
<th>CUSTOMER SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping installation per IFC drawings (latest revision) provided by WRT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well pump working and operational to design specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure and leak test system, not to exceed PRV set point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disinfection/sampling of contractor installation per AWWA recommendations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw water provided at design basis pressure and flow per contract and WRT Provided Design Basis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical/Controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service power connected to control panel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control panel wiring and connections installed per drawings, including well pump run status and well pump run permissive connections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building erection completed per engineering plans (as needed) per contract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building ambient temperature can be maintained above 40-degrees F.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify tractor trailer access provided for WRT mobile service equipment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
- Two weeks after the above items are complete and the form is signed and sent to WRT, WRT will schedule the system startup beginning on the next Monday.
- Alternatively, the customer may complete the form two weeks before the desired arrival date for the startup crew, guaranteeing the items to be complete by the crew's arrival. WRT will charge the client for expenses incurred due to incomplete or improperly performed work that causes WRT delays. The delays will be charged on an hourly basis for the crew. Delays causing additional days on site will be charged at full crew travel costs (airfare, lodging, meals, equipment rental, flight changes, etc.). Longer delays incurred after the startup crew's arrival, which require demobilization and remobilization will result in charges to the customer to cover the additional travel.
- WRT requires a minimum of two (2) weeks notice of readiness in order to reschedule if initial startup schedule is not met.

WRT Project Manager Initials __________ Validation Acceptance Date _____________

Operations Initials: ________
Examples and Lessons Learned

Past start-up situations in Illinois

- WRT mobilized and site was not ready
- Client power and water unavailable
- Drive the creation of the Site Readiness form

WRT Mobilizes → Client Not Ready → WRT onsite, but cannot perform work → WRT loses travel costs → WRT to create Site Readiness Form
Examples and Lessons Learned
Examples and Lessons Learned

Large Texas Project OT and hardware costs.

- Project was well ahead of schedule for assembly
- Contractor was waiting for last deliveries of assembly hardware and had signed off on receipt of all other material.
- Contractor worked his personnel on weekends to get them paid more (OT)
- Didn’t want to wait for some missing items to show up and they purchased them to complete work
- Change Order Eligible for Contractor to WRT?
Examples and Lessons Learned

Large Project in NJ Sequestrant Injection point and interior paint

- Original Scope included installation of a chemical injection quill into a valve box outside of building
- Client volunteered (in writing) to pull injection line out from building to valve box
- There was an injection quill currently in place on the same feed line, but inside the building vs upstream of cartridge filter outside the building. Another spot also located within discharge piping
- Is this a change order for contractor?
Examples and Lessons Learned
Examples and Lessons Learned

- Contractor was responsible for removing treatment media from vessels and inspecting liner prior to re-installation of fresh media.

- Inspection revealed multiple pinhole and large areas of degraded coatings. Engineer determined that liner had to be repaired prior to media installation.

- Contractor was not a coatings installation expert.

- Is this a change order for the contractor?
Examples and Lessons Learned
Examples and Lessons Learned

System Vessel delivery, NJ

- Contractor had delivery of vessels set for a specific date and time.
- Due to event outside of driver’s control, but not acts of God, vessels were going to be delivered late (2 different changes on delivery due to downed power lines and accidents)
- Driver showed up 1 day later, late in the afternoon
- Crews and crane held over, other facility work was put on hold and rescheduled
- Is this a change order for contractor? For supplier?
Examples and Lessons Learned
Examples and Lessons Learned

System Start-up in SC

- Start-up scheduled and verified 24 hrs prior
- Contractor not going to be onsite, but engineer onsite
- Work set to be completed by contractor is not complete and sub-contractor onsite doesn’t know how to remedy situation
Examples and Lessons Learned
Examples and Lessons Learned
Examples and Lessons Learned

- Delivery scheduled for a certain day/time after shipping fully tarped and crated
- Supplier spoke with driver at 6:30 am about delivery to the site
- Driver showed up to site with equipment from pictures
- Driver did not mention any damage concerning the load
- Is this a change order for supplier?
Examples and Lessons Learned

- Customer’s water tank feeds pumps that feeds treatment system
- Upon completion of connecting control panel and wiring, pumps are to flow water at design parameters to treatment equipment
- Pumps will only supply water at reduced flow only when valves are choked to almost closed
- Pump impellers determined to be wrong size/configuration
- Treatment equipment manufacturer unable to complete onsite work.
- Is this a change order for treatment equipment manufacturer
Lessons Learned Overview

- Develop Site Readiness Form
- Take pictures and document everything
- Define, in detail, your Scope of Work
- Have an External Kickoff Meeting to make sure both sides understand and interpret contract and all included clauses
QUESTIONS