

Challenges for Pipeline Bidding in a Seller's Market

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Introduction

The market for large diameter water pipeline construction in Texas has historically been a buyer's market compared to most of the remainder of the United States. Unit prices for pipeline construction in Texas have historically been very competitive, due to the large capacity of local contractors and pipe suppliers, low labor and material costs, and local construction practices.

In the last four years, pipeline construction demand in Texas has increased significantly due to growth and drought. Local demand has begun to exceed local supply and prices have increased as much as ninety-six percent in four years. Some of the price escalation is due to the increases in costs for steel, cement, gravel, diesel and other raw materials of construction. Contractors are also raising bid prices to cover material price volatility and to increase margins in this Seller's market. Other inflationary factors include increased labor cost due to reconstruction after Hurricanes Katrina and Rita and fewer bidders due to the bonding companies tightening up on the bonding capacity of general contractors.

Measures used to mitigate the price escalation include structure of the bidding packages, allowing longer advertising periods, using smaller construction projects, recruiting more out of state contractors, allowing lower qualification requirements, allowing alternate pipe materials, and providing incentives.

This paper describes some of the escalation factors seen in the Texas market, measures taken to mitigate the price escalation, and lessons learned.

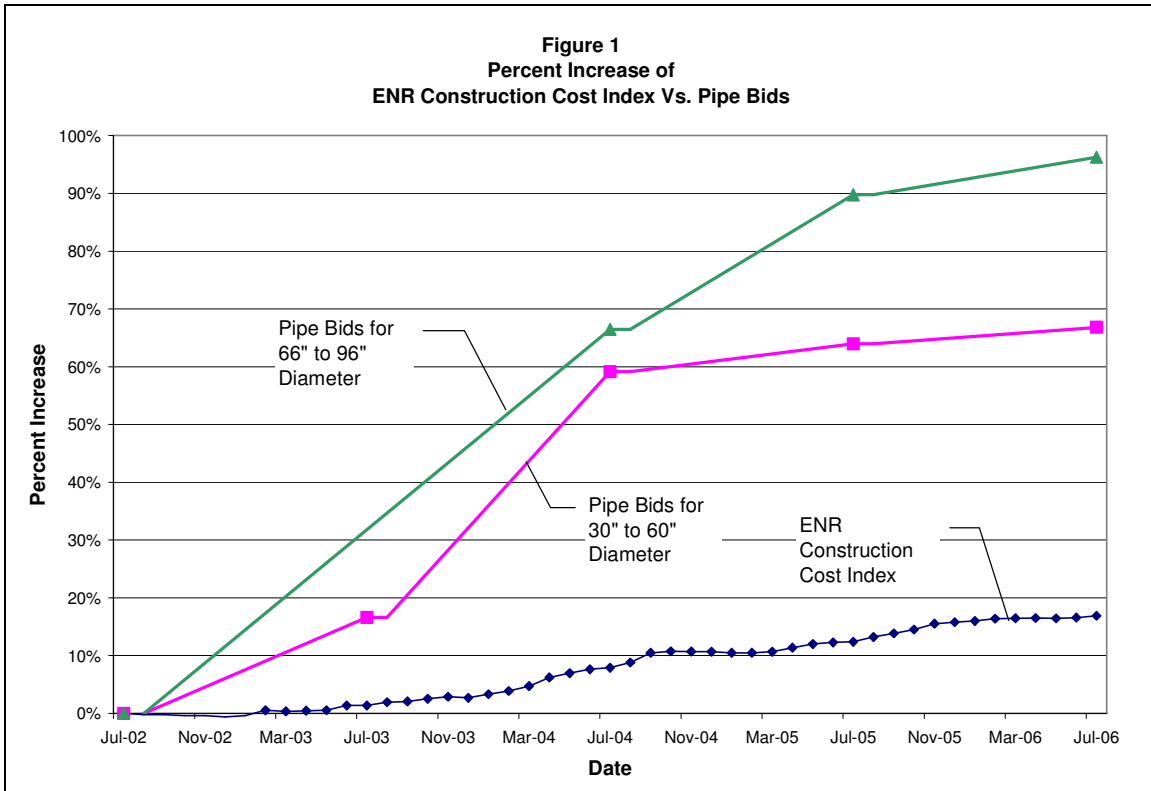
Historical Pipe Prices

Figure 1 shows a comparison of the Engineering News Record (ENR) construction price index versus pipe installation prices in Texas for the last five years. The cost for pipe installation is based on the cost per linear foot divided by the pipe nominal diameter for 57 projects. Separate curves are shown for medium diameter water lines (24-inch to 60-inch diameter) and larger diameter lines (72-inch to 108-inch diameter pipelines), since there is a larger increase in cost per diameter inch for the larger size range. This increase for the larger diameter range is for three reasons as follows:

1. The market for medium diameter pipe material is more competitive than larger diameter pipe. The medium diameter water pipelines are typically constructed of ductile iron pipe (AWWA C-151), bar wrapped concrete cylinder pipe (AWWA C-303), or steel pipe (AWWA C-200) in the Texas market. The larger diameter

water lines are typically constructed of pre-stressed concrete cylinder pipe (AWWA C-301) or steel pipe.

2. The larger diameters are typically installed with larger construction equipment, due to the size and weight of larger pipe joints.
3. There are fewer qualified contractors available for the larger diameters, thus less competition at bid time.

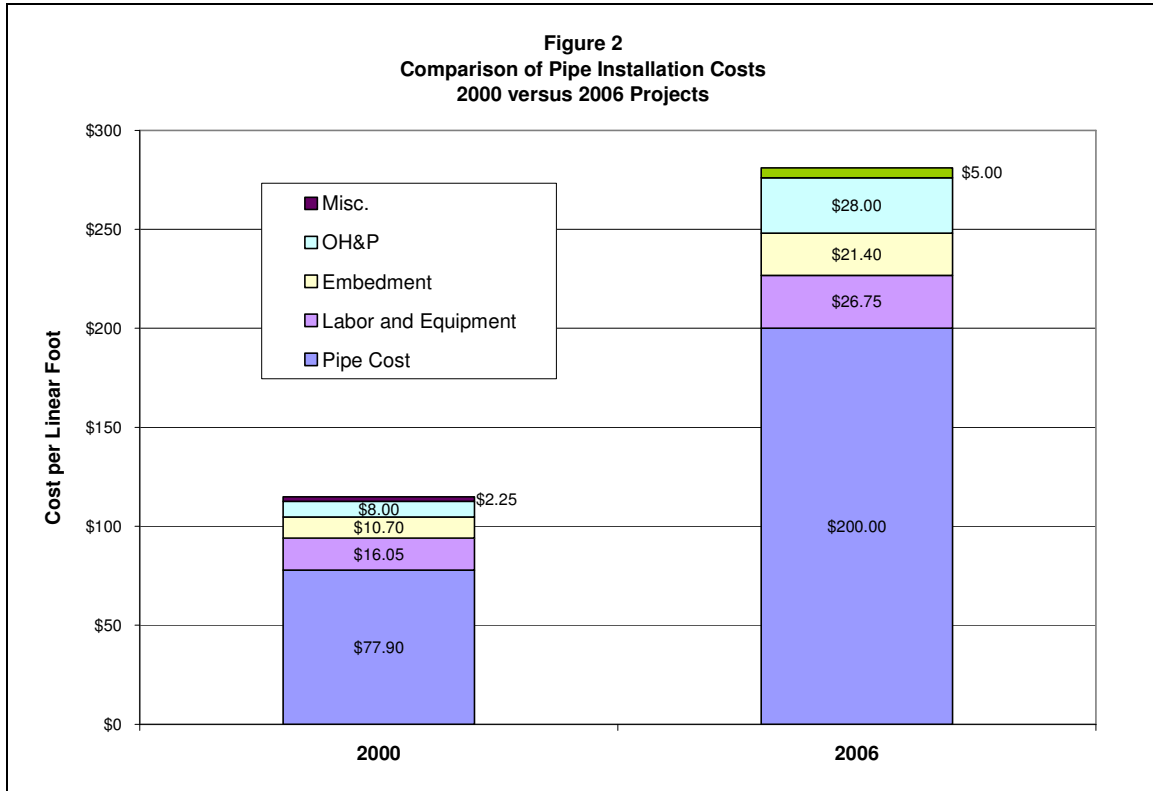


As can be seen in Figure 1, the inflation rates over the four year period are as follows:

- ENR index inflation rate has averaged 4.22% per year with a total inflation rate of 16.9% over the four year period.
- Medium diameter pipeline inflation rate has averaged 16.7% per year with a total inflation rate of 66.8%
- Large diameter pipeline inflation rate has averaged 24% per year with a total inflation rate of 96.3%

The market price for pipeline installation has clearly increased at a higher rate than the overall construction market, as measured by the ENR index. To understand why, we compared the unit prices for two 54-inch diameter pipeline construction projects. Project A was a 36-mile 54-inch pipeline which started construction in 2000. Project B was a 30-mile 60-inch and 54-inch pipeline which started construction in 2006. Both projects were in rural areas with little rock and were constructed with the same pipe materials. Figure 2 shows a breakdown of the various components of the pipe installation for 54"

pipe. As can be seen, the largest increases are for pipe materials (250%), and the contractors' overhead and profit (40%).



Inflation Factors

The inflation factors for pipeline installation can be broken into the following categories:

- Raw materials such as steel, cement, concrete, diesel, and gravel
- Labor
- Construction equipment
- Increased prices to cover price volatility, shortages, and other risks
- Increased profits due to market conditions
- More expensive design standards, such as pipe coatings

Figure 3 shows the price history for raw steel over the last five years. Steel prices were stable until 2004, but experienced a 60% increase through the summer of 2006. The world wide demand for steel, particularly in China, has fueled the increase in price. Steel prices are expected to decrease by 8.7 % in 2007 due in part to increased imports (ENR 12-18-06). Steel (or iron) is the most expensive material component in steel pipe and ductile iron pipe.

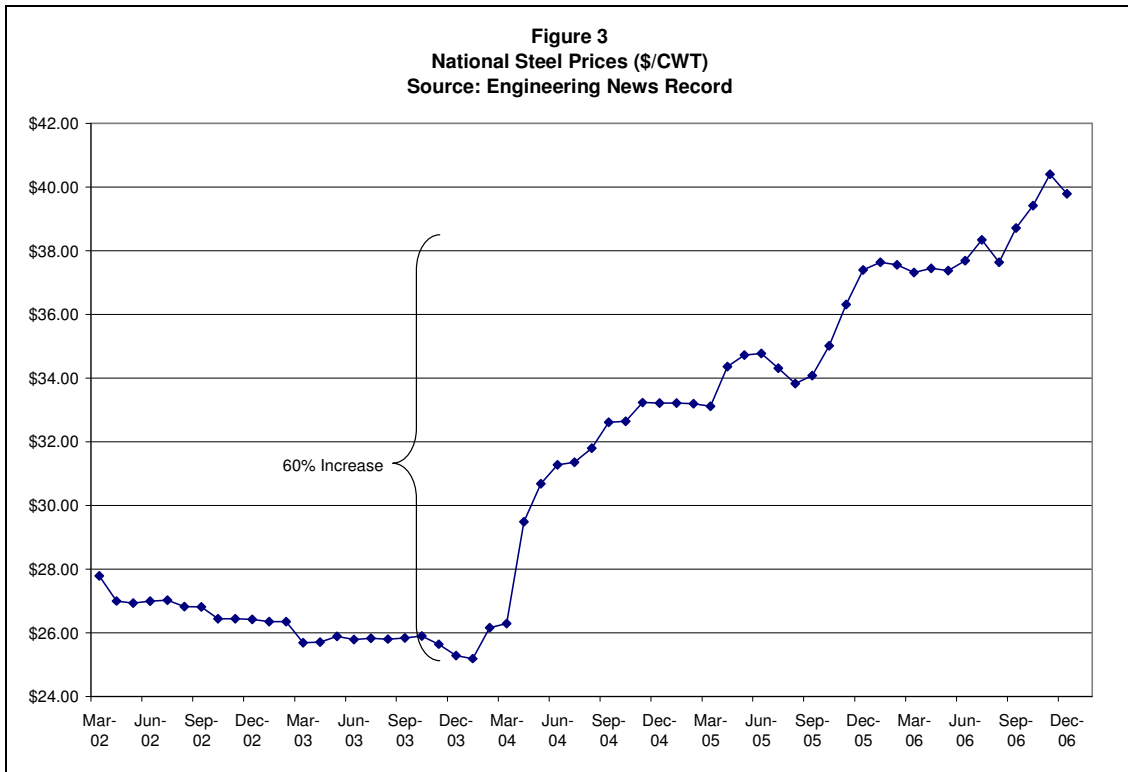


Figure 4 shows the price history for concrete and cement both nationally and in the Dallas, Texas market (ENR source). As can be seen, there was a steep price increase beginning in late 2005 in the national and Dallas market. Prices of cement have begun decreasing in the summer of 2006. A recent surge in imports from China has helped to eliminate shortages and prices are starting to level off. Overall prices remain high and prices are expected to increase nationally by 3.3% in 2007 (ENR 12-18-06). However, prices could increase by higher rates in hot markets such as Texas. Overall, cement and concrete are a minor factor in the total cost of pipeline installation.

Figure 5 shows the price history for diesel fuel (source: U.S. Dept of Energy). As can be seen, there has been a 220% increase in price from January 2002 to August 2006, followed by a 22% decrease at the end of 2006. The effect of diesel price increases is difficult to predict for pipeline installation, since it affects almost all components of the construction to some extent. Diesel prices affect hauling costs for material deliveries as well as operating costs for construction equipment. The cost of fuel to operate construction equipment is estimated to be one to three percent of the total costs. This amount does not include diesel for hauling of materials to and from the job site.

Figure 4
Concrete and Cement Prices (\$/TN or CY)
 Source: Engineering News Record

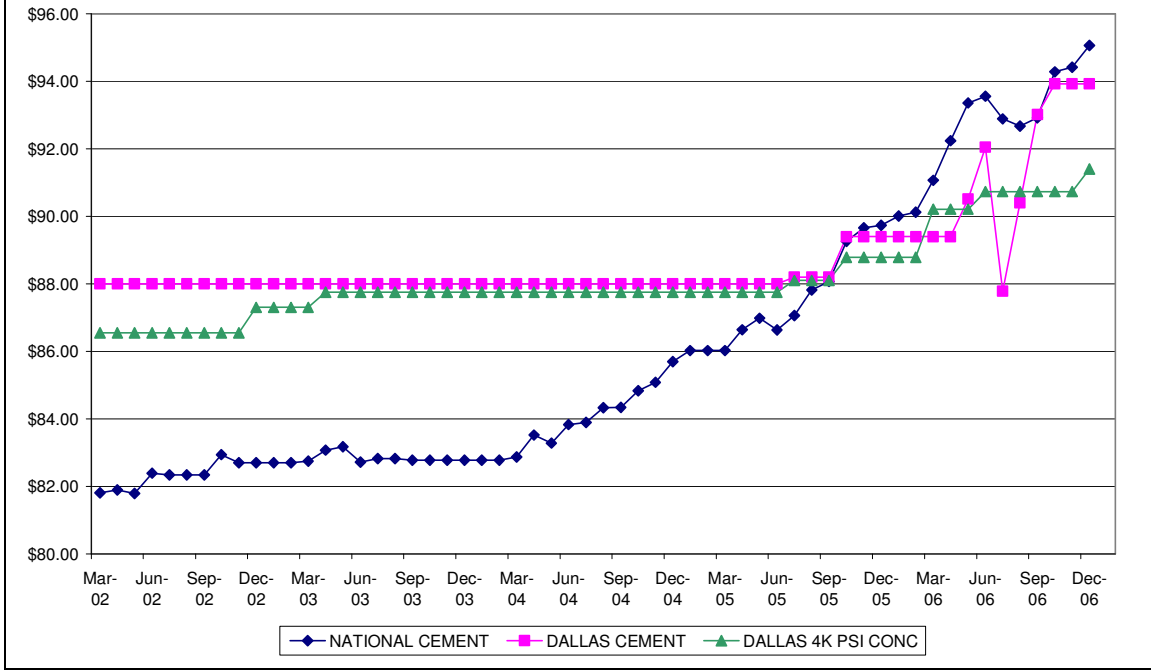
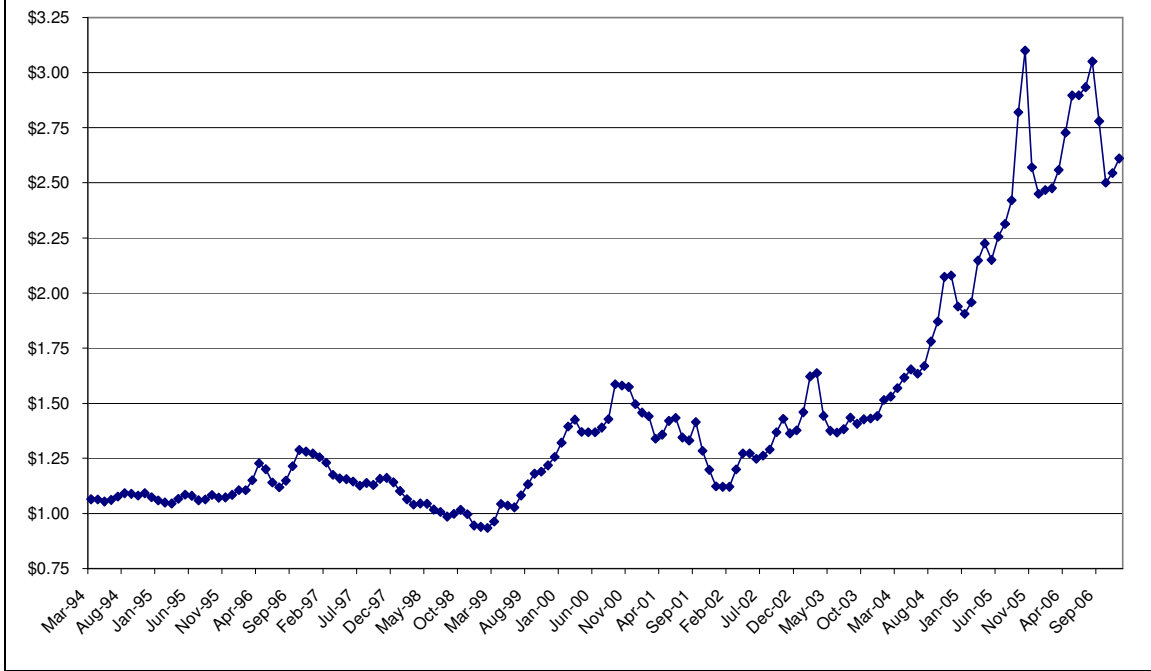
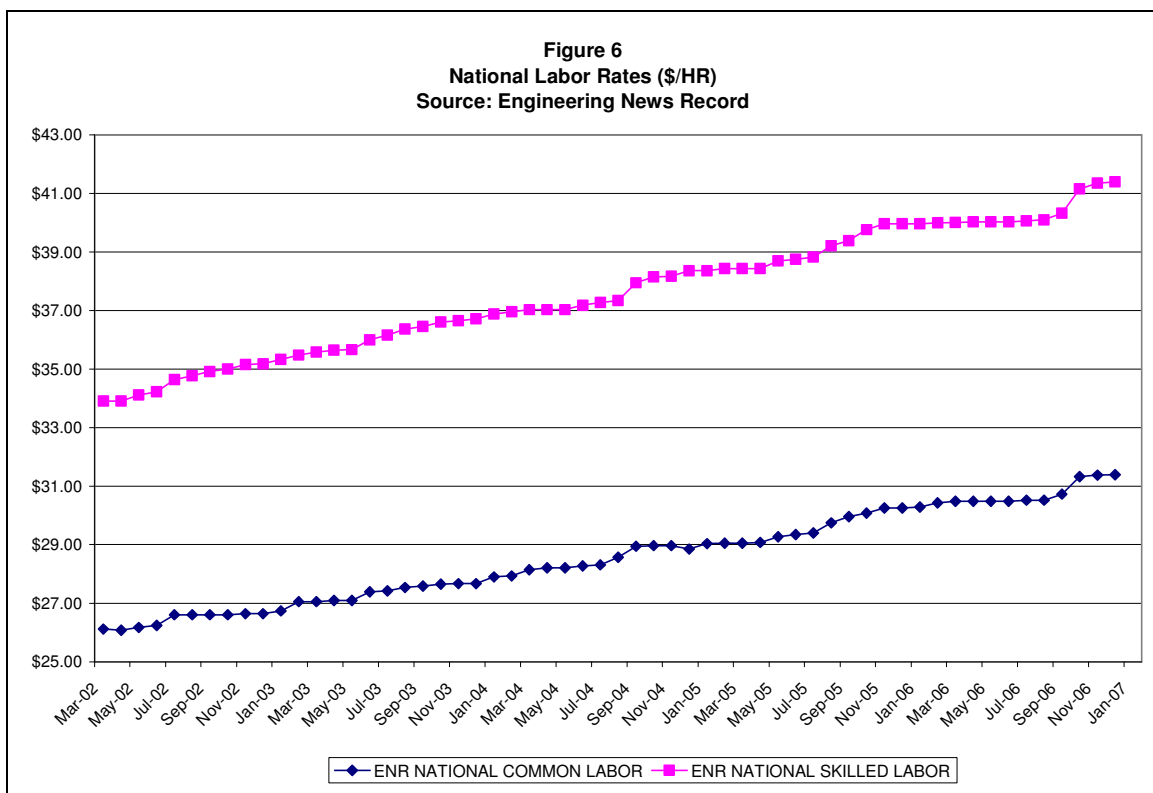


Figure 5
National Diesel Prices (\$/GAL)
 Source: U.S. Department of Energy



Imported gravel is a common embedment material for pipeline installation in Texas. Gravel prices are heavily influenced by local availability and hauling costs. Gravel prices are estimated to have increased by 9 percent from 2002 through the end of 2004, with an increase of 19 percent from 2005 through late 2006 (Source: Bureau of Labor Statistics). Overall, gravel embedment material is estimated to be 4 to 8 percent of the total pipeline construction costs.

Figure 6 shows the national trend for skilled and common labor over the last five years. As can be seen, there has been an overall increase of approximately 18% over the period. Labor prices are expected to increase by 5.0% in 2007 (ENR 12-18-06). Overall, the construction labor costs are estimated to be 3 to 8 percent of the total pipeline construction costs.



Construction machinery and equipment does not appear to be a major culprit in pipeline construction inflation. Equipment prices have increased only 17% in the last five years (source: Bureau of Labor Statistics).

Contractors face many challenges in today's market. Which subcontractors and suppliers will not honor their price quotes after bid time? Will deliveries of materials be on time? Will the delays affect the construction schedule and costs? Will shortages of materials require work stoppage or re-design of the facilities? Will the owner negotiate changes due to material delivery delays or shortages? Many contractors have indicated these are huge factors in today's bid prices, and smart contractors are putting in larger risk premiums on pipeline projects. These factors sometimes result in large swings in bid

prices from one project to another. These inflationary factors will probably continue until supply catches up with demand and material prices stabilize.

The final factor in pipeline construction inflation is old-fashioned American capitalism. When demand exceeds supply prices go up. When prices go up, more supply becomes available and the market corrects itself. Nationally, the US Department of Commerce reports an 11% increase in water supply construction and a 19.6% increase in sewage and waste disposal construction. Unfortunately for owners (and fortunately for contractors), there has been a surge in demand for pipeline construction in Texas. This increase in demand is due to population growth in Texas, drought, and pent up demand after 9/11. Also, at least four large pipeline contractors left the North Texas market in the last four years. Some of the remaining contractors report that the bonding companies are tightening up on the size of contracts they can bid. These factors have resulted in fewer bidders for a larger volume of pipeline construction. Contractors can monitor the status of future projects and bid projects with higher profit margins, since they know there will be other chances to bid projects. These inflationary factors will probably continue until supply catches up with demand.

Another factor that should not be overlooked in evaluating pipeline construction inflation is the evolution of more expensive design standards. Industry practices continue to become more expensive to address past pipeline failures and to meet higher goals of pipeline life expectancy and lower risk. These factors can affect specifications for pipe material options, coatings, cathodic protection, joints, quality control testing, and many other components. These factors should not be considered inflation, but should be categorized as increases to meet higher performance standards.

Inflation Mitigation Techniques

Owners and engineers may take several approaches to mitigate the effects of inflation. These include making modifications to the typical contract structure and construction contract general conditions as well as making changes to the design and cost estimating procedures.

The following changes to a typical contract structure could improve the bidding conditions and help reduce the cost of a large water transmission project.

- **Bid smaller pipe sections.** As mentioned previously, the bonding capacity of many contractors is being tightened or reaching its limit due to the increase volume of work. Some contractors may choose to not bid or may be unable to bid a long, expensive pipeline project. One solution is to break pipelines into shorter segments. This allows more contractors to bid on the segments. A recent 50-mile, 84-inch pipeline was broken into four pipeline segments. Similarly, a 30-mile, 54/60-inch pipeline was broken into three segments. For both projects, all pipeline segments received at least four bidders on each pipe segment with prices coming in under budget.

- **Allow joint ventures for pipe suppliers and contractors.** One way for contractors and manufacturers to compete for jobs when their bonding capacity is limited is to partner with another firm. In some cases, pipe manufacturers that are stretched too thin have combined forces with other suppliers to compete on projects. Historically, our firm has not allowed multiple pipe suppliers on a contract, but recently allowed this on a 12-mile 84" pipeline to try to encourage competition.
- **Employ the "Winner Takes All" approach.** Another option available to owners and engineers is to bid multiple contracts at one bid opening and allows contractors to offer a deduct if a contractor is awarded all phases of the project. When projects are broken into smaller segments, bidding the projects at the same time may entice larger contractors to bid in a market in which they may not typically be drawn. One company may be able to do the entire job more efficiently with less overhead and pass those savings onto the owner. It also encourages contractors to sharpen their pencils compared to bidding the project in sequential phases, since there will not be a second chance at another portion of the project. There are some potential drawbacks to this bidding structure. Smaller contractors who may not have the bonding capacity to build the entire project may only be able to bid one segment, thereby reducing competition on other segments. The winner takes all provision worked well on our 156-mile 60"/53" Ivie Pipeline Project, which received nine bidders during a 1992 buyer's market. However, the winner takes all approach was not as successful on the 20-mile 96"/84" Eagle Mountain Project, which received only four bids on one section and two on the other section. For these reasons, the winner takes all strategy may be best employed in a buyer's market.
- **Be realistic in your contract's construction schedule.** It is important to allow enough time for construction, assuming one pipe manufacturer and one pipe-laying crew. Tight construction schedules tend to reduce the number of bidders and may limit some pipe manufacturers from bidding. Allowing longer construction periods may also enable a contractor to bid multiple pipe sections instead of having to focus on making a tight schedule on one segment.
- **Use the A+B bidding equation.** In some instances, meeting an aggressive schedule is paramount to the success of the project. A + B bidding requires the contractor to submit (A) the amount bid and (B) the days it will take to complete the bid. The calendar days required to complete the project is multiplied times a daily value (usually equal to the liquidated damage) to get the B portion of the bid. The A and B are added together to evaluate the bids. A+B bidding, in conjunction with an incentive payment for early project completion, was used successfully on a recent pump station project. For pipeline construction, A+B bidding gives the contractor an incentive for streamlining their production and lets the contractor set the fastest possible schedule.
- **Pre-qualify.** In a seller's market, contractors can pick and choose what projects they go after. In some cases, contractors may not bid a project if they're concerned about meeting the minimum qualifications. But, if they're pre-qualified, they can be confident of getting the award if they're the low bidder.

- **Benchmark material prices at bid time.** Recent history has shown wild swings in the prices of steel, concrete, copper and fuel. Many contractors have been burned by rapid price escalations that occur post-bid. During these times, contractors tend to add money to their bids to cover the risk of material escalation. One way to offset this is for the owner to take on some of the risk. This can be accomplished by setting a benchmark for material prices at bid time with the owner either paying for rising prices above the benchmark or receiving a deduction for prices falling below the benchmark.

In addition to adjusting the contract structure, sometimes making small changes to the general conditions can make a project more attractive to potential bidders. The general conditions will spell out how a Contractor will be paid for the work. Many times, full payment for pipeline installation will have conditions such as completing the hydrostatic test or establishing grass on the right-of-way. Five to 10 percent of the payment may be withheld even if the cost of these items is closer to 1 percent of the total cost. Similarly, excessive retainage can put a heavy burden on the Contractor's cash flow. Lightening up on the retainage and other withholdings may help the bottom line at bid time and attract more bidders. A few contractors have indicated they would not bid projects because the payment provisions caused cash flow problems.

Another way to mitigate inflation and lower bid prices is for owners to share in the risk of other portions of the project. The amount of rock excavation on a pipeline project is one area of risk that typically falls to the contractor. An owner who pays for thorough geotechnical investigation during the design phase can reduce the amount of risk the contractor must take on.

In one case, a project was re-bid after a lack of bidders resulted in poor bids. One contracting firm revealed that they didn't bid because of a concern that the pipe delivery trucks would have to use sub-standard county roads, requiring them to add money to the job for repairing these roads. When the project was re-bid, the general conditions limited the potential repair areas to roads directly parallel with the pipeline route, so long as the contractor used legal loads, thus limiting the contractors risk and reducing bid inflation.

Another way to mitigate rising costs due to inflation is to pay close attention to some of the pipeline details. Allowing techniques that increase contractor's productivity can reduce costs. For example, allowing weld after backfill will increase pipe laying productivity by taking joint welding out of the critical path. Imported pipeline embedment can be a very large expense for contractors. Allowing multiple embedment options such as trench excavated material or cement-stabilized trench excavated material can result in a large savings to the contractor that may be passed on to the owner. Also, allowing the contractor to spoil excess material over the pipeline right-of-way can be a large cost saver, particularly for large diameter pipelines. Finally, allowing competitive pipe material options results in more pipeline manufacturers to compete for the project resulting in lower prices.

Once you've done everything in your power to mitigate inflation, the next step is to keep a close ear to the ground to reduce sticker shock at bid time. In a seller's market, accurate cost estimating become more difficult and requires more diligence. Engineers would be wise to follow these suggestions:

- **Stay up on the market.** Changes to the market can drastically affect material prices almost overnight. Follow the major markets that affect pipeline prices such as steel, concrete and fuel prices and make changes to the estimate accordingly.
- **Get contractor and supplier input.** Contractors and suppliers must keep close tabs on the marketplace. Use your contacts to review your cost estimates, get updated pricing, and to learn about other issues you may have missed affecting prices.
- **Update estimates frequently.** Things change rapidly. An estimate performed at the 50% level can change drastically by bid time. In the beginning of a project, set a reasonable schedule for updating cost estimates, perhaps once a month, and update the client as changes occur.
- **Adapt design to market conditions where possible.** Pipe material that appeared too expensive one month might become more attractive later. Perhaps resin shortages raised the cost of PVC pipe to match steel or concrete pipe. Pipe manufacturer's backlog and delivery schedule can greatly impact bid prices. Be flexible.
- **Advertise smart.** Consider advertising for a full five weeks to allow plenty of time for contractors to prepare their bids. Allow adequate access to the pipeline route and schedule test digs if required. Be proactive about communicating the invitation to bid through faxes, email and website notifications. Also, carefully choose the bid date so that it doesn't conflict with other bids or industry conferences.

Finally, remember, your reputation precedes you. Projects will attract more bidders if the owner or engineer has a reputation for being fair and responsive. Engineers should be responsive on submittals and consistent on enforcement of the specifications. Inspectors should enforce the specifications to achieve a quality project, but be fair. Owners should make payments in a timely manner and negotiate in good faith on change orders.

Conclusions

The Texas market has seen a large increase in pipeline construction costs over the last four years. Several factors have contributed to this increase including growing demand, fewer contractors and material price volatility. It is anticipated that overall pipe installation prices should escalate 6 to 8 percent in 2007.

In a seller's market, it is important for the Owner and engineer to use diligence in assessing the market, updating cost estimates, and taking steps necessary to mitigate large cost increases to avoid sticker shock at bid time.

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