FIXED PRICE BIDDING OF DISTRIBUTION LINE CLEARANCE WORK: ANOTHER LOOK[1]

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Abstract. Awarding distribution system line clearance tree trimming under the terms of a contractural agreement establishing a fixed price for the completion of an entire work project has proven to be a cost effective alternative to traditional use of time and material basis contract tree crews. Successful utilization starts with establishing clear definition of project work requirements in the form of detailed specifications. Changes in the role of the contract administrator and contractor supervisor are necessary. An understanding of potential benefits and cost will increase the likelihood of success in adopting the fixed price bidding technique.

The utility industry's goal of providing reliable service establishes the need for management of right-of-way vegetation. A concern for program cost effectiveness is one factor influencing selection of methods used in attaining this goal. Line clearance tree trimming and tree removal are the principal components of distribution system vegetation management, representing a substantial commitment of company resources.

Wisconsin Public Service Corporation (WPS) is a gas and electric utility serving about 325,000 electric and natural gas customers across a 10,000 square mile service territory in Northeastern Wisconsin and Michigan's upper peninsula. At WPS the traditional approach to distribution vegetation maintenance has been to utilize three line clearance contractors working under the terms of annual time and materials basis contracts. A total of 32 two-man bucket crews are involved in the program. As administered, the program assigns each contractor to specific Company district locations on a crew by crew basis. Changes in the awarding of work locations have been moderated by a concern over the successful contractor's ability to establish a new headquarters and the required local supervision. WPS, like other companies in the industry, has been evaluating fixed-price or "lump-sum" bidding for the past three years. In 1984 approximately 20% of the distribution line clearance budget will be spent on lump-sum basis bid jobs. The program has proven to be cost effective and will be expanded.

Figure 1 defines three types of contractual agreements common to line clearance work as used in this paper. As described here, fixed-price bidding requires that each contractor submit a price for completing an entire project. While this approach to contracting has been successfully applied to capital clearing and herbicide application maintenance jobs, its use in distribution tree trimming has been limited. This may be due to the fact that trimming work is not easily quantifiable, making project description difficult. Another factor may be the perceived need for maximum flexibility in responding to customers, or to problems commonly encountered on distribution systems. This requirement is best addressed by time and material basis crews, but at potentially greater cost.

Contract specifications

The key to successful fixed-price bidding lies in developing a concise definition of the project. This is accomplished through the specific requirements of a detailed set of project specifications included as part of the terms of the formal contractual agreement. Within the distribution line clearance specs in use at WPS, six major sections have emerged as being important:

Scope. The project should be described both in a verbal fashion and on a circuit map. Particular attention should be paid to right-of-way on or adjacent to the project boundary. All maintenance work within the project boundary should be included in the bid package. An attempt should be made to keep all the work within the project area relatively uniform in terms of work requirements. For this reason, the use of herbicides with the

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exception of stump treatment applications are as a rule not included as a requirement of any line clearance tree trimming jobs. Projects containing a combination of urban, rural or recreational type rights-of-way should be reviewed for the possibility of breaking each section into sub-units. Project size is also a concern. Based on past experience, it is now our practice to put together rural jobs of 30-50 ROW miles (48-80 km). Urban and residential jobs are let in geographic unit areas of approximately 0.5 to 1 square miles (1.3-2.6 km^2) if possible.

Small projects have been awarded with good success where the amount of actual work is high in relation to the geographic area. Small projects have also been used with good success to introduce a district and/or contractor to the fixed price approach to line clearance bidding. If the job is too small, the cost of mobilization may outweigh any advantages to bidding, resulting in higher prices and fewer bidders. Too large a project also will tend to restrict the number of bidders due to increased labor and equipment demands and a concern for adequate cash flow. Large projects may also have a negative impact on the continuity of work available to the contract organizations. Dramatic fluctuations in contract work have the potential effect of reducing the quality of services provided by the contractor and may also reduce the number of available qualified bidders.

Notification. Careful consideration should be given to the requirements of the contract in the area of property owner contact. The specification should clearly establish whose responsibility (Company/contractor) it is to make notification or permission contact, what form this contact should take, and whether work will be allowed to proceed without such contact.

The approach WPS has taken is to establish notification as a responsibility of the contractor. Verbal noficiation is the most common form of contact practiced at WPS. Notification cards on doors are also used. The detailed specification requires that the contractor maintain a log of all attempts made at notification. The specification also allows for work to proceed without property owner notification, upon specific approval by the WPS representative. In practice, WPS has found it necessary to authorize a substantial amount of work with no notification. This primarily is due to the recreational nature of the northern portion of the service territory which typically would require contacting a high percentage of seasonal non-resident owners.

Clearance. The clearance required of the contractor to attain reliable operating conditions is really the bottom line. It is also the area that, at least initially, seems most difficult to quantify. The basic approach that we have taken is to start with some absolute clearance limits and then to add modifiers. Less clearance is required from the conductor to larger stems and branches, and on species known for strong wood and relatively slow growth. Clearance requirements are further modified in the text of the detailed specification which establishes the standards for "directional," "natural" and "lateral" trimming as a requirement of the contract.

In practice, clearance requirements have not been an issue. They are being effectively communicated to the men doing the work, many of whom have previous experience on time and materials crews. Clearance requirements on fixed price jobs are not intended to represent a departure from those expected of a standard time and material crew. There are situations where, because of a property-owner's concern, clearances must be modified. This is only done by approval of the WPS representative. WPS district supervisors have observed some sites where less clearance is being attained than would normally be achieved by a time and materials crew. In these cases the terms of the fixed price contract have been followed. What we are seeing is that the time and material crews may on occasion take the time to get some extra clearance. The benefit and cost

THREE BASIC FORMS OF CONTRACTUAL AGREEMENTS USED IN LINE CLEARENCE WORK

TIME & MATERIALS – AN AGREEMENT ESTABLISHING HOURLY RATES FOR SPECIFIC LABOR AND EQUIPMENT CLASSIFICATIONS, AND UNIT PRICES FOR MATERIALS THAT MAY BE USED.

UNIT PRICE – AN AGREEMENT ESTABLISHING FIXED PRICES PER VARIOUS SPECIFIC PRODUCTION UNITS (ie ACRES, HECTARES, LINEAR DISTANCE TRIMMED, INDIVIDUAL TREE REMOVAL BY dbh CLASS... ect)

FIXED PRICE – AN AGREEMENT ESTABLISHING A PRICE FOR THE COMPLETION OF THE ENTIRE SPECIFIED PROJECT.

Figure 1.

of additional clearance cannot be easily quantified.

Slash disposal. It has been our experience that slash disposal is one of the issues with the greatest potential for problems in fixed price bidding. Windrowing or piling of cut material is practiced extensively by our time and materials crews. As with hourly crews, the goal of fixed price jobs is to accomplish slash disposal in the cheapest manner acceptable to the property owner. However, using this description of slash disposal as a requirement of the contract is undesirable from the standpoint that it is nonspecific. The question of what is acceptable to the property owner, at least during bid preparation, is an uncertainty. Such uncertainties potentially lead to increased cost and difficulty in determining what is acceptable practice. A site by site or span by span definition of disposal techniques would clearly define the project, but in our case it is not practical due to other demands on the time of WPS district personnel.

The slash disposal section currently included in WPS fixed-price bid specifications for jobs in urban and residential areas establishes chipping and removal as the basic slash disposal technique, and also acknowledges the option of leaving firewood by the request of the property owner. On rural jobs chipping and blowing chips on site is required except in lawn areas where chip removal is necessary. In either case, alternate techniques are acceptable where the contractor can get the property owner's approval. In this situation if a future problem develops, it remains the contractor's responsibility to return to the site to complete "proper" disposal as required in the contract. Agreements between property owners and the contractor are external to the contractual agreement between WPS and it's contractor. However, some uncertainty remains with the contractor making some assumptions during bid preparation.

Reporting. The detailed specification should establish the requirements for record keeping by the contractor and the frequency of Company/contractor contacts. Other sections of this general subject area include addressing the frequency of invoicing and payment. On the larger jobs WPS has accepted payment on a "percent completed" basis as each section of approximately 25% or more is completed. While no form of surety is held on a trimming job, the final invoice is not paid until the entire job is reviewed and accepted by the Company. Project start and completion dates should also be clearly established. Payment of lump sum invoices may potentially impact maintenance budgets. Other considerations such as seasonal timing in both terms of weather and other factors such as tourism and presence of seasonal residents may be important.

Exceptions. A well-written specification can be expected to define the major tasks associated with a work project, guiding decision making in the field. However, some provision for addressing unique situations must be provided. Including hourly time and material rates as part of the fixed-price contract builds in the needed flexibility. If the potential for unique situations occurring can be anticipated it may be desirable to specifically address them in the contract specifications using a unit price approach. For example, tree removals are often more desirable than trimming. We would like to encourage take downs, but recognize that they may be more costly than trimming, particularly in urban areas. The number of take downs cannot easily be anticipated during bid preparation and included in the bid. On urban bid projects WPS states that the contractor should consider the entire project as a trimming job. Unit prices for tree removal by dbh class are also required as part of the bid. The unit removal prices are intended to reflect only the cost of differential between the required trimming and removal and can only be used for removals within the project area. In actual practice this approach has had an incentive effect by stimulating the contractor's interest in obtaining additional takedowns. As with any unit basis agreement, there is a question as to what a "typical" unit might be.

Contract Administration

Once the project scope and work requirements have been established, a pre-bid meeting is held. It has been WPS's practice to utilize a restricted list of bidders, limited to four basic contractors. Local contractors have been invited to bid on some of the smallest jobs with some success.

The bid meeting itself has proven to be a very important learning tool for both the contractors and WPS personnel. By getting project specifications to the contractors for review prior to the meeting, many potential problem areas are identified. It was not uncommon to find it necessary to change some wording or add some further definition to the earlier version of the detailed specification. This was accomplished both orally at the bid meeting and through a written follow-up prior to the bid due date. A conscious effort has been made to use consistently uniform wording between jobs.

Specific work requirements may vary by the job. A period of 3-4 weeks is normally allowed between bid meeting and the bid due date. In nearly every case the contract will be awarded to the low bidder. On occasion we have asked that the low bidder re-evaluate his bid, and either voluntarily withdraw it or accept the job as bid. On at least one occasion a job has been cancelled because of what appears to be an unrealistically low price. It is not in anyone's best interest to accept a bid that has the potential for causing the failure of a contractor.

Once the contract has been awarded, scheduling of work, staffing and equipping the job, and direct supervision of work are strictly the contractor's responsibility. The key concept is that control of production is entirely the contractor's responsibility. WPS's involvement is limited to determining whether the terms of the contract have been met. WPS personnel typically are involved with review of job progress in terms of compliance of work completed with the requirements of the specification. It has become our practice to conduct frequent reviews. This aids in rapid identification of problem areas, aids in minimizing property owner complaints, and limits the need for the contractor to return to a "completed" site to assure compliance and WPS acceptance. As invoices are received, the WPS supervisor in charge conducts a detailed evaluation of the job with the contractor. The job is either accepted and payment is processed, or the need for further work is identified. Eventually, all work within the project will be completed and final payment made.

Discussion

The foregoing description of WPS's approach to fixed-price bidding has been limited to a discussion of the technique. The real benefit and potentail cost associated with fixed-price bidding are of equal concern.

Fixed-price contracts are cost-effective. While our estimates are somewhat subjective, primarily due to a lack of historical information, a cost savings of 15% to 20% is often realized on the fixed-price bid jobs, with a few jobs running at substantially greater savings. Further, there may be other less tangible benefits to this approach to line clearance bidding in terms of changes in the requirements for supervision by the utility and the emphasis on systematic scheduling of work on a circuit basis and identification of effective work practices.

By design, fixed-price bidding allows the contractor to maximize the efficiency of the job by giving him freedom in applying men and equipment to the project. What we have observed is an increase in specialized equipment and hybridized crews being applied to work on the WPS system. More off-road equipment and specialized manual crews are being used. Also multiple trim lift, five-man crews, utilizing lower labor classifications and fewer foremen are common. An intermediate level of supervision between general foreman and crew foreman also seems to be emerging as contractors strive to accomplish efficient direct supervision of these bid jobs.

Cost savings due to optimization in equipment utilization through greater flexibility in scheduling are being achieved. The contractors have also implemented various forms of production incentive systems for their crews. Together these changes have resulted in greater efficiency in terms of clearance achieved per dollar spent.

Fixed-price bidding has also led to some other "in-house" effects on WPS. It has had the effect of moving field operation toward greater uniformity system-wide and increased Company supervisions' awareness of the line clearance program. The supervisory demand on Company personnel has changed from direct day-to-day production-oriented supervision to periodic project reviews and specification interpretation as requested by the contractor. It should be noted that con-

siderable time is required in setting up each project.

There are issues associated with fixed-price bidding that have the potential for increasing project cost both in terms of tangible monetary cost and lost customer goodwill. Generally, we are not experiencing an increase in the number of property-owner complaints over the number received from typical time and material basis contracts. There have been exceptions to this observation. WPS has experienced some problems on fixed-price bid jobs, primarily in the area of slash disposal or site cleanup. Our response has been to increase the frequency of job reviews. The intent of this increase in monitoring activity is to identify problems before they get out of hand and to minimize the number of locations to which the contractor must return. The increased intensity of supervision also has a cost associated with it.

The importance of accurate communication of project requirements between the Company and contractor has been stressed. The communication of these requirements within the contractor's organization from supervisor to workman is also important. We have observed problems in this area. It is imperative that the crew foreman have a copy of and be familiar with the contract specifications. Where this has not occurred problems quickly develop. This has led to the identification of the importance of an on site review of the specifications and general project between the WPS representative and the crew foreman during job start up.

There is a need to be concerned with how this method of letting work is affecting our contractors. Several factors are involved here. The intent of fixed-price bidding is to realize cost effectiveness through optimization of labor and equipment utilization, and not to encourage under pricing of required work projects. As noted earlier, there would be no advantage in breaking a contractor.

The number of bidders on any one job is also a concern. Our basic approach thus far has been to utilize four contractors on all but the smallest jobs. As the percentage of the maintenance budget spent on fixed-price bidding increases, it may become increasingly important to expand the list of bidders. The need for increasing the number of contractors involved in bidding is mitigated by a concern for continuity. If the work is spread over too many organizations, or if it is let too sporadically, it may result in a decrease in the overall quality of performance which in term has an impact on cost. A related problem that WPS has been experiencing has to do with the impact of demands placed on the contractor by other utilities in the region. Recently, there has been considerable demand for time and materials crews. We feel that the availability of hourly work, which is preferred by many contractors, has somewhat curbed competitive interest in attaining WPS fixed-price jobs.

The adaption of fixed-price bidding on the WPS system coincided with an increased emphasis on aggressive line clearance trimming. These developments initially created considerable anxiety among the contractors. The perceived risk-taking that WPS was requiring of the contractor, considering the indemnification provisions of the standard contract, appeared to be substantial. WPS has been attempting to build credibility with the contractors through support and involvement in handling complaints and damage claims. While it cannot be documented, this attempt at reducing contractor risk-taking should lead to lower prices.

Summary

The fixed-price bid approach to contracting distribution line clearance work has proven to be effective. The program will continue to be expanded at WPS. There are, however, no plans to eliminate all hourly contract crews. The question of whether prices will increase or decrease as the contractors become more familiar with this technique remains to be answered.

The method requires a detailed description of the project requirements and a practical approach to contract administration. The potential for problems is there, as is the potential for significant cost savings.

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