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DEVELOPMENT OF SUBCONTRACTOR INDIRECT COST AND OTHER DIRECT COST AT THE DOE FERNALD SITE

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DEVELOPMENT OF SUBCONTRACTOR INDIRECT COST AND OTHER DIRECT COST AT THE DOE FERNALD SITE

BACKGROUND

The Fernald Environmental Restoration Management Corporation (FERMCO) took great strides in the development of cost estimates at Fernald. There have been many opportunities to improve on how the policies and procedures pertaining to cost estimates were to be implemented. As FERMCO took over the existing Fernald facility, the Project Controls Division began to format the estimating procedures and tools to do business at Fernald. The Estimating Department looked at the problems that pre-existed at the site. One of the key problems that FERMCO encountered was how to summarize the direct and indirect accounts of each subcontracted estimate. Direct costs were broken down by prime and sub-prime accounts. This presented a level of detail that had not been experienced at the site before; it also created many issues concerning accounts and definitions to be applied to "all other accounts associated with a project."

Existing subcontract indirect cost accounts were reviewed from existing historical estimates. It was found that some were very detailed and some were not. The Estimating Department was given the task of standardizing the accounts and percentages for each of the subcontractor indirect costs. Then, as the project progressed, the percentages could be revised with actual estimates, subcontract comparisons, or with level of effort (LOE) accounts, which would represent qualified people assigned a task for the completion of each project. The approach is to assign particular employees to perform a specific task within a project from start to finish, and then to reassign the individual(s) to a new project (if it was available) integrating the expertise available with the skills required by the other operable units.

The draft details were presented to the Department of Energy (DOE) with the intent to improve the way FERMCO does business on a government project. These improvements were to address the many DOE concerns that the indirect cost estimate technique used in the past had not been uniform or consistent, and had not been presented in a manner that was uniform in each estimate that was received.

The Estimating Department then went back and reviewed the highs and lows of dollars that were experienced in each historical estimate. The Estimating Department went to each department and reviewed the actuals that would occur as each project was kicked-off, the types of changes the project would encounter. Previous estimating procedures did not account for all indirect costs that would occur during implementation and completion of a project.

The Estimating Department conducted meetings with each department (Health & Safety, QA, etc.) to determine all the needs and budgets. As these path-forward meetings progressed, it was found that the department managers were cooperative and had vast quantities of information to produce the percentages for the early estimates. Percentages to be applied to subcontractor directs was a new concept in the development of subcontractor indirect accounts, assuring a consistent formula to cover all costs in an out-year estimate. The representative departments had never experienced full budgeting (directs and indirects) to fulfill each task.

The Estimating Department then established the accounts to represent all departments and subcontractor overheads. Subcontractor overheads were a key issue that had been forgotten in the past. Subcontractor supervision, overhead, and profit had been assumed to be in the direct numbers, which were commonly not budgeted in estimates. All direct charges, using the bare rates, did not include all costs necessary to complete a project. Training, safety meetings, and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) costs were the most commonly forgotten. The concept was

to produce the percentages and categories necessary for the completion of an estimate and have the required budget to complete a project.

The Estimating Department researched all the categories by reviewing the high- and low-dollar totals to reference them to the direct field costs. In developing the percentages, it was evident that some of the categories of subcontractor indirects were not addressed because of the higher represented values of summary estimates. The higher represented estimates presented problems with budgeting for all the accounts. In this exercise, the Estimating Department created an increased "comfort level" within each estimate.

The client reviewers were favorably impressed with the analysis of each subcontract indirect account; the intent was to create average percentages to be added to the total cost of each estimate. The initial estimates produced required significant documentation to fulfill all the DOE requirements necessary to produce a comfort level with this effort. As estimates were completed and reviewed by department managers and DOE representatives, the Estimating Department analyzed the results with great success. Auditors from other DOE sites and DOE subcontractors were consulted to review and make comments on this system of estimating and cost systems. The final results proved to be well accepted, and there were no significant faults with this system of estimating. The Estimating Department made minor changes from suggestions that the audit teams made, but no major changes were needed from the original concept.

The following detail of each subcontract indirect and other direct costs will explain:

- the necessity for each account;
- the description, percentage, or dollar amount that is calculated to produce a preliminary estimate for the purpose of budgeting out-year tasks; and

- the ability to change as actual labor/personnel and contracts are budgeted in well-defined detail estimates.

SUBCONTRACTOR INDIRECTS

A supervision account for contractors was developed and included the superintendent, field office staff, and all subcontractor management overhead costs. In reviewing the past history of contractors on site, the Estimating Department developed a percentage to be applied to all direct field labor dollars. Previously, the percentages were from 15 to 20 percent of total labor. After averaging, 17 percent was chosen as the percentage to be used because it was a fair amount that could be applied to all accounts. Recent contracts that have been awarded have proven the accuracy of these estimates to be within five percent of contract values.

Small tools and consumables accounts, commonly forgotten, were accounts that needed to be stated in a budget. Small tools and consumables include items such as welding rods, oxygen, hand tools, and items needed to supply the day-to-day needs of a given project. After reviewing the overruns of estimates in the past, six percent of direct field dollars was originally chosen to represent this account. This percentage created some problems because small projects were not projecting enough budgeting for small tools and consumables to supply small projects properly. The account was revised to be driven by direct field hours rather than dollars. In this approach, a dollar amount of $3.50 per hour rather than the percentage was chosen. This worked better. The averaging process proved to be a more defined way of budgeting this account. All sizes of jobs were reviewed and averaged to create an amount per man-hour that would cover the small job versus the large job. The contracts awarded to date have proven this process to be very successful. The amount is only for out-year budgeting, and can be budgeted at any time with detail estimates which would require detailed support data to accompany the estimate.

Equipment rental was a unique account that presented significant budgeting problems. Upon review of projects previously performed at Fernald, the per direct field labor hour varied significantly from $1.66 per hour to $8.50 per hour.

After intense reviews, the Estimating Department selected a range from $3.00 per hour to $5.00 per hour for each direct field labor dollar spent. This approach was good but did not completely encompass the account. The range selection could not cover all rental equipment such as heavy lift cranes, heavy hauling equipment, and specialty equipment necessary to complete a difficult project. Because of this dilemma, two lists were developed. First, a standard list of equipment that would cover common projects was created. Second, a professional estimator would evaluate the function of the specialty equipment and substitute the cost of standard equipment with a detailed equipment rental list.

Under common conditions the heavy lift, heavy haul equipment categories would not exceed 80 tons of lifting capacity. Consultations with construction managers and rigging engineers were held to see if this profile exceeded the normal conditions that would be detailed, and the equipment lists necessary to project the costs by piece of equipment and its duration. In some cases, on the contaminated side it was proven that the purchase of equipment was more economical than long-term leasing and subsequent decontamination. Some equipment can be reused in different areas which enhances integration plus reduces costs.

Temporary facilities are to be reviewed during each project to ascertain whether the facilities are needed. In reviewing previous job histories, many smaller jobs did not require temporary facilities. The estimating guidelines establish whether to use the percentage or detailed facilities estimate. The range of percentages varied from five to seven percent of total direct field dollars. Each project is to be

reviewed with the project engineers on a case-by-case basis to determine if acquisition of temporary facilities is needed. If so, one of two approaches would be taken:

- detail description and estimate
- if not detailed, six percent of total direct field dollars.

Under no circumstances is the percentage used when detailed estimates have been presented to the Estimating Department by Engineering and Construction Management. The percentages are then split between labor and materials. The most common percentage split is 35 percent labor and 65 percent materials. This method ensures that both labor and material are covered to purchase and install the facilities.

The temporary utilities account must be projected for each temporary facility to ensure that all electric, telephones, water, sewer, and related items are budgeted to support the project. Historically, no budget was developed for this account. After reviewing previous utility data and comparing it to direct field labor dollars, the percentage range established was two to five percent. The Estimating Department chose to average and use three percent as a common denominator for undefined out-year scope. When definition is given, the Estimating Department detailed the temporary utilities account with location and actual requirements. Actual definitions, with significant documentation, accompany the estimate and are represented as estimated quantities with this account. When the percentage is used for undefined out-year budget estimates, a 35 to 65 percent split is used to represent the labor and temporary utilities materials for the account.

The job clean-up account is a common non-budget account that in reality represents from five to seven percent of total direct field labor hours. Six percent was used as average, and it is reflected in every

estimate. The Estimating Department has chosen to use the percentage and has been very successful with this account on covering actual costs that are measured against current finished projects. This account is commonly used for removal of site debris, disposal and storage of debris, and costs associated with disposal of debris from site. This account does not include cost for disposal of contaminated waste.

Safety is a key account at Fernald. Because of the many requirements at Fernald, numerous safety meetings, tailgate meetings, and counseling meetings are held to inform the employees of the correct and safe way to perform a given project, and to identify the hazards of given tasks. It is the subcontractor's responsibility to maintain a current approach on training the employee regarding any state, local, and federal safety requirements. This account budgets for the training and rewards of safety, and for the subcontractor's purchase of any safety equipment. After reviewing the historical percentages, the Estimating Department developed an average of three percent of direct field labor; a common split of this percentage is 35 percent labor and 65 percent safety materials.

The health physics account was developed especially for all DOE sites. It includes dress-out time, monitoring delays, showers, work delays, and recurring physicals to monitor the overall dosage of each employee working on the contaminated side of the facility. (Dress-out time was originally included; now it is included in productivity.) Health physics is another account that has a variable percentage. Professional estimators must use discretion in establishing the correct health physics program. Percentages have been developed to accompany the monitoring required. These percentages vary from two to six percent. If no definition is given, it is typical to use higher percentages on this account (new regulatory requirements tend to drive this percent up). These percentages are applied to direct field costs only and tend to be working very well with little definition available.

CERCLA costs have been calculated for this account and work well on large projects ($1M and higher). Establishing full time equivalents (FTEs) are calculated for each subcontractor by dividing total direct field hours by 2000 hours for a work year. The FTEs are calculated at a flat cost of $1500 per person and are applied to determine a total CERCLA training cost. The $1500 was developed by the 48-hour training criteria needed to allow the employee to enter and to perform work on the contaminated side. This is a minimum requirement, and many employees need to be trained in specialty areas which will be determined by the operable unit, management, and regulatory requirements. The formula is working well, taking into account that some subcontractors have employees already trained for site access but usually need additional training for specific projects. The average is working well except for small projects which generate small numbers of employees. These do not lend themselves to the application of a fixed average because both the durations and the crew sizes are highly variable and impossible to predict. Professional estimators must make adjustments for these conditions on a case-by-case basis. The flat cost of $1500 per FTE is just a guideline which forecasts training costs for out-year estimates. When subcontractors submit actual headcounts, DOE budgeting personnel can be assured that the numbers of employees are accurately represented in total award contracts.

Bonds are forecasted as a percentage of total contract value including all subcontractor direct costs and all subcontractor indirect costs. In reviewing the past bond percentages applied, it was found that most contractors are paying one percent of the total contract. This percentage is represented in the bonds account.

The overhead and profit account contains all the subcontractor home office charges and profit for the project. In reviewing historical completed projects, it was found that most contractors were in the range of eight to ten percent of total contract value. The mid-range of nine percent was chosen to forecast the

overhead and profit in future estimates. The current projects are within this range, but some contractors' percentages are more than is forecasted due to special conditions and controls. DOE and FERMCO had many discussions about the percentage to use and agreed that nine percent would be the allowance used at this time. The nine percent is applied to the subcontractor's total contract including the direct and indirect account. It has been found that some contractors use larger percentages, but these are applied only to portions of the directs and do not include all the subcontractor indirects. In comparing the overall percentage, the Estimating Department is well within the budgeted amounts necessary to represent the out-year projects.

Payroll burdens and benefits accounts were established to include all benefits, burdens, and home office expense for the subcontractor to apply to each discipline's bare rates. After careful review, the Estimating Department calculated the total payroll burdens and benefits for Fernald for performing subcontracts to be 52 percent of all direct field labor dollars. This percentage has proven to be in line with all subcontractors, and has been compared to current contracts in place. The payroll burdens and benefits account is the final account to be applied to subcontractor indirects, which, with all accounts and percentages applied, determine the subcontractors, total project cost less sales tax, and any risk budget to be applied.

OTHER DIRECT COSTS

Transportation and burial cost accounts are the responsibility of the site facility. The facility is responsible for disposal of all contaminated waste. Decisions regarding the types and methods of disposal are made by the operable unit, Environmental Protection Agency (EPA), and DOE based on the

conditions in the approved Record of Decision (ROD) and Remedial Investigation/Feasibility Study (RI/FS) final determinations.

The ROD criteria depict the safe and proven methods of disposal per each case developed. FERMCO follows the disposal requirements mandated by the Nevada Test Site. The per-cubic-foot price of disposal is then multiplied by the total quantity to be shipped. Transportation may vary, and all transportation and disposal costs are detailed even in the out-years based on the RI findings. The Engineering Department works closely with the Estimating Department to determine the exact quantities and costs. Detail sheets are developed to create complete backup to the numbers represented on the summary estimate sheet. No percentages are used to determine this account.

Waste container purchases and distribution to the appropriate operable unit are the responsibility of the site facility. Historically, costs have been incorporated into the project cost for all the standard size boxes and containers. Each container cost also includes all associated labor and material costs to load, handle, and prepare for shipping off-site. The Engineering Department, regulatory agencies, and the ROD are the key factors in the proper box type that is to be used. The details and types are projected in a detailed estimate and used for the estimate summary. There will be cases where special boxes or containers will be acquired for the disposal of waste. In these cases, specialty environmental firms perform detailed studies, projecting the size, material, and cost for each type. These specifications and costs are then projected for the total box disposal cost.

The soil-water-air sampling account is for the projection of all sampling costs to be performed. Engineering and regulatory requirements are the governing factors for the percentage used in estimating the additional tests required by specific projects. Contamination areas are key locations where these types

of tests are required. In reviewing the historical costs, the Estimating Department found that the percentage to be used is one percent of total direct field costs. The account is distributed by a 35 to 65 percent spread between labor and material. When the projects advance to more detailed stages of engineering and construction, the actual type and count are detailed and incorporated into the summary estimate.

The project management account is determined by the amount of people from the operable unit who are projected to support the project in the field during preliminary planning and staffing construction and project close-out. Detailed spreadsheets are developed to determine the necessary labor loading and costs.

The project manager, project office support, and project control people are key personnel who will be budgeted in this account. The method of projecting cost in this account is done by resource loading or an LOE format spreadsheet with current labor rates and projecting the time frame in which the field staff will be required to be budgeted. There is no percentage used in this account for out-year projection for estimating summary sheets.

The construction management account includes personnel needed in the field to manage the project in the field. Management must establish a detailed LOE analysis of the construction manager, field managers, and support staff needed to complete all reporting and management needs. The size of the staff is driven by the complexity of the construction project, the commercial terms to be applied, and various other reporting requirements based on needs internal to the managing organization. There is no percentage for out-year projections for this account.

Modeling costs, including emissions modeling, computer program modeling, and emissions testing are part of predetermined projects and are necessary in many estimates. During the scoping phase of each project, the manager of each project determines whether modeling would be an integral part of each project. If necessary, a 0.5 percent is applied to the total direct and indirect cost of the subcontract. With current projects, this percentage has proven to be accurate and more acceptable. The percentages are only used in out-year estimates and when detail is not presented. When specific modeling tests are determined, the Engineering Department and specialty people develop scope-of-work descriptions which may then be estimated to create a modeling budget. At this time, the estimated amount of actual modeling will be incorporated into the estimate summary. In reviewing the actual costs of modeling, the percentage used in the estimates have been very accurate. The percentages are represented by a 35 to 65 percent split between the labor and material.

The Preliminary Safety Analysis Report/Final Safety Analysis Report (PSAR/FSAR) are special safety and operations reports that must be performed before starting a project; i.e., completed before construction and operation of a facility. Historical analysis indicated that the percentage needed to project these costs would be 0.5 percent of total field costs. This percentage is used only in out-year estimates. In Title II estimates, detailed LOE estimate spreadsheets are developed and applied. Engineering and regulatory comments are the governing factor in developing the details and reports necessary to produce both of the documents. Each project requires a different level of detail depending on the type of project and the amount of contamination and exposure within the project.

The engineering account is developed for Title I, Title II, and Title III Engineering that are required by DOE Order 4700.1 and other DOE orders and requirements. Historical percentages vary from 15 to 25 percent of the cost of the total project. After careful consideration, the Estimating Department decided

to use 20 percent as the out-years percentage to project engineering cost from FERMCO and subcontractors. Six percent above the 20 percent must be used for engineering and design inspection. As the project progresses through various stages of engineering, the estimate is updated to reflect the appropriate contract numbers based on signed purchase orders with the number then being reflected in the estimate summary sheet. Engineering is a key function of each project and is carefully examined by upper management.

The sales tax account is based on materials to be purchased within a project. Many meetings were conducted to determine tax exempt status of this project. In meeting with DOE personnel, the determination was that there is no official documentation in place to support a tax-exempt status; thus, a six percent tax has been applied to all material accounts and no tax is applied to labor. In the event that there is a total subcontract only, the 65 percent of total contract will be used for the material cost within a project.

General and Administrative (G&A) is applied in the cost reporting system and is not budgeted in the estimates. G&A is applied in the downloaded function in the cost section of the project. All estimates are downloaded in the cost system, so G& A is applied within that division. G&A is not represented in summary estimates.

The escalation account is applied by the Cost Control Department. Escalation is applied in the downloads and is not represented in the estimate summary sheet. Escalation is based on the start and finish dates of each project and the total dollar values displayed in the downloads from the cost system. All estimates are downloaded in the cost system. Escalation in the cost system is based on the current DOE escalation tables.

The risk budget account was developed to allow for the conceptual nature of engineering design in the out-year estimates. Risk budget is based on a 50/50 chance of overrun and is incorporated within the estimate summary sheet. Input for the Monte-Carlo scenario (linear risk program) is based on engineering, estimating, and management comfort levels of each cost category. The risk is based on the percent complete and soft areas of engineering and design. Various highs and lows are assigned on each indirect account for evaluation to determine the total Risk Budget.

The contingency account is governed by DOE. The same program as the risk budget account projects the additional amount of budget needed to cover contingency. Contingency is the difference between the risk budget numbers and the projected numbers of contingency projecting percentages for a budget with a five percent chance of overrun. Contingency numbers are not included in the budget of the estimate, but are suggested budget numbers to be used by DOE.

CONCLUSION

This is the conclusion of the description of the Fernald operations subcontract indirects and other direct costs as developed by the Estimating Department. After many audits and compliance checks, FERMCO has been commended for the effort and methods on which the task was developed.