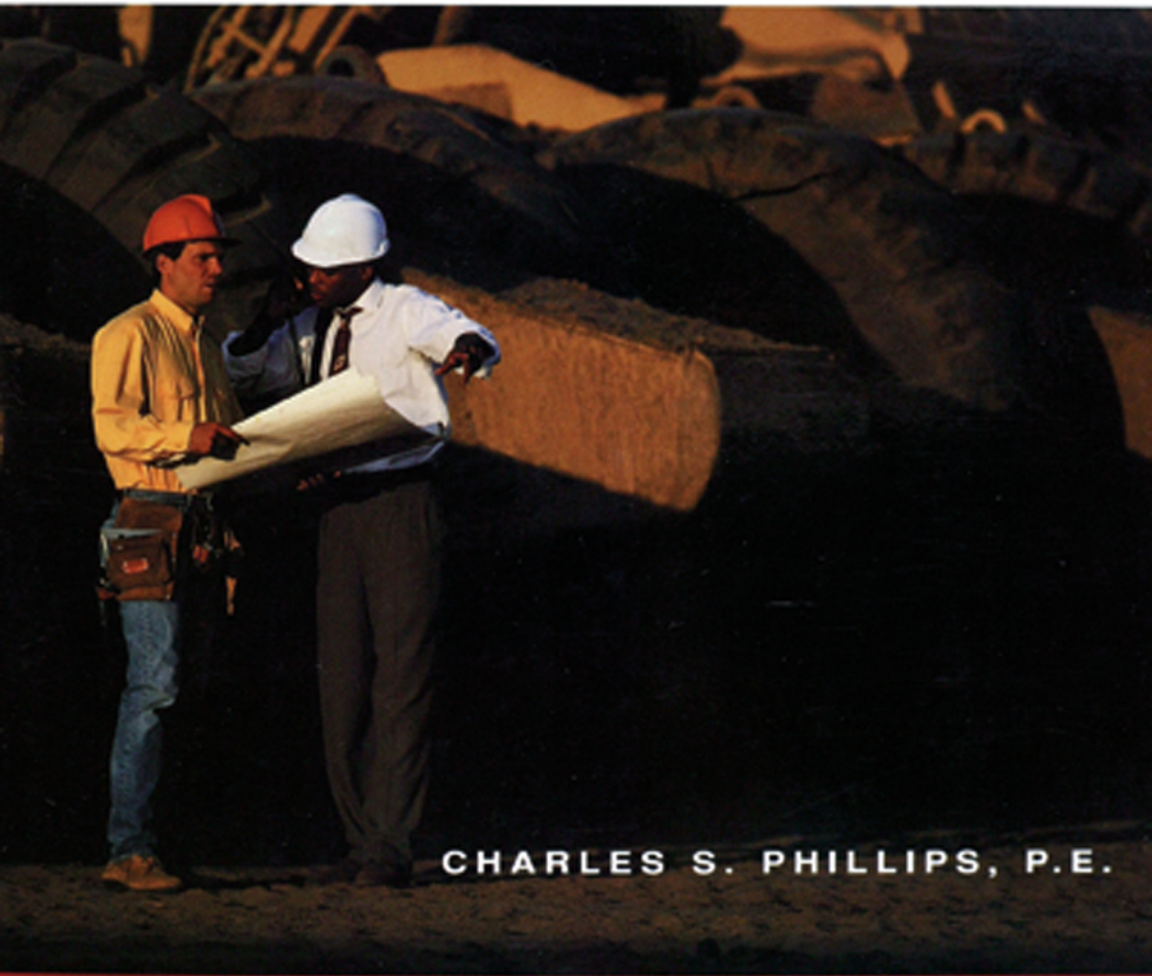
Construction Contract Administration



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SME

Construction Contract Administration

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Published by the

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For my wife
Mary Christian Vest Phillips

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Preface

A successful construction project is completed safely, on time, and within budget; meets designed performance; and produces no claims. This book was written to help those working with privately awarded construction contracts meet these goals.

Students, Contractors, foremen, superintendents and managers, project managers and engineers, site and contract administrators and managers, Owner's representatives, and others associated with the industry will find the book to be current and useful. It is designed to serve as a guide and general reference for the many subjects that must be considered in the production and site management of a construction contract.

The author has represented Owners and Contractors for the past 50 years in operations, maintenance, design, construction, estimating, engineering, management, and claims resolution in domestic and offshore mining, process, mineral, refinery, smelter, petrochemical, and environmental remediation facilities.

The book is divided into three parts. Part 1 deals with the selection, production, and assembly of the elements required for a construction contract. Part 2 reviews the basics for a reasonable, fair, practical, logical, and orderly contract administration system, using the sample bid package included in appendix B to illustrate the various elements and considerations. Part 3 presents four case studies from construction projects to help those who manage contracts recognize potential problem areas. Some of the latest advances in information technology for construction contract management are discussed in chapter 9.

I hereby acknowledge the many friends and colleagues who have gone out of their way to help me through the past 50 years in a career spent in mining, engineering and construction: Charles T. Holland, Frank Morris, K.C. Browne, D.C. Tretzel, S.F. Erba, Walter F. Jones, S.J. Campagna, O.J. Champagne, Robert L. Presson, C.W. McCumsey, W.O. Hansen, Hans J. Zimmermann, S.V. Distefano, Sheldon Teel, T.D. James, Michael Killgore, and Roy A. Dardenne, Jr.

In particular, I thank Stephen M. Spohrer, P.E., for taking the time to review each page of text as the book took shape and for many valuable suggestions and assistance.

PART 1

Contract Production

CHAPTER 1

Introduction

DEFINITION OF CONTRACTS

Contracts are defined as binding agreements between two or more persons or parties. Construction contracts are defined as agreements, oral or written, executed between Owners and Contractors for construction and/or maintenance work done for compensation.

HISTORY

Evidence exists that contracts were being recorded before 2,000 B.C. (soon after the introduction of written language). Excavations at several sites in ancient Mesopotamia have unearthed clay tablets with contracts written by the Sumerians in cuneiform script. Some set wages for workers and administrators tending to the fields, vineyards, and livestock. Others specified food allotments and/or wages for those constructing, maintaining, and operating the extensive irrigation systems. Clay tablet artifacts found at excavation sites of some Babylonian schools for scribes are believed to have been used for practice layouts of commercial letters and contracts by apprentice scribes perfecting their writing skills. Clay tablet lexicons of older Sumerian legal phrases, along with their Babylonian translations (again, presumably for use by the students in their exercises) have been uncovered at other archaeological sites.

Painted limestone shards (ostraca), dated to the Middle Kingdom Period (2,284–1,570 B.C.), have been unearthed at Deir el-Medineh near Egypt's Valley of the Kings. Translation shows some to be daily records of work by the administrators, craftsmen, artists, and laborers housed there to design, excavate, construct, and decorate the royal tombs. Others are contracts that specify the daily allotments of bread, oil, fish, firewood, and beer to be paid in exchange for the work. Today's construction laborers and craftsmen expect to receive more than food and shelter for their efforts. Depending on the type of work, current labor costs often account for as much as one-half of the total cost of a construction project.

CURRENT CONSTRUCTION SPENDING

The estimated total value of public and private construction to be put in place in the United States in 1999 (adjusted for inflation) is a new record, $525.4 billion. Private, nonresidential construction to be put in place in 1999 is forecast at $181.8 billion.*

Owners have developed contract administration systems that suit their individual needs for controlling what can be a large part of their total spending. Comparison of a number of these systems shows that all are similar in content, form, and intent, and are based on the same document, the construction contract.

CONSIDERATIONS FOR CREATING CONTRACTS

Effective construction contracts require careful and precise preparation of each activity undertaken to produce them. This includes the proposal, design, document selection and preparation, bid package assembly, and contract award stages. Individuals assigned to these activities must be selected for their skill, ability, and experience because the frequency of project delays, cost overruns, and claims will be directly affected by the quality of their efforts.

Construction contracts pass through five distinct phases: proposal, design, award, construction, and completion. Figure 1.1 lists the basic activities and considerations for each phase. Chapters 2–4 discuss various aspects of the proposal, design, and award of the construction contract, as well as development of the bid package and the construction contract. For additional detail about the activities and phases listed in Figure 1.1, see Appendix A, "Checklist for Processing from Start to Start-Up." This list is a useful reference for identifying the many activities and matters that must be considered before starting a construction project. Although it was first published in 1966, the basic information remains valid, and it can be updated by adding the requirements of federal and state regulatory agencies such as the Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and Mine Safety and Health Administration (MSHA).

REQUIREMENTS FOR EFFECTIVE CONTRACTS

Construction contract management systems are expected to provide uniform, orderly, and effective procedures to regulate and administer project design, bid package preparation, contract award, application, progress, spending, schedules, inspection, completion, and acceptance. Procedures related to construction site work must be fair to all the parties concerned, logical, reasonable, and suitable for use with construction projects and contracts of any type, size, or location.

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* Patrick Macauley, "Forecast 1999, U.S. Department of Commerce, Construction Put in Place," *ENR* (November 2, 1998).

Contract Checklist from Proposal to Completion

Phase	Activities	Considerations	
1. Proposal	• Initiate • Define • Select • Submit	• Facility Concept • Concept Estimate • Method of Award • Type Management	• Type of Contract • Proposed Bidders • Bonding • Insurance
2. Design (Basic and Final)	• Plan • Estimate • Present • Review • Approve • Distribute	• Master Plan • Master Schedule • Management Plan • Work Scope • Design Criteria • Specifications • Purchasing Plan • Document Register • Equipment List • Material List	• Flowsheets • Estimates • Budgets • Drawings • Constructability • Invitation to Bid • Instructions to Bid • Proposal • Bid Package
3. Award	• Organize • Select • Process	• Qualify Bidders • Bid List • Bid Procedure • Addenda	• Award Procedures • Award Contract • Notice to Proceed
4. Construct	• Direct • Observe • Analyze • Document • Report	• Administration • Progress Meetings • Progress Reports • Cost Reports • Inspections • Testing	• Receiving • Change Orders • Amendments • Payments • Claims • Correspondence
5. Complete	• Coordinate • Prepare • Schedule • Execute	• Beneficial Occupancy • Punch Lists • Test Runs • Checkout • Start-up	• As Built Drawings • Acceptance • Final Reports • Final Payment • Release of Retainage • Transfer of Facility to Operators

FIGURE 1.1 Construction contract checklist

CONSTRUCTION INDUSTRY ORGANIZATIONS: RESOURCES FOR OWNERS AND CONTRACTORS

Construction industry associations such as the American Institute of Architects (AIA), Associated Builders and Contractors (ABC), Associated General Contractors (AGC), The Business Roundtable, and the Construction Industry Institute (CII) provide valuable services for owners and contractors. They develop and issue standard contract forms and documents; issue publications and hold training programs about preparing and managing contracts; conduct craft and supervisory training on productivity, safety, and risk management; issue alerts on state and federal legislation related to construction; and do research and issue reports on methods to improve the entire construction process.

The Business Roundtable was started by chief executives of 200 leading U.S. companies in 1972 to identify and correct causes for declining productivity in their own construction services activities. They fund research and report results on major construction-related issues such as project management, construction technology, labor supply and training, and regulations and codes. Recommendations are developed and provided to members and local user councils (LUCs) for use in promoting their goal of "more construction for the money."

CHAPTER 2

Project Origin

Owners require detailed information about proposed construction projects before they can make sound decisions concerning project feasibility. The types of information they need include a project objective, design criteria, product information, expected results, and a cost estimate. Concept proposals are used to present this basic information as well as suggestions for the method of contract award, the type of contract and construction management most suited to the work, a list of proposed bidders, and bond and insurance coverage.

CONCEPT PROPOSAL

Owners make a thorough analysis of all concept proposal information provided, particularly concept cost estimates. These estimates may be based on minimal information and could include contingencies as high as 20 to 30% of total project costs for structures and equipment. Owners recognize this fact and use proposal cost estimates only as a guide to indicate an "order of magnitude" of costs for proposed projects. For example, new or "grassroots" proposals may lack the necessary soils information to select the most cost-effective design for site structural foundations. These can range from simple concrete spread footings to more complicated, and expensive, combinations of compaction, dewatering, concrete, steel, and piling. Experienced estimators will add enough contingency to their standard cost assumptions to ensure adequate funding for extreme conditions. Investigations often include a feasibility study used to predict the chances for success of a plan or project, and/or a cash flow analysis, to forecast the amount of money to be spent and the amount to be earned over a specified period for the same plan or project. If less than acceptable returns on investment are indicated, the project may be delayed or even abandoned. If the investigation indicates an acceptable return, Owners will approve added spending for the next stage, the "base" design stage.

BASE DESIGN

Base design activities are monitored closely by the Owner. Added information is expected to produce a more accurate cost estimate. At some point (between 40 and 50%) of base design completion, Owners must decide to either abandon the project, continue with base design, or enter the final design stage. Completed final designs contain all the necessary information, documents, and drawings required for project bidding, contract award, and construction. Depending on the type of project, Owners hope that final design estimates are accurate to within plus or minus 8 to 10% of final construction

costs. Mandated projects such as those for environmental remediation and health and safety considerations often move directly from the concept proposal to the final design stage.

A surprising number of Owners still fail to use their operations and maintenance personnel, who are familiar with the site, plant, and process, to review construction drawings and specifications. This pool of talent is a valuable resource for identifying site-specific problems in design and placement that might not be obvious to others and thus preventing added costs, claims, and missed schedules caused by construction changes.

METHOD OF AWARD

Construction contracts are awarded by either competitive bidding or negotiation. Competitive bidding is usually selected for those construction projects where the work can be well defined. Aspects of competitive bidding are discussed in chapter 4, "Contract Award."

Negotiated contracts may be considered for projects with unusual requirements of size, time, and complexity and with a less than well-defined scope. Owners pre-qualify Contractors to determine those best qualified for their needs. Lump sum, unit price, cost plus, cost plus not to exceed, design-build, and design-build with qualifiers such as "lease back" or "buy back," or any combination of these, are just some of the possible contracts that may be negotiated. Owners select the method of award and type of contract that they feel is best suited to their project and will give them "more construction for their money."

CONTRACT TYPES

The four basic types of construction contracts are fixed price, unit price, cost plus, and design-build. Occasions do arise when some combination or alternative of the basic types may be appropriate.

1. *Fixed price (lump sum) contracts* quote a single, guaranteed price as compensation for all the labor, materials, equipment, and services stipulated to complete the facility described in the construction contract. Fixed price contracts provide Owners with an exact sum (barring exceptions and changes) to budget for their construction project. A majority of private construction contracts awarded in the United States today are for a fixed price because Owners still believe it is the most cost-effective means to deliver their completed construction projects.
2. *Unit price contracts* are used for those less-complicated projects that are based on readily identifiable units. Paving, for example, can be accurately quantified in units of area and thickness, piling in linear feet or number of piles, and mass concrete in cubic yards and pounds of reinforcing material. Unit price contracts also require careful preparation to prevent disputes. Well-estimated guide quantities for each unit price item as well as clear instructions for their measurement are the key to successful unit price contracts. Actual quantity variances greater than 10% may cause legitimate claims for added or deductible costs. Clauses are usually included in unit price contracts that address this issue. They are expected to be fair and equitable to both Owners and Contractors.

3. *Cost plus contracts* may be the best choice in emergencies or when the additional time and cost to scope and specify a project accurately are unacceptable. Variations of cost plus contracts may or may not include a fee, which can be negotiated or fixed, and a "not to exceed price." The intent is to stipulate a fair cost for the Contractor's fees, expenses, and profit. Cost plus contracts, too, require precise wording to prevent spending overruns and claims. "Fixed" or "percentage" fees, markups, profit, services, and work limits must be clearly defined in the contract. Ready Owner access to the daily labor, materials, equipment, and services records written into the contract helps prevent disputes.
4. *Design-build contracts* are a type of project delivery system assigning both design and construction services to one group. In the past, design-build was associated only with large and complex heavy, marine, transportation, and electric utility construction. A trend toward wider use of design-build contracts started in the early 1980s after many industries downsized or abolished their in-house engineering and construction groups to reduce overhead. These industries were then forced to look outside for project design. Owners took the next step and assigned one firm the complete design-build responsibility. This type of construction is growing and there are estimates that design-build contracts will account for 50% of U.S. construction project delivery methods by the year 2005.* Proponents believe that design-build construction eliminates conflicts among the designer, Contractor, and Owner over poor design, specifications, and drawings. Owners with little or no design-build experience should know that design-build construction is not a panacea, nor appropriate for every project. Before selecting this option, Owners should discuss design-build results with others who have completed design-build projects.

BID LIST

A qualified bidders' list, naming proposed bidders, should accompany all concept proposals. It is recognized that the selection of qualified and reputable bidders is just one of many requirements for a successful project. If a bidders' list does not exist for a project site, one must be generated. Careful selection of qualified and reputable bidders is a major consideration. Subjects to consider when qualifying and selecting bidders are addressed in greater detail in chapters 3 and 4.

CONSTRUCTION MANAGEMENT

Owners with experienced "in-house" construction departments usually provide their own Site Manager to act within established limits as the Owner's "on-site" agent (see Chapter 5). Site Managers are expected to manage, administer, and coordinate all field or site activities from contract award through construction, completion, testing, acceptance, start-up, and transfer to the operators. Owners without qualified construction management personnel may engage construction management firms to act as their Construction Manager (CM) and provide site management services. This work is done on a "for fee" or "at risk" basis, depending on the CM's financial involvement.

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* Tanya C. Matthews, Presentation at Design-Build Institute of America Annual Meeting, Chicago, October 14–16, 1998.

BOND REQUIREMENTS

Three types of bonds are associated with construction contracts: bid bonds, payment bonds, and performance bonds. They are three party instruments that protect the Owner (Obligee) from damage or default by the Contractor (Principal) through a bonding company (Surety). Claims for damage may arise should a Contractor fail to sign a contract after being declared the low bidder (bid bonds cover this), fail to pay Subcontractors and suppliers (payment bonds cover this), or fail to complete the work according to the plans and specifications (performance bonds cover this). The bonds ensure that compensation is made to the appropriate party for each of these problems. Owners set their bond requirements based on project type, size, location, and prior relations with the Contractor. The bond limits must be stipulated in the bid documents.

INSURANCE REQUIREMENTS

Insurance is a two-party risk-transfer mechanism by which one party pays to have another party protect it from certain defined risks. Copies of properly executed Certificates of Insurance, meeting the Owner's minimum requirements, should accompany each Contractor's proposal or bid or be submitted before the contract is awarded. The insurance limits must be stipulated in the bid documents. Typical limits and types of insurance for projects are found in Appendix B, Exhibit B, Article 11, and Appendix B, Exhibit G.

The basic types of construction insurance coverage follow:

- *Worker's Compensation* limits the liability of employers to their employees, generally set at the statutory limit for a work location.
- *Employer's liability* insures the Owner for employee injury claims not covered by the Workmen's Compensation law.
- *Comprehensive general liability* is a broad form of insurance covering liability claims by third parties for bodily injury or property damage caused by the Owner's or Contractor's facilities or actions.
- *Comprehensive automotive liability* provides the Owner with protection from claims for injury or damage to property or persons by automobiles.
- *Builder's risk insurance* is provided by the Contractor on an "all risks" basis to cover all conventional perils.

CHAPTER 3

Planning and Control

Construction project plans must define and set limits on the "what, why, where, when, who, and how" of design and construction. Owners require such plans to schedule and control their construction projects within the limits set for design, scope, time, and budget. Successful construction projects are defined as being completed safely, on time, within the budget, meeting designed performance, and with no claims. Achieving this goal is difficult under the best of conditions and impossible without a system of well-written procedures to plan, schedule, and control project design, document preparation, and construction.

Project plans consist of a master development plan describing and defining the total project in detail; a realistic project schedule, preferably using the critical path method (CPM) or the program evaluation review technique (PERT); a well-defined scope of work establishing work limits; design criteria to quantify and establish operating limits for each component; and a budget to provide details of the costs necessary to construct the project.

MASTER DEVELOPMENT PLAN

Master development plans are expected to present an orderly sequence for the overall Owner considerations necessary to plan, schedule, control, and complete an entire construction project. Individual elements must be scheduled in order of precedence so that they can be completed in a logical sequence. Items to be included in the plan are the basic project requirements for activities, documents, procedures, staffing, management, resources, finance, and a schedule or timetable. All of these elements must be addressed when planning a construction project.

The various items required to plan and control construction projects include schedules, the scope of work, design criteria, a budget, a management plan, a purchasing plan, and a bid package, all discussed later in this chapter. Events related to the contract include contract award (see Chapter 4), construction, inspection (see Chapters 5 and 6), completion and acceptance (see Chapter 7), start-up, transfer to the Owner or operator (see Chapter 6), payment (see Chapters 6 and 7), and claims (see Chapter 6). Changes in completed and approved master development plan documents must be considered carefully. All elements interact and changes in any one element may affect the schedule or the budget and cause missed completion dates or cost overruns.

Master development plan documents are produced by the project team members or groups most familiar with the type of work to be done, and the plan is created under the direction of the Project Manager.

PROJECT PLANNING

A master development plan sets the agenda for an entire project by providing clear, concise, and attainable goals, definitions, descriptions, and plans. Basic elements include the project goal, schedule, scope of work, design criteria, and budget. The plan must assign clear responsibility for each interacting function of design, engineering, purchasing, equipment sizing and selection, construction, finance, estimating, budgeting, and management. Master development plans require much more detail than concept design proposals, including a complete description of each major component. Typical details included are the type of facility, purpose, location, type of contract, method of award, process and equipment description, products, capacity or rates, raw material and source, fuel, storage and expansion provisions, buildings, and markets. Development plans also identify "in place" and required infrastructure and support facilities such as utilities, communications, property, transportation, access, manning tables, and labor sources. Success or failure of a project is directly proportional to how well those producing the master development plan define and write their contributions.

Project Schedule

Project schedules are used to predict the duration of and time needed to complete each construction task or activity. Schedules help to track, adjust, and control the timing and progress of projects from the concept phase through construction and start-up. Gantt or conventional bar chart schedules (see Appendix B, Figure D.1) are useful for smaller projects but do not always show potential conflicts until too late to prevent delays. For example, a piece of equipment might be scheduled for installation before its scheduled purchase. To manage projects, prevent scheduling delays, and ensure an orderly sequence of planning and scheduling of what can become a rather large assemblage of related activities, the use of precedence type schedules is recommended. The two most widely used precedence type applications are the CPM and PERT. PERT schedules are used for large-scale projects that are not easily defined. Each activity is based on early, most likely, and late start and finish times. CPM schedules, on the other hand, are used for projects that are more easily defined and are based on a single time to start and a single time to finish each activity.

Figure 3.1 shows a sample precedence type CPM schedule used to erect a process plant. Each activity is represented by a block or rectangle, and its relationship to all other project activities is shown by connecting lines, a distinct advantage over Gantt type schedules. The critical path follows the heavier outlined boxes and lines.

Scope of Work

Project limits are set by providing detailed descriptions of what work must be done, where it starts, where it stops, and the major components required. Factors that affect the determination of scope of the work include existing and proposed utilities; structures; equipment; production rates; capacity; raw material; in-process and finished product; receiving, storage, handling, and shipping requirements; location; access to transport; tie-ins to other components; number and types of construction contracts required; and Owner-furnished equipment, materials, services, and supplies. Designers require a completed and approved scope of work to design the project components.

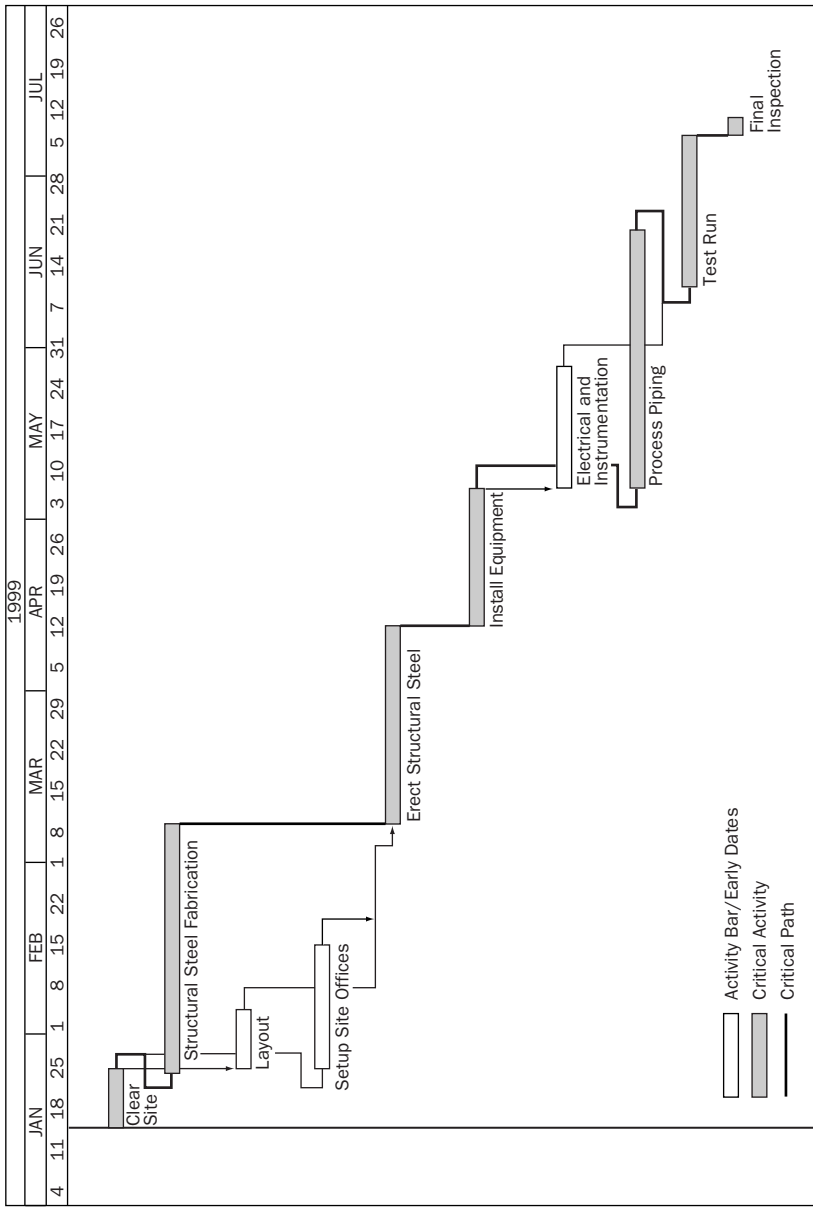

FIGURE 3.1 Sample CPM schedule

Design Criteria

Project component design is controlled by setting criteria to establish upper and lower limits of operating performance, capacity, or use. Engineering and economic analyses are then used to study the variables and size the components within those limits. Variables may range from a single value of density for the compaction of soils in roadways and structural foundations as established by the American Association of State Highway Officials (AASHO) to the numerous variables that can be associated with a process plant digester. These may include site restrictions, materials of construction, raw material, feed and product rates, by-products, particle size, specific gravity, conveying media, temperatures, pressures, pH, velocities, reagents, and catalysts. Once components and their required performances are determined, operating ranges can be predicted on paper by analyzing interactions of the variables using rules of physics and material balances. These ranges are based on the laws of conservation of energy and matter and simply put state that "input of energy or material must equal the output of energy or material, plus losses." The ranges can be used to evaluate variable influences singly and in concert to design components that meet requirements and will not be over- or under-designed. Flowsheets are useful tools to illustrate operating ranges and predicted performance graphically.

Materials for construction; special fabrication requirements; and applicable codes for vessels and related piping, controls, and other equipment must also be identified and specified to ensure that completed design, drawings, and specifications of components illustrate project requirements. Owners of smaller projects often consolidate the scope of work and the design criteria into a single document.

Budget

Budgets provide the estimated costs to construct a project. They include costs for the total project based on the final design, detailed cost estimates for each component, and contingency costs covering unforeseen or unknown costs. Approved construction budgets become the reference against which to measure and control project spending.

Management Plan

A detailed plan showing the project organization and structure is required. The plan must identify individual members of the project team; their areas of responsibility; the limits of their authority; and a document origin, approval, and distribution schedule. Project team members are selected for their expertise in design, engineering, estimating, purchasing, accounting, project management, and construction.

Purchasing Plan

Material and equipment purchases may account for up to 50 to 60% of total construction project costs. A detailed purchasing plan describes the pre-planning and effective purchasing, delivery, and expediting procedures and is essential to control this large amount of Owner spending. Owners prefer to furnish the bulk of construction materials and equipment to eliminate markups on these items and to maintain Owner control over delivery and expediting of critical items. One recurring event that can trigger Contractor claims and requests for time extensions is late delivery of Owner-furnished equipment

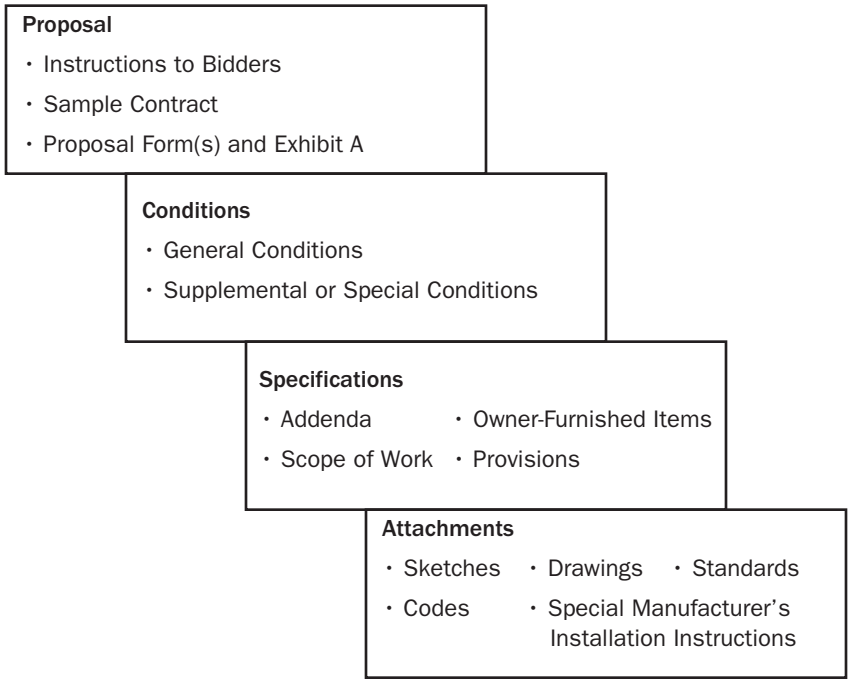

FIGURE 3.2 Construction bid package major divisions

and materials. Project managers should insist that all purchasing plans include adequate procedures to ensure on-time delivery.

BID PACKAGE

Construction contracts awarded by competitive bidding are based on the bid package. All have similar contents and objectives and are expected to provide dependable and complete information so bidders can make a fair proposal to construct the project. Bids that differ markedly from the Owner's estimate and those difficult to evaluate and compare may not meet those requirements. Bid packages have four major divisions that must contain all the information that bidders will need to estimate and submit a fair offer to construct the project: a proposal, conditions, specifications, and attachments. These major bid package divisions and their related documents are shown in Figure 3.2 and are discussed below.

Proposal

Instructions to Bidders cover Owner requirements for preparing and submitting bid proposals. Information provided includes the date written, a reference or specification number, the intent of the instructions, general statements and instructions applying to all projects, Owner contacts and telephone numbers for commercial and technical questions, and the deadline for submitting bids.

Construction contract forms contain a preamble section with spaces for a project or specification number, a contract number, an effective date, and identities of the Owner and

the successful bidder or Contractor, followed by four sections: a statement of the work, responsibility for completion, compensation, and a signatory section. Construction contract forms must be reviewed and approved for legality in the state or area where the work is to take place.

Proposal Forms are project specific and include the date submitted, a reference number and brief description of the project, names of the Owner and Bidder, a proposed price to complete the work (in words and in numbers), and an expiration date. They also contain certifications and agreements, including standard or "boilerplate" statements such as "time is of the essence" and "sufficiency of bid," time to complete the work, a list of all related attachments, and addenda. Some include requests for special information on pricing to aid in bid comparisons (including a breakdown of the lump sum price for each work item; estimated sales and use tax; direct craft hours; percentage of markup for equipment rental, material, and labor; and unit prices for changes (see Appendix B, Exhibit A); proposed Subcontractors (see Appendix B, Exhibit F); an execution plan (see Appendix B, Exhibit H); a bar chart or other schedule as requested by the owner (see Appendix B, Exhibit D); and a worksheet for alternate proposals (see Appendix B, Exhibit I).

Conditions

Conditions refer to contract documents used to define nontechnical construction contract terminology and procedures necessary for safe, orderly execution and management of the work. They establish rights, responsibilities, risks, and requirements of Owners and Contractors in fulfilling contract obligations and must provide fair and equitable levels of protection for both parties. Owners presenting onerous and poorly written conditions, slanted in their favor, will find it increasingly difficult to attract qualified bidders.

General Conditions are those written to cover conditions that will apply to all of an Owner's construction contracts. Typical subjects appear in the table of contents page of Appendix B, Exhibit B, and in Figure 3.3. Most Owners prepare their own forms and include only those subjects that suit their needs. Two good sources for basic construction contract forms (which may be modified to suit individual needs) are the American Institute of Architects (AIA) and the Associated General Contractors (AGC). See Appendix C and telephone directories for contacts in your area.

Supplemental or special conditions modify existing conditions or add new ones to address subjects not covered. Examples include additional insurance not covered in the contract documents for a high-risk project or a need to protect valuable proprietary information during bidding and construction. Modified or new conditions addressing increased insurance coverage or additional nondisclosure language may be included as a special or supplemental condition.

Specifications

Specifications provide a comprehensive written description stipulating "how" the work is to be accomplished and the results required. Drawings present a picture of "what" work is required and when combined with the specifications are expected to describe a project in sufficient detail for bidding and construction. Specification writers require a thorough

ANYCO, Inc. **EXHIBIT B**

GENERAL CONDITIONS FOR CONSTRUCTION CONTRACTS

ARTICLE	TITLE
1.	Application
2.	Definition of Terms
3.	Declaration
4.	Indemnification
5.	Governing Laws, Regulations, and Entire Agreement
6.	Precedence & Discrepancies
7.	Sub-contracting & Assignment
8.	Permits, Licenses, & Taxes
9.	Health, Safety, Security, First Aid, Medical
10.	Bond Requirements
11.	Insurance Requirements
12.	Other Work
13.	Contractor Site Manager
14.	Owner Site Manager
15.	Independent Contractor
16.	Changes
17.	Claims
18.	Delays and Time Extensions
19.	Risk
20.	Suspension of the Work
21.	Termination of the Work
22.	Conduct of the Work
23.	Payment
24.	Owner's Right to Occupancy
25.	Inspection & Acceptance
26.	Guarantee and Warranty
27.	Confidentiality
28.	Dispute Resolution

FIGURE 3.3 Typical list of general conditions

knowledge of construction methods, material, manning, and equipment. They must possess an ability to write technical instructions clearly and precisely so that they can be readily understood. Of equal importance is a thorough knowledge of the basics of composition, grammar, punctuation, and word usage. Sentences must be complete, short, and to the point and deal only with the technical instructions necessary to describe the work. Ambiguous and misspelled words, with missing and incorrect punctuation, can impart an entirely different meaning to instructions and result in confusion, misunderstandings, and claims. See Appendix B a sample specification.

Specifications contain four sections. (1) Scope of work sets the project limits precisely by describing work included, work not included, and individual items of work and the time allowed to complete them. (2) Provisions list the drawings, publications, standards, and codes that govern the quality of workmanship and materials, site-specific technical data on materials, and the basic design conditions and service. (3) Owner-furnished materials and services are listed along with their dates of availability and location. (4) Attachments list the drawings, standards, codes, and publications included with the bid package that will become contract documents.

Attachments

The Attachments section of the bid package also contains all other documents such as sketches, drawings, standards, codes, and special instructions.

INVITATION TO BID

Owners use Invitation to Bid letters to invite bidder proposals or bids for their construction projects. Bid packages may be transmitted with the Invitation to Bid letter or distributed at pre-bid meetings. The former is preferred to give bidders more time to review the documents, develop work plans, and list their questions. The Invitation to Bid does not become a contract document.

Information provided in Invitation to Bid letters should include (1) the date; (2) a reference or specification number; (3) a brief description of the project and work location; (4) the time, date, and place for the pre-bid meeting and site visit; (5) special requirements for personal protective gear for the site visit; and (6) clear, detailed instructions (including the deadline) for submitting bids. A sample Invitation to Bid letter is shown in Figure 3.4.

PROJECT DOCUMENTS REGISTER

The number of documents required to manage a construction project is directly related to project size and complexity. The most effective means to control what can become an unwieldy mass of essential planning, scheduling, control, and bid package information for construction projects is through use of a project documents register. Presentation is usually in matrix form, as a spreadsheet, listing the necessary documents or activities down the left-hand side in the order in which they are to be produced. Names of the individuals or groups responsible for originating and approving each document and the distribution list for the approved version are placed across the top. Owners may modify their spreadsheets to display special information that they require, but the essential information is shown in the sample project document register in Figure 3.5.

ANYCO, Inc.
INVITATION to BID

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

Date: June 5, 1998

To: Harpercon, Inc. 200 Muddy Bayou, Ruston, Louisiana 71273
Attention: James Harper, Vice President, Construction

Reference: Bid Package (Attached) for Waste Gypsum Recycle Piping Modifications
Specification Number: PIPE-101.3, Dated: June 1, 1998.

ANYCO, Inc. requests your lump-sum proposal for the following Project:

The complete piping modification and installation of the waste gypsum recycle system located at the Owner's Zachary, Louisiana Plant. The work shall include but not be limited to the installation of two each, 1219.1 m (4,000 ft) x 30.48 cm (12 in) steel pipelines between the plant site and the waste gypsum storage site, installation of flanges and valves, fabrication and installation of concrete pipe foundations, pipe sleepers, one new valve manifold, hydrostatic testing of the recycle piping system, and tie-in to the existing waste gypsum storage system.

Your authorized representative equipped with personal protective gear (PPE), hard hat, safety glasses, & hearing protection, is invited to attend the Pre-Bid Meeting and Site Visit scheduled as follows:

10:00 a.m. on Tuesday, June 9, 1998, in the Zachary Plant Construction Office Trailer, No. 101.

Three sets of sealed bids for the work, using the Bid Proposal Form and Attachments included in the Bid Package, clearly marked with Specification Number: PIPE-101.3 and addressed to the attention of Buyem Lowe, Purchasing Dept., ANYCO, Inc., 16000 Scenic Highway, Zachary, Louisiana 70791. Bids will be accepted until: 4:00 p.m. on Monday, June 22, 1998.

Yours truly,

Buyem Lowe

Buyem Lowe,
Purchasing Manager, ANYCO, Inc.

attachments

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FIGURE 3.4 Sample Invitation to Bid letter

PROJECT DOCUMENTS REGISTER

PROJECT: ANYCO, Inc. Gypsum Plant Waste Gypsum Recycle Project No. PIPE 101.3

DOCUMENT:	ORIGINATOR: PROJ. MANAGER	ORIGINATOR: PROJ. ENGINEER	ORIGINATOR: SITE MANAGER	ORIGINATOR: PURCH. MANAGER	ORIGINATOR: WORKS MANAGER	APPROVALS: PROJ. MANAGER	APPROVALS: PROJ. ENGINEER	APPROVALS: SITE MANAGER	APPROVALS: PURCH. MANAGER	APPROVALS: WORKS MANAGER	DISTRIBUTION: PROJ. MANAGER	DISTRIBUTION: PROJ. ENGINEER	DISTRIBUTION: SITE MANAGER	DISTRIBUTION: PURCH. MANAGER	DISTRIBUTION: WORKS MANAGER	DISTRIBUTION: V.P. OPERATIONS
PROPOSAL	X					X				X		X		X	X	X
ESTIMATES		X				X				X	X		X	X	X	X
WORK SCOPE		X				X				X	X				X	
DESIGN CRITERIA		X				X				X	X			X	X	
JOB SPECIFICATIONS		X				X		X		X	X		X		X	
BUDGET		X				X				X	X		X		X	
DETAIL DESIGN DWGS.		X				X		X		X	X		X		X	
BID LIST/ BID PACKAGE				X		X	X			X	X	X	X		X	
BID ANALYSIS	X			X		X			X	X	X	X		X	X	
CONTRACT				X		X				X	X	X	X	X	X	
PURCHASE ORDERS	X								X	X		X	X		X	
EXPEDITE MEMOS				X							X	X	X			
SITE TRANSMIT MEMOS			X								X	X		X		
PAYMENT REQUESTS			X			X			X	X		X		X	X	
INVOICES						X		X		X	X		X			
FIELD REPORTS			X			X					X	X		X		
PROGRESS REPORTS		X				X							X	X	X	X
SPENDING REPORTS		X				X							X	X	X	
PURCH STATUS RPTS.				X							X	X	X			
PROGRESS PHOTOS			X								X					
CERTIF. COMPLETION			X			X				X	X	X		X	X	
RELEASE/WAIVER LIEN				X		X					X		X	X		
START & OP. PROCDS.	X									X			X	X		
COMPLETION REPORT	X										X	X	X	X	X	X

PREPARED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

Form PDR (Rev. 10/97) Page 1 of 1

FIGURE 3.5 Project documents register

CHAPTER 4

Contract Award

Carefully prepared award procedures increase chances for successful completion of construction contracts. The procedures must be uniform, fair to all concerned, logical, flexible, and applicable to contracts of any type, size, or location.

Construction contracts, based on bid packages, can be awarded only after a number of procedures have been identified, selected, defined, planned, scheduled, written, and applied. These bidding procedures require clear statements of Owner intent, requirements, and expectations because they may affect a Contractor's ability to meet the overall project objectives, safely, to the specifications, at optimum cost, on time, and with a minimum of Owner exposure to claims.

PRE-BID ACTIVITIES

A number of activities must be performed by the Owner and prospective bidders before final bids are received:

Qualify and select bidders.
Determine number of bidders.
Distribute bid package.
Issue Invitation to Bid.
Hold pre-bid meeting.
Make site visit.
Issue addenda.

Qualify and Select Bidders

Owners of existing facilities use Contractor performance evaluation forms to quantify a Contractor's work. Owner representatives rate relevant elements of a Contractor's performance on completion of each project. The ratings are retained and provide a reference based on the Owner's experience to compare and select or reject bidders for new work.

Those owners of new or "green site" facilities who have no Contractor performance records find Contractor qualification questionnaire forms useful when selecting bidders. The questionnaires request detailed business, commercial, and technical information and references. Questions may cover number of years in business, trade and bank references, bonding limits, insurance coverage, names and background of the organization's

officers, work locations, and certifications and licenses. Other important topics include types of work performed, work in progress, major work completed within the past three to five years, work references, resumés including construction experience for key individuals, and audited financial information.

Detailed Contractor safety and health records are required by Owners, including OSHA summary logs and reports. Owner safety and health professionals evaluate and compare the records with their own safety and health requirements. Alcohol and drug abuse policies and procedures must be examined closely to ensure that they too meet current Owner and agency requirements. New bidders must not be qualified for projects until all records have been received, studied, and evaluated. Qualification questionnaires should be submitted annually for bidders to remain qualified.

Currently, Owners require that qualified Contractors have the following minimums for their safety and health ratings: Worker's Compensation insurance experience modifier ratings of 1.0 or less, lost workday case incident rate of 2.0 or less, and recorded injury case incident rate of 4.0 or less. When local bidders do not meet these standards, Owners must choose Contractors from outside the area or write special provisions to incorporate additional Contractor safety and health requirements in bid package conditions. This option requires careful consideration by Owners and their safety and health professionals. Allowing any Contractor with a poor safety record to bid on construction projects increases the Owner's exposure to claims.

Sample contractor performance evaluation and contractor qualification questionnaire forms are provided in Figures 4.1 and 4.2. Additional information about qualifying bidders for construction projects is available in the American Institute of Architects Document A305 and the Associated General Contractors Document 320.

Determine Number of Bidders

Each construction project has different requirements. No single number of bidders can suit every situation. Most Owners have determined that three competitive bids suit their needs for most lump sum projects. To meet this requirement, four Contractors may be invited to bid. This leaves the desired minimum of three bidders should one not respond or elect to submit a "courtesy bid." As more bidders are added, bid analysis becomes increasingly complicated, time consuming, and a waste of Contractor and Owner resources. It is therefore unusual to find more than four or five invited bidders on private construction projects. Costs for estimating and bidding construction projects can vary widely, depending on the type of work, materials, complexity, location, and travel requirements. Many well-qualified Contractors are not willing to spend their time and other resources to produce good competitive proposals, knowing they must compete with six or eight other bidders.

Distribute Bid Packages and Invitation to Bid

Bid packages are usually distributed to Contractors using an Invitation to Bid letter similar to the sample in Figure 3.4 (p. 19). Circumstances may arise in which delays and time constraints prevent bid package distribution until pre-bid meetings. This practice should be avoided whenever possible. Experience shows that pre-bid meetings are more productive when bid packages are distributed beforehand, giving bidders more time to study and become familiar with project requirements and obligations and to prepare their questions, comments, or observations. Bidder questions and concerns are usually clarified and resolved during Owner presentations at pre-bid meetings.

ANYCO, Inc.
CONTRACTOR PERFORMANCE EVALUATION FORM

Contract No. _____ Contractor: _____
Specification No._____ Contractor Site Manager: _____

Rate Overall Project Performance (O-5) 0=Unsatisfactory, 3=Average, 5=Excellent

1. Safety & Health
   A. Achieved Owner's Project Safety & Health Objectives _____
   B. Compliance with Owner's Safety & Health Requirements _____
   C. Contractor's Home Office Safety & Health Support _____
   D. Quality of Contractor's On Site Safety & Health Program _____
   E. Responsiveness to Owner's Safety & Health Audits & Requests _____

   Average Safety & Health Rating: _____

2. Work Quality
   A. Rate Contractor's Quality Assurance/Quality Control Program _____
   B. Quality of Cooperation, Reports, Documents, Meeting Attendance _____
   C. Quality Of Completed Work & Work Force _____
   D. Handling of Owner & Contractor Furnished Material & Equipment _____

   Average Work Quality Rating: _____

3. Schedule
   A. Achieved Project Milestones & Completion Dates _____
   B. Schedule & Progress Reporting _____
   C. Schedule Maintenance & Recovery Efforts _____
   D. Site Work Force Manning, Size and Effectiveness _____

   Average Schedule Rating: _____

4. Housekeeping _____
5. Commercial Performance _____
6. Technical Performance _____
7. Overall Contractor Home Office Management Support _____

Total Performance Rating: _____

Comments: _____

Do you recommend that Contractor be kept as a Qualified Bidder? YES____ NO____

Prepared By: _____ Dated: _____

Form CPE-LS (Rev. 10/95) Page 1 of 1

FIGURE 4.1 Contractor performance evaluation form

ANYCO, Inc.
CONTRACTOR QUALIFICATION QUESTIONNAIRE

1. ORGANIZATION

A. Name: _____
Address: _____
Telephone Number: _____ Fax Number: _____
Contact: _____ Title: _____

B. Type of Organization
Corporation _____ Partnership _____ Proprietorship _____
Incorporated or Organized Date: _____ Location (State): _____
Major Business Activities: _____
_____

C. Principal Officers

Name	Title:	Years with Firm
_____	_____	_____
_____	_____	_____
_____	_____	_____

D. Number of Employees
Permanent Office Staff Number: _____ Average Years Experience: _____
Field Construction Managers: _____ Average Years Experience: _____
Average Number Field Construction Workers (Weekly): _____

E. Labor Affiliation
Open Shop: _____ Closed Shop: _____ Other: _____(Explain)
Comments: _____

2. WORK EXPERIENCE

A. List types of work performed with own force on a separate sheet.
B. Attach a summary of major maintenance/construction projects completed in the past three years. Show type of work, owner, name of project, contract amount, contract value, completion date, percentage of work by own forces, and the owner reference contact and telephone number.
C. Have you at any time failed to complete a contract? _____
D. Do you have any judgments or suits pending or outstanding? _____
(If questions 2.C or 2.D are answered "Yes," explain on an attachment)

3. COST EFFECTIVENESS

Does your Company utilize the findings and recommendations of The Business Roundtable CICE Concepts ? Yes __ No __ (If answer is Yes, attach a copy of your procedures or comments)

Form CQQ2(Rev.12/97) Page 1 of 3

FIGURE 4.2 Contractor qualification questionnaire form

4. FINANCIAL INFORMATION

A. Attach audited copy of latest Income Statement and Balance Sheet.
B. Net Present Worth _____ Date: _____

C. Annual Construction Dollar Volume and Field Construction Man Hours for the past three years:

Year	Contract Dollar Volume	Field Construction Man Hours
199 ____	$ _____	_____
199 ____	$ _____	_____
199 ____	$ _____	_____

D. Largest Contract Completed in Past Three Years Owner: _____
Name of Project: _____ Name Owner Reference: _____
Contract Value: _____ Total Project Manhours: _____

E. Dun & Bradstreet Rating: _____

F. Commercial and Credit References: (Three Each)

Bank	Address	Contact
_____	_____	_____
_____	_____	_____
_____	_____	_____

Supplier	Address	Contact
_____	_____	_____
_____	_____	_____
_____	_____	_____

G. Bonding Status

Total Bonding Capacity:	Bonding Company	Location	Contact
$ _____	_____	_____	_____

H. Insurance Coverage

Workers Compensation	$ _____
Employers Liability-Maritime	$ _____
Comprehensive Gen. Liability	$ _____
Automobile Liability	$ _____
Excess Liability	$ _____
Other Insurance	$ _____

5. CRAFT TRAINING

Does your Company have agreements with the National Center for Construction Education and Research (NCCER), or other agencies, to perform your long-term craft training requirements ?
Yes ___ No ___ (If answer is yes, attach copy of your agreement or comments)

Form CQQ 2(Rev. 12/97) Page 2 of 3

FIGURE 4.2 Contractor qualification questionnaire form *(continued)*

6. SAFETY & HEALTH

A. List Your Workers Compensation Insurance Experience Modifier Rate for past five years.
19 ___ ____, 19 ___ ____, 19 ___ ____, 19 ___ ____, 19 ___ ____

B. From your OSHA 200 Logs provide Injury/Illness data for the past three years:

	19___	19___	19___
Total Recordable Incident Rate:	_____	_____	_____
Number of Fatalities:	_____	_____	_____
No. of Lost Workday Cases:	_____	_____	_____
Number of Restricted Workday Cases:	_____	_____	_____
Number of Medical Attention Only Cases:	_____	_____	_____
Number of First Aid Only Cases:	_____	_____	_____
Total Employee hours actually worked:	_____	_____	_____
Lost Workday Case Incident Rate:	_____	_____	_____
Use the formula NL* x 200,000 Employee Hrs Worked			
* NL= Lost Workday Cases from OSHA 200 Log			
Recorded Injury Case Incident Rate:	_____	_____	_____
Use the Formula NR*x 200,000 Employee Hrs Worked			
*NR= Recordable Cases from the OSHA 200 Log			

C. Name and Title of Your Chief Safety and Health Officer: _____
Attach Chart of your Safety and Health Organization.
Attach copies of your Safety Program, Safety Training and Instruction Manuals, and your Drug and Alcohol Abuse and Controlled Substances Screening Procedures and Policies

D. Do you conduct New Hire Safety Orientation? Yes ___ No ___
Do you conduct Pre-Job Safety Meetings? Yes ___ No ___
Do you conduct Field Supervisors Safety Meetings? Yes ___ No ___
Do you conduct "Tool Box" Safety Meetings? Yes ___ No ___
Do you conduct Routine Site Safety Inspections? Yes ___ No ___
Do you conduct Significant Incident Investigations? Yes ___ No ___
Comment, by use of an attachment, on any other areas of your Safety and Health Program that you feel may influence our evaluation.

Submitted By: _____ Date: _____

Forward the completed Contractor Qualification Questionnaire to ANYCO, Inc.
Attention: Purchasing Manager, 1600 Scenic Highway, Zachary, Louisiana 70791

Form CQQ 3(Rev. 12/97) Page 3 of 3

FIGURE 4.2 Contractor qualification questionnaire form *(continued)*

Hold Pre-Bid Meeting

Contractor and Subcontractor personnel responsible for the work should be required to attend the pre-bid meeting. This meeting provides Owners with an opportunity to review and explain project requirements to all bidders at one time. The agenda should include introductions, attendee sign-up sheets, a review of the entire bid package, time for questions, and detailed minutes kept by the Owner. Reviews include all commercial and technical documents, attachments, schedules (including milestone dates), conditions, standards, sketches, drawings, and site specific procedures and safety requirements. Bidder questions and comments are addressed and additions, clarifications, or corrections to bid documents can be made at that time. Issues not answered or resolved at pre-bid meetings or site visits are clarified and resolved later by issuing Addenda, distributed well before the bid due date.

Make Site Visit

Site inspections give bidders an equal opportunity to participate in and be aware of all work site discussions concerning the project. Bidders can observe and evaluate site conditions as related to their plan for constructing a project. Factors to consider are entry and exit routes for personnel, equipment, and material; potential safety hazards during construction, including overhead utilities and obstructions; possible sites for interference with Owner operations or other contractors; and emergency evacuation routes. Other considerations include facilities for storage, offices, sanitation, first aid, utilities, ground conditions (especially drainage), tie-in locations, and waste disposal areas.

Known underground obstructions must appear on project drawings and documents and be shown to bidders during site visits. Not following this procedure is not only unethical, it is foolish. Those obstructions found during construction and not identified on the bid documents present changed conditions to the contract. They may become safety or environmental hazards; cause accidents, delays, and added costs; and increase the exposure to claims.

Issue Addenda

Questions not resolved during pre-bid meetings and site visits may be answered for all bidders by issuing an addendum consisting of written or graphical documents to modify, correct, clarify, or interpret other bid documents. Addenda are sent to all bidders and Owner personnel concerned, well before the bid due date. They become contract documents on award of the contract. A sample addendum is included in Appendix B.

POST-BID ACTIVITIES

Open and analyze bids.

Select best bid.

Hold bid resolution meeting.

- Letter of Understanding
- Letter of Intent
- Notice of Award

Notify bidders that were not selected.

Open and Analyze Bids

Bids are submitted, opened, recorded, and compared with each other and the Owner's estimate using a form similar to the sample bid price comparison shown in Figure 4.3. Items 1.4.1 through 1.4.10 are listed for a typical project. Added detail such as markups for equipment rental, materials, and labor as well as unit prices for changes in the work, exceptions, and any other pertinent information may be included to help in the analysis. Owners look for large differences between their estimates and bidder proposals for each bid item. Should major differences of pricing exist, bidders may be given the opportunity to review their worksheets, correct errors, and submit adjusted bids. Review of the prices in Figure 4.3 shows Bidder No. 1 to be the apparent low bidder.

The sample bid and adjusted price comparison in Figure 4.4 shows how results can change when Owners give bidders an opportunity to submit adjusted bids. Bidders No. 3 and 4 advised the Owner that they were comfortable with their bids and would not make changes. Bidder No. 1 reported errors in calculations for Bid Items 1.4.2, 1.4.3, 1.4.5, and 1.4.7 and increased the price by $21,700. The greatest differences appear to be in Bid Items 1.4.2, 1.4.3, and 1.4.5. Additional analysis is required by the Owner to determine the reason. This may require improvements in estimating, specification writing, or presentation during the pre-bid meeting. After evaluating the adjusted bids, Bidder No. 3 has become the apparent low bidder.

Select Best Bid

Occasions often arise where factors other than price influence the final selection of winning bids. When this situation occurs, it should be addressed by Owners at pre-bid meetings to prevent misunderstandings. Even though all invited bidders are assumed to be qualified to construct a project, one may have more experience in critical areas than do other bidders. Items other than price that may influence final selection include the bidder's experience in constructing similar projects; past performance on other Owner projects; availability of proven and known bidder personnel; financial, legal, or bonding status; the amount of subcontracting proposed; safety and health history; exposure to contingencies; and exceptions taken to the specifications. Careful evaluation of price and all other relevant factors helps Owners select the bid that in their judgment will produce a successful contract at the lowest overall cost.

Hold Bid Resolution Meeting

Owners and the apparent best bidder's authorized representatives meet for a final detailed review of bid package documents and work requirements and the bidder's proposal, prices, work plan, exceptions, and alternates. The purpose of this meeting is to determine that the apparent best bidder does indeed have a clear understanding of the work requirements, obligations, and consequences of failure to perform if awarded a contract. Detailed minutes record all discussions, comments, and mutually agreed to changes in bid documents. When a full understanding and agreement have been established, the minutes are transcribed into a Letter of Understanding to be incorporated into the contract. Owner procedures may vary, but usually call for formal signing of the contract at this point. For that reason, a bidder representative, authorized to sign contracts, is required to be in attendance at the meeting. Occasionally, agreement is reached but for some reason the construction contract agreement is not signed at the bid resolution meeting. This situation is usually covered by a procedure providing for a Letter of

BID PRICE COMPARISON

SPECIFICATION NO. PIPE 101.3

DATE: 06/22/98

BID ITEM	OWNER ESTIMATE	BIDDER NO.1 $ BID	BIDDER NO.2 $ BID	BIDDER NO.3 $ BID	BIDDER NO.4 $ BID
1.4.1 MOBILIZE, SETUP, LAYOUT, YARD COST	**10,550**	8,500	9,200	10,300	11,000
INSTALL-					
1.4.2 No. 1 STEEL PIPELINE	**41,400**	36,650	45,300	43,100	49,600
1.4.3 No. 2 STEEL PIPELINE	**38,600**	35,850	42,600	41,100	46,950
FABRICATE, INSTALL-					
1.4.4 MANIFOLD VM-2	**12,000**	15,200	15,500	13,250	16,050
1.4.5 CONC. FOUNDATION	**39,200**	41,250	42,500	44,400	47,150
1.4.6 CONC. SLEEPERS	**30,700**	28,900	33,000	31,000	36,260
1.4.7 STEEL PIPE RACKS	**12,500**	14,000	15,500	8,450	16,050
1.4.8 FLUSH AND TEST	**7,950**	9,250	9,700	9,500	10,440
1.4.9 TIE IN TO PLANT	**3,000**	3,500	3,000	3,400	3,600
1.4.10 CLEANUP, DEMOB.	**4,100**	4,500	3,700	4,000	5,350
BID PRICES	**$200,000**	$197,600	$220,000	$208,500	$242,450

FORM BC1 (Rev. 1/95)

FIGURE 4.3 Bid price comparison form

BID and ADJUSTED PRICE COMPARISON

SPECIFICATION NO. PIPE 101.3 DATE: 06/25/98

BID ITEM	OWNER ESTIMATE	BIDDER NO.1 $ BID	BIDDER NO.1 ADJUSTED	BIDDER NO.2 $ BID	BIDDER NO.2 ADJUSTED	BIDDER NO.3 $ BID	BIDDER NO.3 ADJUSTED	BIDDER NO.4 $ BID	BIDDER NO.4 ADJUSTED
1.4.1 MOBILIZE, SETUP, LAYOUT, YARD COST	**10,550**	8,500	8,500	9,200	9,200	10,300	10,300	11,000	11,000
INSTALL-									
1.4.2 No. 1 STEEL PIPELINE	**41,400**	36,650	42,100	45,300	43,950	43,100	43,100	49,600	49,600
1.4.3 No. 2 STEEL PIPELINE	**38,600**	35,850	40,350	42,600	41,550	41,100	41,100	46,950	46,950
FABRICATE, INSTALL-									
1.4.4 MANIFOLD VM-2	**12,000**	15,200	15,200	15,500	15,500	13,250	13,250	16,050	16,050
1.4.5 CONC. FOUNDATION	**39,200**	41,250	51,500	42,500	47,500	44,400	44,400	47,150	47,150
1.4.6 CONC. SLEEPERS	**30,700**	28,900	28,900	33,000	29,000	31,000	31,000	36,260	36,260
1.4.7 STEEL PIPE RACKS	**12,500**	14,000	15,500	15,500	15,500	8,450	8,450	16,050	16,050
1.4.8 FLUSH AND TEST	**7,950**	9,250	9,250	9,700	9,700	9,500	9,500	10,440	10,440
1.4.9 TIE IN TO PLANT	**3,000**	3,500	3,500	3,000	3,000	3,400	3,400	3,600	3,600
1.4.10 CLEANUP, DEMOB.	**4,100**	4,500	4,500	3,700	3,700	4,000	4,000	5,350	5,350
BID PRICES	**$200,000**	$197,600		$220,000		$208,500		$242,450	
			$219,300		$218,600		$208,500		$242,450

FORM BC2 (Rev. 1/95)

FIGURE 4.4 Bid and adjusted price comparison form

Intent or a Notice of Award to be issued stating the facts and that the construction contract is to be signed later.

If the construction site will not be available for work immediately after the bid resolution meeting, a Letter of Intent is issued by the Owner stating that the site is not available for work at the time expected and that the Owner intends to issue the construction contract agreement later for signing by the successful bidder. In fairness to both parties, reasons for delays must be stated and a mutually acceptable date for beginning be established, allowing the bidder to withdraw or adjust prices should the delay be extended.

Some procedures call for the issue of a Notice of Award to the best bidder at the bid resolution meeting stating that the Owner intends to issue a contract for the terms and conditions mutually agreed to as defined in the Letter of Understanding. The bidder must sign and return the Notice within a specified time to complete the contract. On receipt of the signed notice within the time specified, the Owner signs and issues a construction contract. The Owner's Site Manager, and his or her limits of authority may be stated in the Letter of Understanding, Notice of Award, or a separate notice.

Examples of post-bid forms for use with the sample construction contract (see Appendix B) are shown in Figures 4.5 (2 pages) through 4.8 (2 pages).

Notify Bidders That Were Not Selected

Often overlooked is prompt notice to contractors that their bid was not accepted. After spending time and money submitting bids, contractors deserve at least the courtesy of learning the status of their bids from the Owner and not "on the street" from a third party.

THE CONSTRUCTION CONTRACT

The goal of the procedures reviewed in this chapter is to produce a lump sum construction contract; the agreement between a Contractor and an Owner to complete a project, to a specification, and for compensation. Figure 4.9 reviews the path of documents and events moving from a completed bid package to award of a typical construction contract.

ANYCO, Inc.
LETTER of UNDERSTANDING

DATE: Friday, June 26. 1998

I. PURPOSE

A. This Letter of Understanding records all agreements, clarifications, and resolutions to questions and concerns raised during a detailed review of the Owner's Bid Package and the Bidder's Proposal at the Bid Resolution Meeting held on 06/26/98. Should a contract be awarded, Bidder understands it shall be based solely on the Owner's Bid Package for Specification No. PIPE-101.3, and any changes made at the Bid Resolution Meeting as recorded in this Letter.

B. Bid Resolution Meeting Attendees: (*identifies those authorized to negotiate & sign contracts)

Attending for Owner: ANYCO, Inc.	Attending for Bidder: HARPERCON, Inc.
1. John Brown, Project Manager	1. James Harper, Vice President *
2. Buyum Lowe, Purchasing Manager *	2. Roger Ready, Chief Engineer
3. Sam Spade, Project Engineer	3. Fred Packer, Projects Manager
4. Norman Knitpick, Senior Engineer	4. Amos Harper, Field Manager
5. D. B. Cooper, Senior Accountant	5. ----------

II. REVIEW OF OWNER BID PACKAGE CONTENTS

A. Instructions to Bidders and Bid Proposal Form Certifications and Agreements.
No questions, comments, or changes after the review.

B. Exhibit A
No questions, comments, or changes after the review.

C. Exhibit B
Bidder states "retainage of 10% in Article 22 is too high for Contractors having long term business relationships with the Owner." Asks for a reduction to 5%. Owner agrees to investigate the possibility of reducing retainage after 50% completion on selected future contracts. Retainage stays at 10% for this project.

D. Exhibit C
No questions, comments, or changes after the review.

E. Exhibit D
Owner authorizes the submittal of a bar chart type of construction schedule.

F. Exhibits E, F, and G.
No questions, comments, or changes after the review.

G. Exhibit H and I
No Execution Plan was required nor was an Alternative Proposal tendered.

H. Exhibit J, Specification
1. Scope. No questions, comments, or changes after the review.
2. Provisions, General and Technical. Type A Portland Cement Grout is specified for equipment setting on Contract Drawing No. 03-P-102, Rev.1.

Form LOU (Rev.01/15/97) Page 1 of 2

FIGURE 4.5 Letter of Understanding

Any time that waiting for grout to cure places contract completion at risk, the Site Administrator shall direct that Type C Epoxy Grout be used at no added cost to the Owner. No other questions, comments, or changes after the review.

3. Owner Furnished Services and Materials. Bidder asked for the Owner Furnished Pipe Storage Yard on ANYCO, Inc. Contract Drawing No. 03-G-100, Rev.3 to be moved to the Contractor Storage Yard to reduce the use of heavy equipment in a congested area. Owner agrees, storage area will be relocated on Revision No. 4 of the subject drawing. No other questions, comments, or changes after the review.
4. Attachments: Contract and Reference Drawings and Construction Standards. Owner referred to ANYCO, Inc. Contract Drawing No. 03-P-102, Rev. 1, noting that one of six connections between new piping and the existing piping is in the wrong location and one connection was not shown. Owner and Bidder agree that the missing connection shall be completed using the Unit Prices found in Exhibit A, with no additional time allowed. The Connection in the wrong location shall be relocated as a part of the Lump Sum Price submitted by the Bidder. No other questions, comments, or changes on the Construction Drawings or Standards.

III. REVIEW BIDDER DOCUMENTS

A. Bid Proposal and Exhibit A

No questions, comments, or changes after the review of Bidder documents.

IV. GENERAL

A. Name Owner's Site Administrator and Limits of Authority

Norman Knitpick will be the Owner's Site Manager for work to complete Specification Number PIPE-101.3. He has sole authority to give the Owner's instructions to the Contractor and has authority to make changes and approve extras up to the maximum of $5,000 for each occurrence.

B. Site Transmittal Memo (STM) System of Correspondence

The "STM" System was reviewed in detail. No questions, comments, or changes.

C. General Discussions

Reviewed Contractor and Owner obligations including schedule, warranty, "time is of the essence" statement, and prompt notification of changed conditions. Bidder states he understands his obligations. No added questions, comments, or changes.

V. RESOLUTION

A. Construction Contract Agreement No. A/BR-98-020 for complete installation of Specification Number PIPE-101.3, based on the Owner's Bid Package and this Letter of Accord will be issued to HARPERCON, Inc. on or before 07/01/98.

B. Signed for Owner: Buyem Lowe Buyem Lowe

Signed for Bidder: James Harper James Harper

Form LOU(Rev. 01/15/97) Page 2 of 2

FIGURE 4.5 Letter of Understanding *(continued)*

ANYCO, Inc.
LETTER of INTENT

Date: June 26, 1998

To: HARPERCON, Inc. 200 Muddy Bayou, Ruston, Louisiana 71273
Attention: James Harper, Vice President, Construction

Reference:

A. Bid Package for Specification No. PIPE-101.3, Dated June 1,1998, and Titled "Waste Gypsum Recycle Piping Modifications."
B. Bidder Proposal for the Work in Reference (A), Dated June 22, 1998
C. Addenda No. 1. Increased allowed length of Schedule 20 flanged joints.
D. Bid Resolution Meeting, held June 26, 1998
E. Letter of Understanding, Dated June 26, 1998

It is the Owner's intent to issue Construction Contract No. A/BR-98-020 to your Company for the lump sum amount of $ 208,500.00 to perform Work described in References (A), (B), (C), (D), and (E) after receipt of a firm delivery date for the Owner furnished 30.48 cm (12 inch), Schedule 40, Steel Pipe. The delay is due to a rolling mill equipment failure. The Vendor has assured us that Delivery will start in approximately two (2) weeks.

We will issue a Notice of Award for the Contract as soon as a firm delivery date is established. The Contract will be based solely on the documents contained in References (A), (B), and (C), and mutually agreed changes made during the Bid Resolution Meeting, Reference (D) and recorded in the Letter of Understanding, Reference (E).

Yours truly,
Buyem Lowe
Buyem Lowe,
Purchasing Manager

Please sign, date, and return if acceptable to the Contractor:
Name: _____ Date: _____
Title: _____

Use this type of Form if construction is to be delayed by the Owner for any reason after the Bid Resolution Meeting

FIGURE 4.6 Letter of Intent

ANYCO, Inc.
NOTICE of AWARD

Date: June 26, 1998

To: HARPERCON, Inc. 200 Muddy Bayou, Ruston, Louisiana 71273
Attention: James Harper, Vice President

Reference:
A. Bid Package for Specification No. PIPE-101.3, Dated June 1,1998, and Titled "Waste Gypsum Recycle Piping Modifications."
B. Bidder Proposal for the Work in Reference A., Dated June 22, 1998.
C. Addenda No. 1 Increased allowed length of Schedule 20 flanged joints.
D. Bid Resolution Meeting held on June 26, 1998.
E. Letter of Understanding, Dated June 26, 1998.

Construction Contract No. A/BR-98-020 will be awarded to your Company for the lump sum amount of $ 208,500.00 to perform the Work described in References A, B, C, D, and E. The Construction Contract Agreement will be issued to your Company on receipt of your signed notification of acceptance and return of this Notice of Award by Tuesday, June 30, 1998.

The Contract will be based solely on documents contained in References (A), (B), and (C), and changes made in the Bid Resolution Meeting, Reference (D) and recorded in the Letter of Understanding, Reference (E).

Yours truly,
Buyem Lowe
Buyem Lowe,
Purchasing Manager

Accepted for the Contractor:
Name: _____ Date: _____
Title: _____

Use this Form only if the Construction Contract was not signed at the Bid Resolution Meeting

FIGURE 4.7 Notice of Award

ANYCO, Inc.
CONSTRUCTION CONTRACT AGREEMENT
(LUMP SUM CONTRACTS)

CONTRACT NUMBER: A/BR-98-020

Reference: Bid Package for Specification No. PIPE 101.3, Dated: June 1, 1998

THIS AGREEMENT is entered into this 26th day of June 1998, and between: **ANYCO, Inc.**, 16000 Scenic Highway, Zachary, Louisiana 70791, hereinafter ("Owner"), and HARPERCON, Inc., hereinafter ("Contractor"). 200 Muddy Bayou. Ruston, Louisiana 71273

WITNESSETH

ARTICLE 1. STATEMENT OF WORK

Owner and Contractor agree that as of the above date, Contractor has agreed to perform the work herein and to be bound by the terms of this Contract. Contractor shall provide all labor, materials, tools, and transportation, (other than the Owner furnished services and materials specified), necessary to construct, install, and complete the following "Work" at the Owner's Zachary, Louisiana Plant, Waste Gypsum Recycle Piping Modifications.

In consideration of the mutual covenants herein contained, Contractor agrees to perform in good faith, all obligations set forth in the Proposal and acknowledges receipt of the following Contract Documents incorporated into their Proposal by reference.

Bid Proposal Form for Inquiry No. PIPE-101.3, Dated May 21, 1998.
Exhibit A, Lump Sum Pricing Summary
Exhibit B, General Conditions for Construction Contracts.
Exhibit C, Craft Hourly Rates for Changes in the Work
Exhibit D, Sample Contractor's Performance Schedule
Exhibit E, Safety and Health Requirements
Exhibit F, Proposed Subcontractors
Exhibit G, Insurance Requirements
Exhibit H, Execution Plan
Exhibit I, Alternate Proposals
Exhibit J, Specification No. PIPE-101.3 and Attachments
Letter of Understanding Dated: June 26, 1998
Addenda No.1 Increased allowed length of Schedule 20 flanged joints.

FORM CON-LS (Rev.6/95) PAGE 1 of 2

FIGURE 4.8 Construction Contract Agreement form

ARTICLE 2. Responsibility for Completion

Contractor represents that he has carefully examined all related contract documents listed above and has become fully acquainted with all work site surface conditions and surroundings and assumes the risk of any variance between actual surface conditions related to the work and those set out in the contract documents. Having fully acquainted himself with the work, work site, surroundings, and the risk connected therein, the Contractor assumes full responsibility for completing the work for the compensation proposed in Article 3. Work shall commence on 07/06/98 , or within 7 days after receipt of the Owner's "Notice to Proceed." Work shall be completed by 09/18/98 .

ARTICLE 3. Compensation

Subject to full performance of all obligations and provisions contained in the Contract Documents, Owner agrees to pay to Contractor the following total fixed compensation.

Two Hundred and Eight Thousand, Five Hundred Dollars, ($208,500.00).

This price is subject to adjustment only when authorized by a properly executed Owner's Contract Amendment.

All Federal, State, and Local taxes applicable to the Work are included in the above named compensation.

ARTICLE 4. Execution

In Witness Whereof, the parties named below have hereby executed this Contract to be effective as of this date, June 26, 1998.

Signed By: Buyem Lowe	Signed By: James Harper
(For Contractor)	(For Owner)
Title: Purchasing Manager	Title: V.P., Construction

FORM CON-LS(Rev.6/95) PAGE 2 of 2

FIGURE 4.8 Construction Contract Agreement form *(continued)*

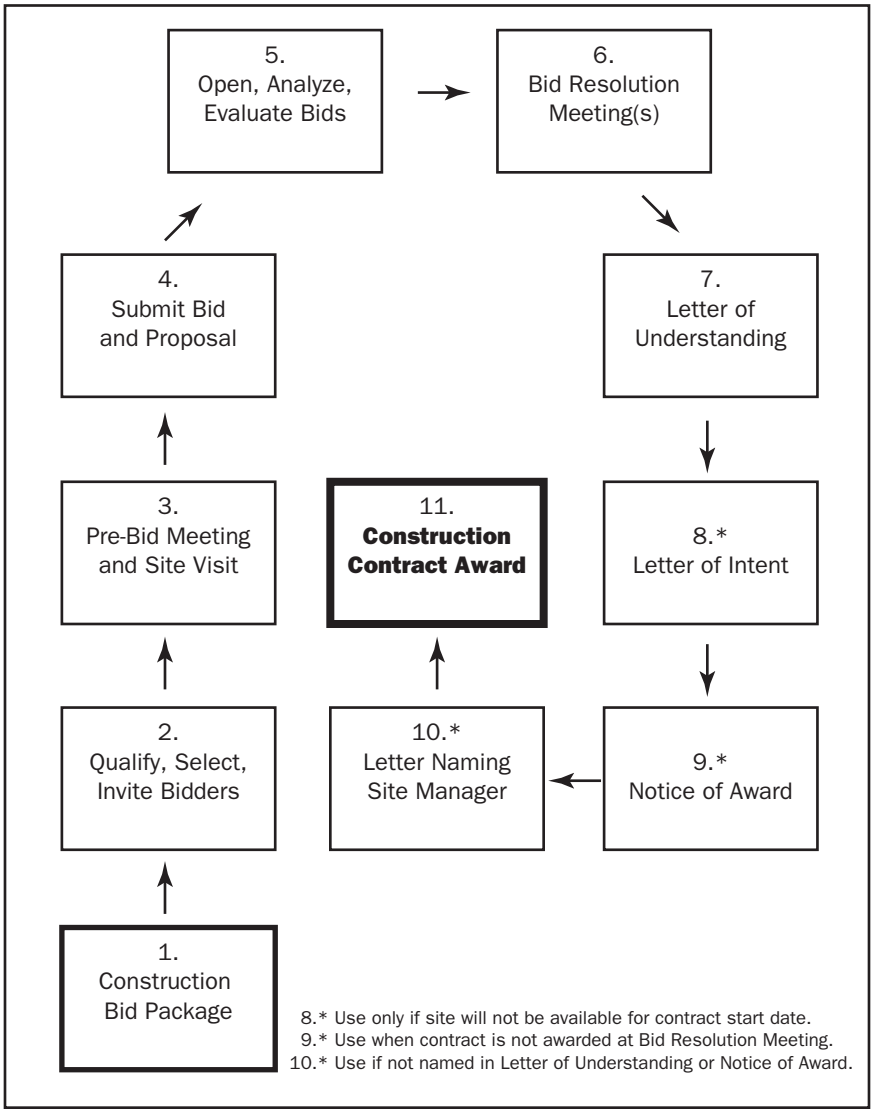

FIGURE 4.9 Path from bid package to construction contract award

PART 2

Contract Administration

CHAPTER 5

Fundamentals

This chapter discusses the basic activities involved in applying a contract to a construction project. These activities are overseen by the Project Manager, who is assigned to direct and guide construction projects through a myriad of events and issues, as outlined in Chapter 1, all necessary to advance through the project proposal, design, award, construction, and completion phases.

ORGANIZATION

Project Teams

Project Teams assist Project Managers to select, generate, apply, monitor, and administer the details, documents, and activities required to implement, build, and complete construction projects. Team members are usually drawn from the various disciplines associated with individual projects and their selection is based on job knowledge and experience. Of equal importance is a proven ability to record written contributions and instructions in clear and simple statements. This skill is necessary to help others to readily understand the detailed requirements of a project and prevent misinterpretations. The Project Team member responsible to the Project Manager for "on-site" construction management may be called Site or Contract Administrator, Owner's Representative, or Site or Construction Manager, all titles used by various Owners to describe the same position. Site Manager is used here.

Project Team members should be selected solely for their ability to contribute to a successful construction project. Success, as described in the Preface, is having the project be completed safely, on time, within the budget, meeting designed performance and quality, and with no claims.

Site Manager

Job descriptions for the position of Site Manager contain statements similar to the following: "Continually coordinate, analyze, manage, and report on each contractor's site progress and performance to insure that the work is executed within the project's contractually established limits regarding the schedule, cost to the Owner, and quality of safety, work, and materials." A large part of construction site management concerns dealing with people and analyzing situations. Most successful Site Managers possess or

have developed an ability to communicate with others in a mature, businesslike, and non-adversarial manner. Equally important is the ability to organize, set priorities, and coordinate the many project activities that often occur at inconvenient times. Lack of these skills does not necessarily lead to disorder, missed schedules, cost overruns, rework, or claims; however, given a choice, it would be wise to look for these skills when selecting construction Site Managers.

Construction Site Managers are routinely assigned to conduct bidder site visits and answer technical questions. Their experience and technical knowledge will also prove valuable when developing and reviewing other pre-construction items such as feasibility studies, bidders' lists, schedules, specifications, flowsheets, drawings, constructability, estimates, budgets, addenda, and bid packages.

When asked to explain his success in managing construction contracts, one experienced Site Manager always prefaced his reply with just three words: "document, document, and document." This may seem oversimplified, but when Owners or Contractors fail to meet contractual obligations, litigation or lawsuits may result. It is reassuring to know that courts judging such cases in the past have always accepted well-documented and contemporaneous records relating to contract matters, from either party, over memory and hearsay, thus supporting the Site Manager's observation.

Records

Contract administration relies on detailed record keeping using construction contract administration records, including logbooks, correspondence, status reports, and any other project-related construction site activity document. All records should be kept on file and easily available for reference to protect Owner interests should disputes arise with Contractors or vendors.

Site Logbooks. Logbooks should provide a precise, factual, and historical record of events that take place during the life of a construction contract. Daily entries provide information about work activity and progress, instructions, agreements, size of workforce, changes, extras, material and equipment delivery, test results and records, and site conditions, including weather, temperature, and precipitation. In other words, logbooks should record anything that may come back to haunt the Owner if not documented factually at the time of occurrence. It is best to record too much rather than too little until one becomes experienced with just what merits entry. To be fair to Owners and contractors alike, entries must be accurate and unbiased, even those showing that the Owner may be at fault if a dispute arises. Some Owners specify one logbook for an entire project and others specify one logbook per contract. Logbooks should be permanently bound, with consecutively numbered pages. Entries must be dated, legible, have no erasures, and reference a contract number, name of the contractor, and work location. Should errors be made, the entry should be crossed out so it can still be read, initialed, and followed with the correct entry. See Figure 5.1 for an example of a site logbook page.

Correspondence. If the Site Manager, Deputy Site Manager, and their limits of authority were not specified in the Letter of Understanding, such notification is necessary in a letter best written by the person who called the bid resolution meeting. Thereafter, all correspondence with Contractors regarding work site matters should be

ANYCO, Inc. **Page** 8

Zachary Gypsum Plant **Date** 06/12/98

SITE LOGBOOK

PROJECT: New Grinding Mill, Specification No. A/BR Mill, 107.00

Weather is clear and dry, Rain forecast for tomorrow. Two contractors working on site, Sparks Electric and Mill Constructors, Inc. Received two shipments of Owner Furnished electrical equipment by Fast Freight Trucking at 9:00 a.m. Offloaded in Sparks Elect. storage yard.

Sparks Electric, Contract No. A/BR-98-04, Specification No. ELECT.-107.06.

No other contractors working in this area. Contractor has one foreman, 6 elects. and 6 helpers on the job. Held "Tool Box Safety Meeting" at 7:10 to 7:25 a.m. Completed laying 4 inch conduit in runs from Sub Station No. 1 switch gear to distribution panels DP-31, DP-34, & DP-35 and encased in red concrete. Total length is 360 ft. Foreman Johnson says he will bring in one extra electrician and two extra helpers tomorrow to complete the 4inch conduit runs to distribution panels DP-32 and DP-33, backfill all five runs, and regain schedule. Those two runs are protected in case of rain and regular crew can also work under cover to complete pulling all five runs of copper conductor.

Mill Constructors, Inc., Contract No. A/BR-98-05, Specification No. MECH. 107.03

Contractor's Site Supt., "Spud" Rentjes has crew of 4 millwrights, 5 ironworkers, 4 welders, 6 helpers, and 2 heavy equip. operators. One 2400 Lima crane/clamshell, No. MC-104, with 100 ft. booms is on site. Second 2400 Lima crane, No. MC-107 with 90 ft. boom delivered to site at 12 noon. Completed setting and leveling the ball mill, process compressor, and 5 of the 10, 12 inch pumps. Erect 6 of 24 steel columns for the digester building, scheduled to complete steel and epoxy grouting on 06/19/98. Millwright Sam Hill, Mill Const. Employee No 8564, left work at 1:35 p.m. complaining of upset stomach. At 2:47 p.m. Lima crane No. MC ~~104~~ 107 dropped 27 ft., 12inch wide flange column about 15 ft. Landed on spread footing excavation, no apparent damage. Rentjes says hoist brake friction piston failed. Crew will work overtime tonight to replace piston so crane can operate safely for tomorrow. Transferred all remaining on site Owner furnished material to Mill. Const. See SIM No. 4. OSHA Mech. Const. equipment inspection postponed to 06/14/98.

Norman Knitpick 06/12/98

Logpage (Rev. 5/96) Page 1 of 1

FIGURE 5.1 Example of site logbook page

originated by the Owner's Site Manager, using the Owner's procedures and forms. These forms are known by almost as many different names as there are Owners. All use various combinations of the words *field, site, contract, transmittal, letter,* and *memo,* and all have the same intent. They provide written, dated, and signed records of correspondence from the Owner to the Contractor pertaining to the activities of contract administration. Among these documents are the transmittal of contract documents and instructions, notification of deficiencies or problems, requests for site-related information, requests for extra or change prices, transfer of custody of Owner-furnished material and equipment, and minutes of site meetings.

The form most widely used provides spaces for essential information such as an individual memo number, a contract number, the Contractor name, a work location, the date, signatures of originator and recipient, a page number, and space for the message. Some Owners try with varying degrees of success to include all the possible combinations of subjects and actions anticipated for a construction contract in one form. This book uses the Owner's site transmittal memo (STM). For an example, see Figure 5.2. Typical forms consist of two pages with the first page labeled "Owner Copy" and the second page labeled "Contractor Copy." STM forms are to be signed and dated as received by the Contractor; the second page is retained for Contractor files and action and the original is returned to the Site Manager. Copies are made and distributed as required by Owner procedures and the originals are filed in a secure place by contract and STM numbers.

STM log sheets provide a convenient and ready reference to the STM file contents. Log sheets record the STM number, contract number, contractor name, date sent, date returned, action (if required) and date completed (if required), amendment number, and cost (if applicable). When reviewing the log sheet, missing information stands out and indicates a need for attention. See Figure 7.19 (p. 89) for a sample STM log sheet.

Status Reports. Contract proposals require that Contractors submit, at a minimum, a bar chart schedule similar to the one used in Appendix B, Figure D.1. It should include a proposed schedule to complete each bid item and must be updated periodically to display progress. The format and frequency of issue and updates will depend on individual Owner requirements, contract size, and project complexity.

Owners of larger, more complex contracts require added detail to show, report, and control the rate of construction progress and advancement. Progress seldom advances at a constant rate; it follows the left half or S-curve portion of a normal distribution curve. When applied over a bar chart schedule, the Contractor's performance or rate of advancement is shown for the just-completed period (week or month). As work progresses, new plots are added showing the actual results or rate for that period. Current plots falling on the base or forecast curve show that the contract is on schedule; plots falling above the curve show that work is ahead of schedule. Plots falling below the base curve show that work is behind schedule and alerts those concerned to take the necessary action to regain the lost time, or face possible delays. Figure 5.3 and Appendix B, Exhibit D show sample performance schedule forms that combine the bar chart and S-curve.

Other status reports based on S-curve type forms are routinely issued by Site Managers to help other Owner personnel in their work. Project Team members responsible for controlling, analyzing, and forecasting project costs and cash flows would find it difficult to accomplish their work without accurate and timely spending status reports that compare the forecast or budget with actual spending. Labor hour status reports compare budgeted

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number : 4
Contract Number: A/Z-98-17
Date: 07/29/98

Contractor: Sparks Electric, Inc. Specification: Elect.107.05, Waste Gypsum Recycle

In accordance with the Specification and Article 16 of the General Conditions for Contracts, the Owner requests your detailed price proposal within five (5) working days to complete the following change in the Work:

Install one each, spare, Owner furnished, Distribution Panel No. DP-36 adjacent to the Sub-Station Distribution Panel No. DP-35 as shown on the attached, Contract Drawing, Waste Gypsum Recycle - Electrical, 03-E-103, Rev. 1.

In addition to your detailed price breakdown concerning the proposed changes, please include your revised Construction Schedule showing the proposed start and completion dates and the net effect of this change on your originally scheduled completion date.

DO NOT PROCEED WITH THESE CHANGES

Typical wording for proposed changes that fall within the Contract Scope of Work.

Received For Contractor
Signature:
Date: Time:

Signed for Owner
Norman Knilpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev(04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 5.2 Example of Owner's site transmittal memo form

ANYCO, Inc.

SAMPLE **EXHIBIT D**

CONTRACTOR SCHEDULE AND PROGRESS REPORT

PROJECT: GYPSUM PROCESSING PLANT CONSTRUCTION

BID ITEM	WORK DESCRIPTION	BID VALUE	% OF BID	% ITEM COMP.	MONTH / WEEK ENDING	JUN 3	JUN 10
1.0	MOBILIZE	$17,246	1.10	100%	100%		
					% CONTRACT		
2.0	OFFICE/SHOP SITE				COMPLETION		
2.1	EXCAVATE/GRADE	$39,196	2.50	100&	90%		
2.2	COMPRESSED AIR SYS.	$18,814	1.20	100%			
2.3	U/G PIPING SYSTEMS	$48,603	3.10	100%			
2.4	SEWAGE PLANT	$15,678	1.00	100%	80%		
2.5	FOUNDATIONS	$47,035	3.00	100%			
2.6	ELECT./ INSTRUM.	$54,874	3.50	100%			
2.7	PRE-FAB BUILDING	$84,663	5.40	30%	70%		
3.0	HAUL ROADS						
3.1	EXCAVATE/GRADE	$109,749	7.00	100%	60%		
3.2	SOIL CEMENT BASE	$164,623	10.50	100%			
3.3	SURFACE	$210,090	13.40	66%			
					50%		
4.0	PROCESS SITE						
4.1	EXCAVATE/GRADE	$51,739	3.30	100%			
4.2	SPREAD FOOTINGS	$68,985	4.40	100%	40%		
4.3	COMPRESSED AIR SYS.	$40,764	2.60	100%			
4.4	U/G PIPING SYSTEMS	$108,181	6.90	100%			
4.5	FOUNDATIONS, PAVING	$137,970	8.80	30%	30%		
4.6	ELECT. / INSTRUM.	$134,834	8.60	-0-			
4.7	RAW MAT. FACILITY	$197,547	12.60	-0-			
					20%		
5.0	DEMOBILIZE	$17,246	1.10	-0-			
					10%		
TOTALS		$1,567,837	100%		0%		

LEGEND		
SCHEDULED PROGRESS:	-X-	
ACTUAL PROGRESS:	-O-	
SCHED. NO PROGRESS:	N/P	
COMP. ON SCHEDULE:		
COMPLETE LATE:	LATE	
REPORT PERIOD:	▼	

SCHED. % COMPLETE:	1.1	2.4
ACTUAL % COMPLETE:	1.1	2.4
WORK WEEK NUMBER:	1	2

FORM PS(Rev. 3/94)

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FIGURE 5.3 Sample schedule and progress report form

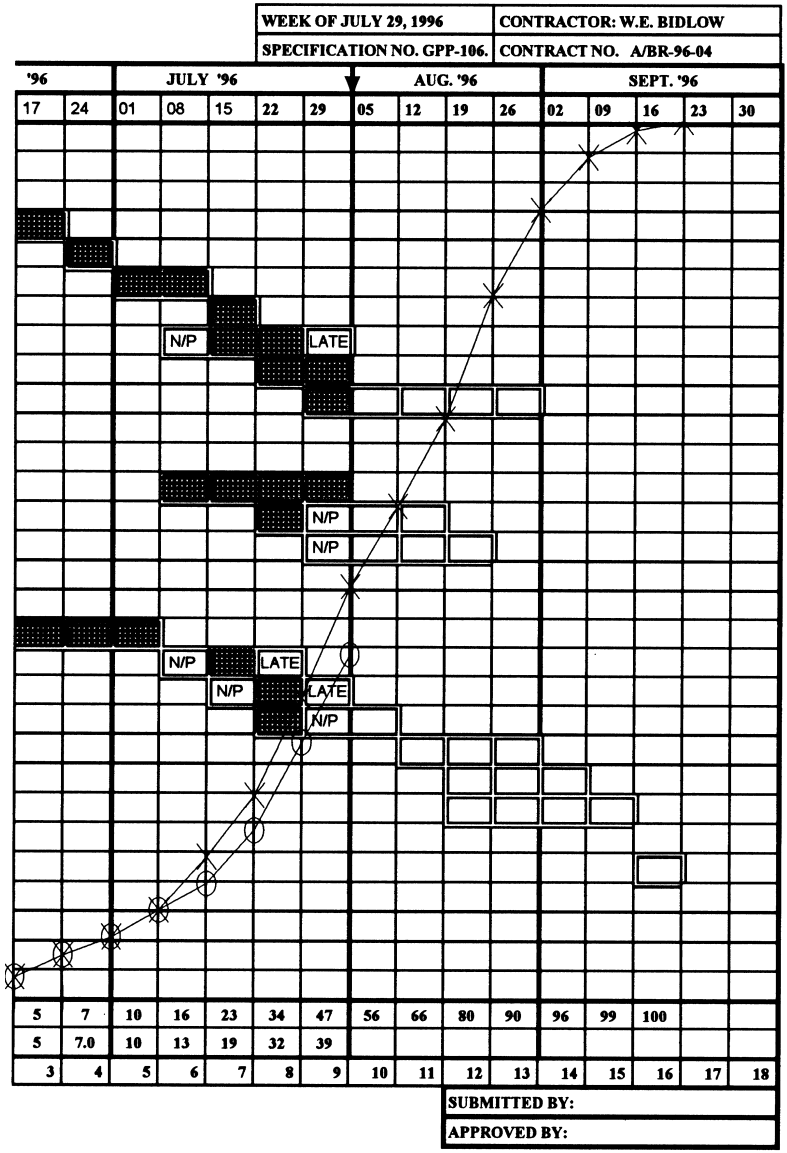

FIGURE 5.3 Sample schedule and progress report form *(continued)*

to actual labor usage and are used by estimators to determine Contractor labor efficiency and to verify the accuracy of their own labor estimates.

Site Files. Copies of all site-related documents, generated on or off site, and received, issued, distributed, referenced, resolved, or approved by the Site Manager, are maintained in site files. Included are forms used to record specialized construction site activities such as surveying; pile driving; concrete pours; steel erection; heating, ventilation, and air conditioning (HVAC); electrical work and instruments; painting; and insulation. These forms include general information on the activity such as date, time started and completed, names of observers, equipment used, location, weather, temperature, and other details. For example, pile driving forms should include the name, size, type, and condition of the crane, hammer, leads, and piling; number of blows per foot to drive each pile; incidents such as damaged or broken piles; and delays. Following is a list of some of the work-related documents maintained in a typical construction site file.

- Logbooks
- Bid packages
- Estimates, budgets
- Contracts
- Contract drawings
- Requisitions
- Purchase orders
- Invoices
- Freight bills
- Delivery tickets
- Manuals
- Procedures
- Test results
  - On site
  - Laboratory
- Bills of material
- Equipment lists
- Spare parts lists
- Schedules
- Amendments
- Correspondence
- Site transmittal memos
- Meeting minutes
- Claims
- Change orders, extras
- Progress photos
- Special reports
  - Status
  - Progress
  - Manpower
  - Spending
  - Inspections
  - Safety, accidents
  - Quality control
  - Receiving
  - Expediting
  - Start-up
- Certifications
  - Contents
  - Performance
- Progress payments
- Beneficial occupancy documents
- Punch lists
- Notice of acceptance
- Certificate of completion
- Release, waiver of lien
- Release of retainage
- Warranty, guarantee

PRE-CONSTRUCTION ACTIVITIES

Contract administration, the control of contract safety, time, cost, and quality, begins before work at the site commences. Site Managers must select, obtain, and set up the facilities, procedures, equipment, and supplies needed to manage their contracts. The work is usually temporary, so rental trailers are a logical choice for office needs. There are many other details that Site Managers must schedule, arrange, provide, or put in place before site construction work starts, including the following requirements:

- Personnel
- Offices, utilities
- Specifications
- Drawings
- Chart of accounts
- Manuals, supplies
- Procedure, forms
- Budgets, estimates
- Schedules, reports
- Protective equipment
- Owner-furnished items
- Pre-job meetings
- Testing facilities
- Transportation

Routine pre-construction activities for the Site Manager may include conducting bidder site visits and answering technical questions. Additionally, Site Managers often assist in developing and reviewing other pre-construction items such as feasibility studies, bid lists, schedules, specifications, flowsheets, drawings, constructability reviews, estimates, budgets, bid analysis, and bid packages.

The first written communication between an Owner's Site Manager and the successful bidder or Contractor is the Notice to Proceed. This letter directs the Contractor to move onto the site and start the work described in the bid package, the Proposal, and the Letter of Understanding, on a certain date. This document has three primary purposes. (1) Acceptance of the letter establishes that a legal contractual relationship exists between an Owner and a Contractor, even though formal contract signing procedures may not be complete. (2) The letter notifies the Contractor that the entire work site is free of obstructions and available for construction. If this is not true, information on the type of obstruction or restriction, location, and the expected date of removal must be included. (3) Dates for starting site work, as shown on the Notice to Proceed, provide the reference or base for converting calendar days to calendar dates, thus establishing a calendar date for contract completion. Starting dates should be established by mutual agreement between the Owner and the Contractor and must allow an acceptable period for mobilization. This can run from a week or less to several weeks, depending on the size and type of the contract. A typical format for Notice to Proceed letters is shown in Figure 5.4.

Most Contractors and Owners are represented by honest and sincere people having a common objective. They try to complete contracts safely and to the mutually agreed specification, price, and schedule. This can be a difficult task under the best of circumstances, and it becomes even more difficult when there is a lack of cooperation or when adversarial relations develop between the parties. With this in mind it is important that the Owner's Site Manager explain his or her role in the project during a pre-job meeting.

The meeting should be held after the Notice to Proceed is issued and before the contract start date. Contractor and Owner site personnel are introduced at the meeting, discuss their individual responsibilities, and review the Contractor's work plan in detail. Site Managers should use this opportunity to emphasize that their main function is to help

ANYCO, INC.
16000 Scenic Highway
Zachary, Louisiana 70791

Date: May 24, 1996

NOTICE TO PROCEED WITH SITE WORK

W.E. Bidlow, Inc.
222 Twenty Second Street
Baker, Louisiana 70892

Subject: Contract No. A/BR-96-04
Specification No. GPP-106.5

Attention: Mr. W. E. Bidlow, President

Sir:

Contract No. A/BR-96-04 for the Gypsum Processing Plant Construction was awarded to your company at our May 24, 1996, Bid Resolution Meeting held at the Zachary, Louisiana Plant Site.

Consistent with the terms of the Contract, this letter serves as your Notice to Proceed with Site Work. By mutual agreement, the date to start Site Work and the Contract is hereby set for June 3, 1996.

Completion requirements for Contract completion as shown in Exhibit "A" of the Specification No. GPP-106.5 as calendar days, are hereby changed to calendar dates as follows:

Item Number	Work Description	Calendar Days	Completion Date
1.0	Mobilize	5	06/07/96
2.0	Office/Shop		
2.1	Excavate Grade	10	06/21/96
2.2	Comp. Air Sys.	6	06/29/96
2.3	U/G Pipe Sys.	10	07/12/96
2.4	Sewage Plant	5	07/19/96
2.5	Foundations	16	07/27/96
2.6	Elect/Inst.	10	08/02/96
2.7	Pre-Fab Bldg	25	08/30/96

Page 1 of 2

FIGURE 5.4 Typical Notice to Proceed letter

ANYCO, Inc.

3.0	Haul Roads		
3.1	Excavate/Grade	20	08/02/96
3.2	Soil Cement	20	08/16/96
3.3	Surface	20	08/23/96
4.0	Process Site		
4.1	Excavate/Grade	16	07/06/96
4.2	Spread Footings	10	07/19/96
4.3	Comp. Air Sys.	11	07/27/96
4.4	U/G Pipe Sys.	16	08/10/96
4.5	Foundations & Paving	16	08/31/96
4.6	Electrical/Inst.	15	09/06/96
4.7	Raw Mat.Store	25	09/13/96
5.0	Demobilize	5	09/20/96

Please sign to confirm receipt of this Notice to Proceed and that you accept the Contract starting date for Site Work as June 3, 1996. Return the original signed copy to this office and retain the copy for your files.

Yours truly,

Norman Knitpick

Norman Knitpick, Site Manager, ANYCO, Inc.

Signed for Contractor: _____

Date: _____

Title: _____

Page 2 of 2

FIGURE 5.4 Typical Notice to Proceed letter *(continued)*

both the Owner and Contractor to meet the contractual obligations. The use of inspections to help maintain the schedule and work quality should also be reviewed.

Site Managers are expected to provide contract interpretation that is fair to both parties. This requires professional judgment that can only be obtained through experience. Too loose interpretations of contract requirements harm the Owner's interests by allowing workmanship or materials with less value than paid for. Too stringent interpretations may harm Contractors by forcing additional or unnecessary spending, leading to disputes and claims.

Regular, thorough inspections and reports of work in progress keep both parties informed of work quality. Inspections must keep pace with the work so that poor workmanship or inferior materials can be identified early and, if necessary, be replaced at the lowest possible cost. The Site Manager or deputy is expected to be readily available on the site, with the authority and resources to answer questions, issue directions, make modifications, and interpret plans and specifications promptly when problems or questions do arise.

CHAPTER 6

Implementing the Contract

Two features are common to all successfully completed construction contracts. The contract documents were written in clear, simple, easily read language that would be difficult to misinterpret, and they were administered by experienced Site Managers.

SITE MANAGER ROLE

Following project concept design, approval, and funding, contract bid package documents, including the specifications, conditions, provisions, drawings, and attachments, can be completed by Project Team members. Bids are solicited, the best bidder is determined, and contracts are awarded. A Site Manager is appointed to administer the contracts and ensure contract fulfillment or compliance with the terms, conditions, and obligations. Site Managers must be designated as the Owner's sole authorized contact with the Contractor regarding contract matters. Failure to maintain this single line of communication will result in confusion and misdirected communications and may even endanger successful completion.

Site management requires a unique blend of administrative, technical, and investigative skills with the ability to work and communicate with others in a mature, businesslike, and non-adversarial manner. Site Managers must understand what they read to recognize all the obligations that Owners and Contractors undertake on signing contracts. Other essential skills include a basic knowledge of construction law, a thorough understanding of the "fine print" or "legalese" in the contract documents, the intent and use of exculpatory clauses, and the ability to negotiate and resolve disputes and claims.

Obligations

Those legally or morally binding agreements assumed by the parties signing construction contracts are referred to as *obligations.* Contractual obligations are those written into the contract documents. Implied obligations are not written, but are indicated by inference, association, or accepted practice. Site Managers and their inspectors must be thoroughly familiar with both so they can determine when both owner and contractor obligations have been met as scheduled.

Contractual Obligations. Owner contractual obligations are to (1) furnish an unencumbered work site at the time and place agreed; (2) deliver Owner-furnished equipment, materials, supplies, and services when, where, and how specified; (3) provide an

"on-site" manager (Site Manager) to interpret contract documents, consider submittals, resolve questions, and initiate payment for work performed; and (4) provide error-free plans and specifications. Contractor contractual obligations include providing the material, equipment, services, labor, and supervision necessary to complete the work described in the specification, safely, at the price stated, and within the schedule.

Implied Obligations. For both Owners and Contractors there is an implied obligation to give prompt notice of any plan errors or omissions, work site changes, or incidents they find that affect contract safety, cost, quality, or schedule. Included is prompt notice concerning late delivery of material, equipment, supplies, or services; unusual delays due to weather, breakdowns, or other factors; interference in the work due to actions of Owners, Contractors, or others; changed and unsafe conditions; underground obstructions; and labor issues. Contractors also have implied obligations to perform their work by meeting or exceeding industry standards and area practices and to inform Owners promptly of any concerns about constructability in design or location. Signing construction contracts binds Owners and Contractors legally to an "implied condition of cooperation," meaning that both parties agree to deal in "good faith" and to take no action that makes the work more difficult or costly for the other, without prior agreement.

Exculpatory Clauses

Exculpatory clauses are included in construction contracts to anticipate and prevent unwarranted claims. They are defined as "A provision in a document that protects a party from liability arising, in the main, from negligence; such clauses are common in leases, contracts, and trusts."* Experienced contractors add to their bids to cover costs for the minor delays inherent in any construction work. Owners, in turn, add exculpatory clauses to protect themselves from unrealistic claims for cost and time extension requests. See Appendix B, Exhibit B, Articles 18a, b, and c for several examples of exculpatory clauses.

Site Managers must realize that exculpatory clauses cannot offer protection from all claims, especially willful acts or omissions that do not meet the "implied condition of cooperation" and failure to deal in "good faith." Acts by Owners that may cause legitimate claims by Contractors, in spite of exculpatory clauses, include failure to (1) deal with contractors in a cooperative and non-adversarial manner; (2) coordinate multi-contractor site activities to prevent work interference; (3) consider the effects of arbitrary changes or decisions that cause work to become more costly or difficult; and (4) respond to Contractor questions and requests for approvals, changes, information, or substitutions within a defined period.

COMPLIANCE

Compliance is monitored for workmanship and quality by observations, tests, and inspections of materials, work-in-progress, and work-completed. Experienced Site Managers use pre-award meetings to review and explain their methods to ensure compliance with contract documents and drawings and to introduce the persons who will inspect the work. They emphasize that the intent for such close scrutiny is not to harass; but to ensure that both Owner and Contractor comply with the obligations accepted when they signed the contract.

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* *Black's Law Dictionary,* Sixth Edition, Henry Campbell Black, M.A., West Publishing Company, St. Paul, Minn., 1990.

Inspectors

Persons assigned to this position observe, examine, inspect, measure, monitor, record, and report on the status of material received, site preparation, site conditions, work-in-progress, and work-completed. Inspectors are often taken from the Owner's pool of experienced maintenance personnel slated to work in the new facility. Experience gained in monitoring individual component construction will be an asset for maintenance of the operating facility. The number of inspectors necessary to ensure contract compliance depends on the size and number of contracts and the disciplines involved in a project. Outside inspectors should be used only when no Owner personnel are available. Site Managers assigned to smaller projects routinely perform the functions of both administrator and inspector. Once inspectors have been selected and assigned, they require access to all contract documents, specifications, drawings, conditions, provisions, codes, standards, ordinances, and purchase orders. They also require time to become familiar with the documents and the various tools needed to perform their work. Inspectors rely on contract drawings and other documents to provide a base from which to inspect and determine that compliance has been achieved. Drawings give a graphical representation of "what" is required. Specifications and other documents establish "how" the work is to be done.

Inspectors compare name plate data and material delivery tickets to specifications and purchase orders for all material and equipment delivered to the work site to ensure that the correct items were delivered. Inspectors also closely examine material and equipment received for any evidence of damage and report the facts. If necessary, steps can then be taken to repair or replace the damaged items and ensure their availability for use as scheduled. Two other details often overlooked require attention by inspectors. First, they confirm that the Owner-furnished baselines and benchmarks are in place and unobstructed. Second, they confirm that Contractor layout for the first permanent facility is correct. This is akin to the old adage concerning the carpenter's advice to "measure twice and saw once." Layout of the work is recognized as the Contractor's obligation, but this fact will be of little consolation to an Owner of new construction that has been located incorrectly. Demolishing and rebuilding, or correcting contract drawings by Owners to show revised locations, require additional time that may delay tightly scheduled contracts.

Tests and Inspections

As contract work advances, tests and inspections are conducted to confirm that quality of construction material and/or workmanship complies with the contract specifications, conditions, provisions, standards, and codes. Included in inspections are four major activities: (1) observe, test, and inspect material, equipment, work-in-progress, and work-completed for compliance and quality; (2) distribute inspection reports; (3) plan for remediation activities, if necessary; and (4) prepare for completion and acceptance.

Quality, as defined for construction contracts, is established by reference to the latest revised Owner or agency standards and specifications. "Agency" refers to the private or governmental group that sets accepted standards and quality for construction, safety, health, materials, and workmanship. Agencies referenced may include the American Concrete Institute (ACI), the American Institute of Steel Construction (AISC), the American National Standards Institute (ANSI), the American Standards Association (ASA), the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), the American Society for Testing and Materials (ASTM), the U.S. Environmental Protection Agency (USEPA), the Occupational Safety and Health Administration (OSHA), and the Mine Safety and Health Administration (MSHA).

Tools, Supplies, and Equipment

Monitoring and inspecting a simple above-ground pipeline contract may only require a permanently bound field book for notes, a mirror for inspecting welds on the bottom of the pipe, and a tape measure to confirm that the pipeline is in the correct location. Buried pipelines will require additional tools to confirm that the specified depths of excavation and degree of backfill compaction have been reached. Inspectors use various tools, equipment, and documents to inspect, monitor, record, control, and ensure that construction workmanship and materials comply with the quality established in the contract specifications. Tools, equipment, and documents must be readily available as required. Contracts with tight specifications and cut-off values for wind and water velocities, temperature, humidity, or seismic activity require highly specialized instruments that may be rented or purchased, or the work may be contracted to others.

Notebook computers fitted with CD-ROM drives and three-dimensional (3-D) color graphics software have become essential tools for inspectors assigned to large, complicated projects. Specifications, drawings, standards, and codes for an entire project can be made available to inspectors on CD-ROM. All necessary reference material to determine work compliance can now be carried by inspectors to the site while doing inspections. Even experienced inspectors, using two-dimensional (2-D) field construction drawings, have difficulty following reinforcing steel (rebar) drawings for some complicated concrete designs. The introduction of 3-D drawings, in color, showing rebar in complicated areas such as column, beam, and capital connections, has improved construction contract inspections markedly. More important, overlooked or misplaced rebar, a vital component of design strength, is readily seen. Following is a list of items that inspectors may require to perform their work.

- Field books and forms
- Specifications
- Construction standards
- Engineering standards
- Contract drawings
- Governing codes
- Tape recorders
- Measuring tapes
- Assorted hand tools
- Torque wrenches
- Scales and balances
- Stop watches
- Rain gauge
- Anemometers
- Thermometers
- Hygrometer
- Portable telephone
- Mirrors
- Magnifying glass
- Leveling instruments
- Electrical instruments
- Audio instruments
- Vibration instruments
- Binoculars
- Camera with dateback
- Photos: progress, aerial
- Notebook computer

Inspection Records

Detailed and accurate inspection records benefit both Owner and Contractor, especially when problems or questions about quality of materials or workmanship arise after the fact. Procedures and frequency of inspections for materials, equipment, work-in-progress, and work-completed and the recording of results vary widely according to individual Owner requirements and the size and type of contract. Some types of construction require inspections to confirm that a portion has been built to compliance before the next stage can proceed. Examples include inspection of all the bolted or welded connections of a steel structure before erection can begin at the next higher level; or inspection of rebar and forms in a concrete structure for the correct number, size, ties, placement, and cover before concrete can be placed. Both parties to the contract must keep in mind their obligations under the "implied condition of cooperation" and schedule their inspection activities jointly to save time.

Inspection records are kept using special forms provided by the Owner and in permanently bound field books used expressly for that purpose. As is the case for the Site Manager's daily site log book, inspection records are expected to be detailed, precise, unbiased, and factual. Deficiencies in workmanship or product quality observed during inspections must be brought to the attention of the Contractor at once so that corrective action can be approved by the Owner and performed without delay. Contract drawings provide another good tool for recording inspection results for many construction activities. Drawings may be marked up during each inspection of work-in-progress through work-completed to indicate individual items that have been installed to compliance. The drawings are kept with other contract records for reference should questions arise later.

Distribution of routine inspection records is made by Site Managers as provided in Owner procedures. Contractors should receive copies of the inspection records; the most logical place for Owners and Contractors to review the inspections is at progress meetings.

Progress Meetings

Site Managers use weekly progress meetings to maintain the lines of communication with Contractor representatives. They provide the opportunity to review, discuss, analyze, and report on contract safety, progress, compliance, outstanding issues, and future work plans. Without such meetings, it would be difficult to maintain control over contracts. When two or more contracts are to be worked in close quarters, the Contractors concerned are invited, before work begins, to send a representative to the meeting. Activities most likely to cause interference while working in close quarters can be identified and plans and schedules completed in time to prevent delays. Progress meetings should not be loaded with too many bodies; as a rule of thumb, the fewer participants, the more productive the meeting. A written agenda helps to keep meetings focused. Contractors are requested to bring revised schedules showing how they expect to regain lost time if they have fallen behind and how they intend to remedy deficiencies in quality or workmanship that may have been revealed by inspections.

Requests for Inspection

Any request for inspection must be followed up without delay. Contractors may initiate requests for inspection of individual components as they are completed to determine if they meet the specifications. When the Contractor feels that all portions of the work are complete and meet the specifications, a more formal Notice of Readiness for Inspection

may be issued to the Site Manager. If the inspection and review of related site files indicates that the work is indeed complete and meets the specifications, this fact is noted in the inspector's records. If the work is not acceptable, the Site Manager must notify the Contractor immediately and issue a written "punch list" to clearly describe each deficiency. The Contractor is then directed, via a site transmittal memo, to start correcting punch list items and, if required, issue a written schedule for the corrective work and schedule a firm date for the next inspection.

CHANGES AND EXTRAS

Construction contract *changes* are defined as any modification, addition, or deletion directed by the Owner and authorized in the contract documents. *Extras* cover additional work directed by the Owner but not within the original scope of work. Either may disrupt a Contractor's plan for the work, and because it is rare for a construction contract to be completed without a single change, this issue requires close attention to prevent disputes.

Contract changes are classified as formal, constructive, or cardinal. Formal changes are those directed by an Owner using authorization written in the contract documents. Constructive changes refer to those not initially documented as a change. An example would concern the "hold" on a portion of a contract drawing awaiting new instructions or material. A "hold" that is not resolved before it delays the Contractor's work plan may end up requiring a formal contract change. Cardinal changes are those that propose major alterations outside the original scope of work and often require that the entire contract be renegotiated.

Contractors bidding for construction contracts study and analyze the Owner's bid package documents to develop their plan of what work must be done and how they would do it. Detailed plans, schedules, and estimates of time and cost are then made for each element or task. These are assembled to establish a proposed work schedule and bid price. Any change or extra proposed by the Owner after contract award may disrupt the planned and orderly progress of work and must be fully evaluated by Owner and Contractor to establish a fair evaluation of the schedule and cost. Possible "ripple effects" on other tasks resulting from changes or extras must also be considered.

Well-defined Owner procedures, addressing both changes and extras, are essential. The procedures are expected to be fair to both parties and provide them with protection from potential disagreements and claims.

Change order forms may be used to request a price and schedule for proposed changes or extras. If the proposal is approved, the form is returned to the Contractor with the notation, "Authorized to Proceed," signed and dated by the Site Manager. Site transmittal memos may also be used for this purpose. On receipt of an acceptable proposal from the Contractor for a change or extra based on the STM request, a new STM is issued authorizing the work to proceed. Field order forms or the STM form may be used to authorize minor changes in work not affecting contract design, schedule, or price.

Occasionally, Contractors are told to "proceed with a change and the paper work will follow." Use this action only as a last resort because it has been the source of many disputes in the past. Immediately after verbal orders are issued to proceed in such a situation, Owner and Contractor representatives must resolve as many of the change issues as possible. These include setting a scope and defining the limits of work; providing a schedule for completion; providing ready access to time, rental, and equipment records; and a

mutually agreed upon method of payment (time and material, unit price, lump sum, or a lump sum not to exceed price). STMs are written recording the issues as resolved.

Questions about changes must be resolved quickly to prevent disputes. A contract amendment or change order must be prepared and approved for payment for changes. Payment is usually included in the pay period following completion of the change.

DELAYS AND TIME EXTENSIONS

Older construction contracts often used exculpatory clauses and articles trying to limit Owner liability for delaying the Contractor's work to time extensions. These efforts were of little value; arbitrators and courts have consistently ruled for the Contractor in disputes over delays to the work that were clearly due to Owner changes, neglect, or failure to cooperate. Most current construction contracts recognize that Contractors may have valid claims for the following three classes of delays.

1. Excusable delays. Included are Acts of God (Force Majeure), war, fire, floods, and other abnormal events which neither Owner nor Contractor can prevent by exercising due diligence. Such delays do not qualify for added compensation; but time extensions may be given to complete the contract on submittal of acceptable supporting data.
2. Compensable delays. Included are delays caused by Owner changes, neglect, or failure to cooperate. To receive monetary compensation for such delays Contractors must provide supporting data promptly.
3. Unacceptable delays. Included are events causing delays over which the Contractor does have control, such as late delivery of Contractor-supplied material or failure to supply an adequate number of employees as needed to do the work. No time extensions or added compensation would be allowed for these delays.

SUSPENSION OR TERMINATION

Events do occur in construction activities requiring Owners to suspend or terminate contract work, in whole or in part, when they feel that their best interests will be served. Articles included in contract documents allow for this action. Directives to suspend or terminate work are originated by Site Managers. They require a detailed description of the work covered, an effective date, and for suspensions, the expected duration. Suspension of construction refers to contract work that is stopped temporarily with the intention of resuming later. Termination refers to contract work that will be ended or concluded with no intention of resuming in the foreseeable future. Either action requires written procedures to protect the interests of the Owner and the Contractor. To be fair, procedures must make provision for the Contractor to recover actual direct costs for work completed, material purchased but not installed, additional work required by the suspension or termination directives, and overhead and profit for such expenses.

DISPUTES

Most contract disputes arise from ambiguous or poorly written documents and design, poor judgment, and poor record keeping.

Ambiguous Documents and Poor Design

Transposition of letters or figures, improper punctuation, incorrect spelling and word selection, and design errors in construction documents can be reduced by simply adding formal procedures for edits, constructability reviews (by experienced owner personnel), and final approvals before release.

Well-intentioned, ill-defined words and phrases continue to be used in construction contract documents and cause an excessive number of disputes. Among these words and phrases are *reasonable, in the area of or near to,* and *to the owner's satisfaction.* Such vague phrases need to be replaced with quantifiable descriptions such as a number of days, a distance in meters or feet, or a reference to an article, standard, or code in the specification. Defining time periods required for actions by Site Managers allows Contractors to plan for a specific period of time to get approvals for and answers to questions about their shop drawings, suggested changes or substitutions, and the work itself. For example, the contract should use definitive phrases such as "Shop drawings submitted to the owner for approval or comments shall be acted on and returned to the contractor within five (5) working days." There can be no question when specifications refer to a finite number such as "haul all excess excavation dirt from foundations to the disposal area located 152.4 m (500 ft.) north of foundation A-1 as shown on ANYCO, Inc. Drawing No. 03-G-100, Rev.6, General Plant Layout." "Spread and compact the excess dirt in accordance with ANYCO, Inc. Construction Standard ABF-2 (Rev.06/95) Backfill and Compaction" tells the contractor that there is an obligation to transport excess excavation dirt a specific distance and to spread and compact it to a measurable standard of density.

Judgment

Judgment is the process by which all related facts and their interactions are collected, evaluated, and considered to reach conclusions or make decisions within an established, attainable deadline. Good judgment is a skill that can only be acquired through experience and is an important attribute for Site Managers, who are required to interpret and enforce contract documents for compliance. There is just no shortcut or substitute for having all the pertinent facts and understanding their interactions to make sound decisions about construction contract matters. Snap decisions made without having all the facts reflect poor judgment, which can easily lead to disputes between Owners and Contractors.

Record Keeping

Site Managers must maintain complete, factual, and current records of all construction contract site activities to ensure that contract work is in conformance with the specifications and that there is documented backup available in case of claims by Contractors or vendors. Some of the important records kept for these purposes are logbooks, site transmittal files, meeting minutes, schedules, inspections, photographs of progress and damaged and defective work, and rate or S-curves. Site records are reviewed routinely to ensure compliance with obligations.

CLAIMS

Unresolved disputes between Owners and Contractors or Owners and vendors over time or costs are the source of claims. Claims are defined as requests for compensation (either time or money) due to, or believed to be due to, or owed by an Owner, a Contractor, or a vendor for damages or losses. It is a rare event for a construction contract to be completed with no disputes, despite the best efforts of Owners to clearly define the work through specifications, pre-bid meetings, and site visits; and of Contractors using their collective powers of observation, experience, and site verification in analyzing bid packages to submit their bid or proposal. When disputes do arise, the concerned parties have a responsibility to try to resolve them, if possible, quickly, fairly, and to their mutual satisfaction.

The construction industry is based on the premise that time is of the essence, a standard phrase included in the wording of construction contracts. This indicates that time in a construction setting has value, and events that add or reduce time to complete a contract can result in a monetary loss or gain to one of the parties. Claims that result from disputes not settled will fall into one or more of the following types:

1. Type I Claims. Contractor claims against Owners concerning interpretation and intent of the contract documents.
2. Type II Claims. Contractor claims for damages caused by changes in the work, delays, acceleration, changed site conditions, termination or suspension of work, loss of efficiency due to delays, breach of contract, or nonpayment.
3. Type III Claims. Owner claims against Contractors for breach of contract that include failure to perform, nonconformance with the specification, or late completion.
4. Type IV Claims. Owner claims against vendors for late delivery or nonconformance with the specifications.

Claims Prevention and Resolution

Site Managers must first try to settle disputes and prevent claims by explaining the Owners interpretation of contract documents relating to the specific issue. Contractors who still remain convinced that they have a legitimate claim have the right to present the facts for resolution, in writing, to the Site Manager, as directed in the General Conditions. Owners also use documents such as Appendix B, Exhibits A and C (included with the proposal) to avoid claims for added costs. The Contractor's proposed unit price and markup for labor, materials, and equipment rental for changes within the scope of work have been recorded as contract documents, making it difficult to justify higher costs for these types of changes.

To carry out their work effectively, personnel concerned with claims resolution require access to a complete set of written procedures. Owners with ongoing construction activities have probably developed such procedures, based on their requirements. Areas of responsibility and monetary limits are assigned to the individuals or groups who will handle claims. Owners who need new or revised claim procedures may hire consultants or send selected employees to one of the seminars and courses available that address the development of construction contract claims procedures. As stated before, all claims procedures rely on the Owner's contemporaneous records. How well these records are prepared and maintained will have a direct bearing on the success of any Owner's efforts to settle claims fairly, impartially, and in a timely fashion.

Type I claims can be resolved by including the following statement in Article 28 of the General Conditions: "Disputes over interpretation and intent of contract documents, not settled to the satisfaction of the owner and contractor or vendor within twenty-four (24) hours of notification, shall be referred to fast track (2 day) binding arbitration."

The majority of construction claims are those in which Contractors seek to recover what they believe to be monetary losses for one or more of the items covered by Type II claims. In the past, Owners have tried, with only limited success, to restrict Contractor claims for delays and changes to time extensions by using "exculpatory" and "no damages for delays" clauses. Because Owners have acknowledged that time is of the essence by including such clauses in the contract, it is not realistic to think that such clauses will restrict legitimate Contractor claims to time extensions should they go to arbitration or litigation.

Types III and IV claims concern issues of Contractor and vendor nonperformance and nonconformance. Owner legal and purchasing personnel usually take the lead role in resolving these claims because they concern contract and purchase order legal issues.

Requests, questions, changes, or claims concerning costs or time extensions must be settled promptly. If it is determined that a Contractor is due additional compensation, or a time extension, a change order or amendment recording the related details is issued. Added compensation is usually included for the pay period following issue of the change order. If it is known that the request or claim will be denied, Owners must advise the Contractor, in writing, at once. If an immediate decision cannot be made, Owners must inform the Contractor, in writing, that an answer will be given within a specific number of days.

Claims Preparation and Pricing

Before a sound decision can be made to pursue or defend a claim, a thorough analysis of all the facts must be undertaken. The following steps play a role in the analysis:

1. Determine the type of claim, the basis, and the chronology.
2. Identify, sort, and evaluate all applicable contract or purchase order documents, conditions, provisions, and related work site records that prove or disprove the claim.
3. Establish that lost time or added cost was actually incurred.
4. Calculate and record realistic and provable claim costs.
5. Prepare and submit details that prove or disprove the claim and recommendations, based on the facts, for settlement.
6. Obtain approvals and forward a written offer to resolve the claim.

Claims that are not denied or accepted as presented should be negotiated, and those still not resolved should be referred to alternate dispute resolution. See Appendix B, Exhibit B, article 30 for an example of an alternate dispute resolution clause. Litigation should be avoided whenever possible because it is the most expensive and time-consuming method for settling contract disputes. Those who prepare, present, defend, or resolve construction contract claims should consider two important facts: (1) The burden of proof is always on the claimant requesting added time or costs for alleged damages, and (2) any claim for additional time or costs requires close scrutiny. The same action that precipitated a claim for damages in one area may be the basis for deducts or tradeoffs in another area.

Another consideration in resolving claims successfully is to present detailed and provable pricing for each tangible and intangible element. Owners and Contractors who do not take the time to calculate such pricing will be at a disadvantage in attempting to resolve their claims. Tangible costs are made up of labor, materials, and equipment and are easily priced for claims concerning changes within the scope of work by using the unit prices and markups included with the Proposal. Costs for delays and changes outside the scope of work are not as easy to price but can be related to costs of work in similar contracts, industry productivity studies, estimating resources, and reviews of current construction costs in weekly and monthly construction journals. Intangible costs consist of items such as extended overheads, loss of efficiency, lost profit, and lost opportunity, and are more difficult to price. Claimants who feel that they have justifiable claims for intangible costs, but do not feel competent to establish a fair price, should contact professional claims consultants for assistance.

Liquidated Damages

Owners expect to occupy and start up newly constructed facilities on schedule. If Contractors fail to complete their work on time, Owners may suffer monetary damages. The inability to fulfill an outstanding order for a product that is supposed to come from a delayed facility may cause lost revenue for the Owner as well as customer dissatisfaction. Late completion of commercial buildings results in lost rentals for the period between scheduled and actual completion.

Rather than litigate to recover damages for late completion claims in court, Owners may include conditions in their contract documents to identify the costs that the Owner expects to recover from the contractor as liquidated damages for each day of late completion. Owners must provide supportable and provable costs for the amount that they establish for liquidated damages.

An alternative to the use of liquidated damages in construction contracts is the penalty/bonus clause. Penalties in such clauses may be higher than for liquidated damages, but the possibility of a bonus gives Contractors greater incentive to complete the work on time.

More detailed information on how changes can affect construction contract costs, claims, and schedules is available in a number of construction industry association publications.* A good example is CII (Construction Industry Institute) Publication 6-10, "The Impact of Changes on Construction Cost and Schedule" (April 1990).

Negotiating

Both Owner and Contractor personnel benefit from formal training in negotiating skills. At the minimum they must learn to plan strategy and set realistic and attainable expectations and goals before attempting to settle contract disputes and claims. Many seminars and publications are available on basic and advanced negotiating techniques, essential skills for Owner and Contractor personnel who manage construction contracts. Those lacking in these skills will be at a distinct disadvantage in the day-to-day negotiations between Owners and Contractors that take place over the life of any construction project. Excellent sources of information on the subject are books and cassettes by Chester L. Karrass, including *The Negotiating Game* and *Effective Negotiating,* found in most public libraries.

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* See Appendix C for some of these associations.

PROGRESS PAYMENTS

Contractors expect to receive periodic payments for work completed and materials expended. Unless other arrangements are made, payments are made monthly under procedures similar to those found in Appendix B, Exhibit B, Article 25. The Owner's Site Manager and Contractor's manager meet within a specified time after the end of each month to determine and agree to the percentage of completion and value for individual work items. The contractor prepares an invoice and progress payment request for the agreed amount and submits them for approval and payment. Figure 6.1 shows a sample form for requesting progress payments.

A portion (usually 10%) of each progress payment is retained or kept by the Owner until the Contractor has met all contractual obligations. An Owner releases the final progress payment and retainage to the Contractor only when three conditions are met: (1) The Owner's certificate of completion and acceptance has been issued and the entire work is complete and accepted by the Site Manager, (2) the Contractor has issued a general release and waiver of lien for claims against the owner, and (3) no unsettled Owner claims exist against the Contractor. None of these three conditions can be met until the entire contract is complete, thus providing an incentive for Contractors to complete the work as scheduled.

BENEFICIAL OCCUPANCY

Owner provisions (Appendix B, Exhibit B, Article 26) in contract documents allow for beneficial occupancy or use of substantially completed portions of the work. Owners can provide work space for other contractors and give plant operating groups an opportunity to locate, identify, trace, train, start up, debug, and verify procedures before starting the entire facility.

Invoking Article 26 exposes Owners to potential unexpected claims by Contractors. Site Managers must be aware of this and take precautions before taking beneficial occupancy of the building, such as the following:

1. Inform the contractor why the owner needs to occupy a particular part of the work.
2. Inspect the area proposed for occupancy with the contractors concerned and prepare procedures that allow all contractors access to complete their work without interference.
3. Recognize that construction work in an operating environment may increase costs and take additional time.
4. Prepare a punch list for all concerned documenting incomplete work items in the area.
5. Discuss and resolve questions about when warranty starts for the areas to be occupied, before moving in.

CLOSURE AND START-UP

Owners commit resources to fund construction projects for expanded facilities to meet increased demands for services or products, for new facilities to supply developing markets, or for environmental and safety improvements or additions. Late completion harms Owners and Contractors alike. Owners are denied use of their facility, when and as planned, and final payment and retainage to the Contractor are delayed.

W.E. BIDLOW, INC.

222 Twenty Second Street
Baker, Louisiana 70892

PROGRESS PAYMENT REQUEST No. 2

TO: ANYCO, Inc.
16000 SCENIC HIGHWAY
ZACHARY, LOUISIANA 70791

CONTRACT NO: A/BR-96-08
CONSTRUCT GYPSUM MILL
PAY PERIOD: JULY, 1996

ATTENTION: NORMAN KNITPICK, SITE MANAGER

ITEM	DESCRIPTION	PAY VALUE	% COMPLETE		MONEY EARNED	
			% TO DATE	% PERIOD	THIS PERIOD	$ TO DATE
1.0	MOBILIZE	$17,246	100	0	$0	$17,246
2.0	OFFICE/SHOP					
2.1	EXC. & GRADE	$39,196	100	0	$0	$39,196
2.2	COMP. AIR SYS.	$18,814	100	0	$0	$18,814
2.3	U/G PIPE SYS.	$48,603	100	100	$48,603	$48,603
2.4	SEWAGE PLANT	$15,678	100	100	$15,678	$15,678
2.5	FOUNDATIONS	$47,035	100	100	$47,035	$47,035
2.6	ELEC/INST.	$54,874	100	100	$54,874	$54,874
2.7	PREFAB BLDG.	$84,663	20	20	$16,933	$16,933
3.0	HAUL ROADS					
3.1	EXC. & GRADE	$109,749	100	100	$109,749	$109,749
3.2	SOIL CEMENT	$164,623	25	25	$41,156	$41,156
3.3	SURFACE	$210,090	0	0	$0	$0
4.0	PROCESS SITE					
4.1	EXC. & GRADE	$51,739	100	33	$17,246	$51,739
4.2	SPREAD FOOTINGS	$68,985	100	100	$68,985	$68,985
4.3	COMP. AIR SYSTEM	$40,764	100	100	$40,764	$40,764
4.4	U/G PIPE	$108,181	50	50	$54,091	$54,091
4.5	FOUNDATIONS	$137,970	0	0	$0	$0
4.6	ELEC/INST.	$134,834	0	0	$0	$0
4.7	RAW MAT. STOR.	$197,547	0	0	$0	$0
5.0	DEMOBILIZE	$17,246	0	0	$0	$0
CONTRACT VALUE:		$1,567,837				
LIST CONTRACT AMENDMENTS						
AMENDMENT NO. 1		$8,500	100	0	$0	$8,500
AMENDMENT NO. 2		$12,800	100	0	$0	$12,800
REVISED VALUE:		$1,589,137	TOTAL EARNED:		$515,114	$646,163
			LESS 10% RETAINED		$51,511	$64,616
			SUB TOTAL:		$463,603	$581,547
			LESS PREVIOUS PAYMENTS:			$117,944
			NET AMOUNT THIS PAYMENT:			$463,603

Amos Bidlow, 08/04/96

Payreq (Rev.6/95) Page 1 of 1

FIGURE 6.1 Typical progress payment request form

Well before the scheduled completion date, Site Managers conduct pre-completion inspections with contractors to identify incomplete and remaining work items. These are placed on a punch list to be cleared before the work is accepted. Tie-ins to existing facilities must be placed on the punch list also and coordinated and scheduled with plant operations for completion before start-up.

As individual components and their ancillary devices are installed, they must be operated and tested to ensure that they conform to specifications. Such devices include all associated mechanical and electrical systems, controls, and devices for starting, controlling, recording, and sequencing start-up, shutdown, and lockout; alarms; safety features; lubrication; temperature; pressure; and the balancing of loads and production. Malfunctions experienced during testing are added to punch lists for correction before startup. Use of the punch list prevents overlooking items of uncompleted, uncorrected, and undocumented work that may cause untimely "surprises" and equipment damage during initial start-up. Whenever possible, plant operating and maintenance personnel should assist in test runs and start-up; their experience in starting, operating, and maintaining the equipment will be a valuable Owner asset during production.

After all punch list items have been identified, documented, completed or corrected, and tested, the facility is ready for start-up. Individual components that have operated as specified in tests do not always perform as expected when joined with a total system. It would be useful to have manufacturer installation or commissioning engineers perform tests and start-up, especially for larger and more complicated projects. Their experience in correcting start-up problems may save Owner start-up personnel hours of frustration and wasted effort.

On completing a successful test run of the entire facility, the final inspection is scheduled. If it confirms that the contract work is indeed complete and meets specifications and no work is outstanding, the Site Manager issues an inspection for completion and acceptance form (often combined with elements of the contractor performance evaluation form) to the Owner personnel designated. The form notes that the entire work has been inspected and operated successfully on the date shown, as certified by the owner employees listed, and was found to be complete, and recommends that a formal certificate of completion and acceptance be issued by the responsible owner group (in this case, purchasing).

At this point, depending on owner procedures, the Site Manager is ready to close the contract(s) and transfer responsibility for production start-up and warranty matters to the designated Owner plant groups. This is also the time to complete reports; arrange for final payment; and transfer site files such as correspondence, STM files, logbooks, test result records, equipment manuals, marked-up and as-built drawings, meeting minutes, field books, and receiving reports to the Owner-designated person. Owner personnel who were assigned to the Site Manager's group are transferred to their next assignment and arrangements are made to return rental equipment and tools.

CHAPTER 7

Site Management Documents

Typical documents and procedures used for site management of a privately owned, lump sum construction project are reviewed in this chapter. The work is described in the sample bid package and in Specification No. PIPE-101.3 of Appendix B, a contract awarded for an environmental construction project to reclaim and recycle waste gypsum at an existing mineral processing facility. Work elements in this contract include mobilization; layout of work; welding; storage of materials and equipment; pipeline construction; steel and concrete fabrication and erection; laying concrete foundations; pressure testing; tie-in to the existing plant; and cleanup, restoration, and demobilization.

An Invitation to Bid letter (Figure 3.4, p. 19) was sent to each of four qualified and invited bidders. All responded and submitted bids as shown in Figure 4.3 (p. 29). The difference between the high and low bids was $44,850, or some 22% of the Owner's estimate. The Owner did not expect such a wide difference in the bids and elected to ask all bidders to review their proposals for possible errors and, if necessary, submit adjusted bids. Bidders 1 and 2 did make revisions while bidders 3 and 4 advised that they were comfortable with their original proposals. Comparisons of original and adjusted bids in Figure 4.4 (p. 30) show that bidder No. 3 was now the apparent low bidder. At the bid resolution meeting, the owner determined that bidder No. 3 understood the bid documents, specifications, and requirements and was prepared to undertake the work. A Letter of Understanding (Figure 4.5, p. 32) was issued at the meeting that recorded issues discussed and their resolutions. Bidder No. 3 was issued Construction Contract No. A/BR-98-020 (Figure 4.8, p. 36).

CONSTRUCTION SCHEDULE AND PROGRESS REPORT

Site Managers require copies of all contract documents to make informed contract management decisions. Figure 7.1 shows a typical construction schedule and progress report as submitted by bidder No. 3 (the Contractor that was awarded the contract). This presentation makes it easy to see if current construction progress is on, ahead of, or behind schedule by comparing scheduled and actual progress curves weekly.

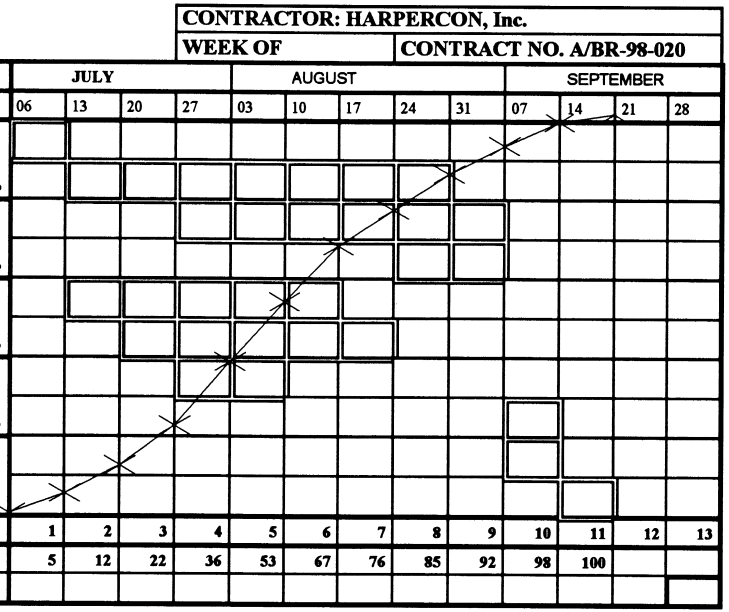
ANYCO, Inc.

CONSTRUCTION SCHEDULE

SPECIFICATION NO: PIPE-101.3
GYPSUM RECYCLE PIPING MODIFICATIONS

CONTRACTOR: HARPERCON, Inc.
WEEK OF | CONTRACT NO. A/BR-98-020

BID ITEM	WORK DESCRIPTION	BID VALUE $	% OF $ BID	% ITEM COMP.
1.3.1	MOBILIZE, SET UP, LAYOUT	$10,300	4.9	0
1.3.2	NO. 1 WASTE PIPELINE	$43,100	20.7	0
1.3.3	NO. 2 RECYCLE PIPELINE	$41,100	19.7	0
1.3.4	VALVE MANIFOLD VM-2	$13,250	6.4	0
1.3.5	CONCRETE FOUNDATIONS	$44,400	21.3	0
1.3.6	CONCRETE PIPE SLEEPERS	$31,000	14.9	0
1.3.7	STEEL PIPE SUPPORTS	$8,450	4	0
1.3.8	FLUSH, HYDROSTATIC TEST	$9,500	4.6	0
1.3.9	TIE IN TO PLANT SYSTEM	$3,400	1.6	0
1.3.10	CLEANUP, DEMOBILIZE	$4,000	1.9	0
	TOTAL	$208,500	100%	42%



SCHEDULED PROGRESS: -X-
ACTUAL PROGRESS: -0-
SCHEDULED, NO PROGRESS: N/P
COMPLETE ON SCHEDULE:
COMPLETE LATE:
REPORT PERIOD:

SUBMITTED BY: James Harper Jr.
DATE: June 22, 1998

FORM PS (Rev. 3/97)

FIGURE 7.1 Sample construction schedule and progress report

NOTICE TO PROCEED

The first written communication from the Site Manager to the Contractor occurs with issue of a Notice to Proceed letter (Figure 7.2). This letter is used to establish a reference date to start the contract and to convert calendar days to calendar dates, thus setting contractual dates or milestones to complete each scheduled work item. Site Managers should consider starting all projects with short, informal, daily communications meetings with Contractor site representatives to discuss and resolve routine problems, issues, plans, and requirements as they arise. Such discussions may prevent minor problems and misunderstandings from becoming major problems.

SITE TRANSMITTAL MEMOS

All written communications from the Owner to the Contractor should be issued by the Site Manager using STM forms. STM forms provide a simple and useful method to record, check status, manage, follow up on, and preserve all written communications between the Owner and Contractor over the life of a contract. Commercial documents such as contract amendments, certificates of completion and acceptance, and release and waiver of lien forms may be written by accounting or purchasing groups but should be transmitted by the Site Manager using an STM form. Messages should be brief and to the point, cite references that apply, and set realistic deadlines for the requested information and documents. STMs should be numbered consecutively and dated for easy reference. Figure 7.3 through 7.18 shows examples of typical STM messages used in construction contract administration. Figure 7.19 shows just one of several formats used to record and organize STMs. This particular layout makes it easy to review individual STMs for status without having to leaf through an entire file.

ROUTINE MANAGEMENT REPORTS

Site Managers issue periodic reports to Owners summarizing construction site conditions, progress, spending activity, and the contract status. Frequency of issue and kind of report will depend on Owner procedures and the type, size, and number of contracts. Monthly status reports in the form of spreadsheets similar to the STM log sheet shown in Figure 7.19 may be issued recapping the status of individual contracts. Activities reported include comparisons of scheduled and actual spending, percentage of completion, labor hours, equipment hours, and material and supply costs

Owners should require, at the minimum, a weekly contract activity report, starting with a narrative describing climatic conditions for the period reported. Weather has a great influence on contract progress and spending and site records of rainfall, temperature, humidity, barometric pressure, wind velocity, and river levels will be useful to owners contesting weather-related contractor claims. Other general information to record includes delays to the work, visitors, accidents, schedule and spending status, and any significant occurrences. Site logbooks are a good source for information to record in weekly contract activity reports.

ANYCO, INC.
16000 Scenic Highway
Zachary, Louisiana 70791

Date: June 26, 1998

NOTICE TO PROCEED WITH SITE WORK

Harpercon, Inc.
200 Muddy Bayou
Ruston, Louisiana 71273

Subject: Contract No. A/BR-98-020
Specification No. PIPE-101.3, Waste
Gypsum Recycle Piping Modifications

Attention: Mr. James Harper, Vice President, Construction

Sir:

Contract No. A/BR-98-020 for the Waste Gypsum Recycle Piping Modifications was awarded to your company at our June 26, 1998, Bid Resolution Meeting held at the Zachary, Louisiana Plant Site.

By mutual agreement and consistent with the terms of the Contract, the reference date to start the subject contract is established as July 6, 1998. You are hereby authorized to move onto the site and start work on that date.

Completion requirements for Contract completion as shown in Exhibit A of the Specification No. PIPE-101.3 as a total of 76 calendar days, are hereby changed to calendar dates as follows:

Work Item	Work Description	Calendar Days	Date to Complete
1.3.1	Mobilize, Set up, Layout	5	07/10/98
1.3.2	No. 1 Waste Gypsum Pipeline	40	08/28/98
1.3.3	No. 2 Recycle Gypsum Pipeline	30	09/04/98
1.3.4	Valve Manifold VM-2	5	09/04/98
1.3.5	Concrete Foundations	25	08/14/98
1.3.6	Concrete Pipe Sleepers	25	08/21/98
1.3.7	Steel Pipe Supports	10	08/07/98
1.3.8	Flush and Hydrostatic Test	05	09/11/98
1.3.9	Tie in to Plant System	05	09/11/98
1.3.10	Cleanup and Demobilize	05	09/18/98

FORM NTP-1 (Rev. 5/96) Page 1 of 2

FIGURE 7.2 Notice to Proceed letter

Please sign to confirm receipt of this Notice to Proceed, and that you accept the Starting Date for Site Work as July 6, 1998. Return the signed original to this office and retain the copy for your files.

Yours truly,

Norman Knitpick

Norman Knitpick, Site Manager, ANYCO, Inc.

Signed for Contractor: _____ Date: _____

Form NTP-2 (Rev. 5/96) Page 2 of 2

FIGURE 7.2 Notice to Proceed letter *(continued)*

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 1
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/06/98

The following Contract Documents are hereby transmitted for use in performing the work described in Contract A/BR-98-020. Please review on receipt as required in Article 22-d of the General Conditions to verify dimensions, measurements, and elevations and report possible errors, omissions, or conflicts as discovered to the Owner.

1. Four (4) sets of Contract Specification No. PIPE-101.3.

2. Four (4) sets of the Contract and Reference Drawings and Construction Standard Specifications listed below:

Contract and Reference Drawings
Waste Gypsum Disposal-P & ID, 03-P-101, Rev. 1*
Waste Gypsum Recycle-Piping Plan, 03-P-102, Rev. 2*
Waste Gypsum Recycle-Piping Detail, 03-P-103, Rev. 4*
General Plant Layout, 03-G-100, Rev. 6*

Construction Standard Specifications
Installation of Service Piping, AP-12, Rev. 1
Service Piping Test Procedures, APT-1, Rev. 3*
Concrete, General Construction, AC-40, Rev. 5
Grout, Non-Rotating Equipment AG-37, Rev. 1

3. One (1) reproducible of the sample Construction Schedule and Progress Report Form found in Exhibit D of Appendix B, to be submitted in accord with Articles 23 and 24 b of Exhibit B, General Conditions.

* *Items are for reference only and have not been included with the Sample Bid Package.*

Sample STM used to transmit the required Contract Documents to the Contractor before site work begins.

Signed for Contractor: _____ Signed for Owner: Norman Knitpick
Date: _____ Time: _____

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.3 Transmit contract documents

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 2
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/08/98

As discussed with your Site Superintendent on Thursday, July 9 , 1998, please make arrangements to accept custody of the following Owner-furnished material as of 0700 on Monday, July 13, 1998. Please review and become familiar with your responsibility for handling, storage, and protecting this material under Articles 22-e and 22-f of the General Conditions.

1. Pipe

Description and Size	Quantity	Location
a. Schedule 40, API 5LX-46, E.R. Welded B.E. 12.192 m (40 ft.) x 30.48 cm (12 in.)	1,219.2 m (4,000 ft.)	Pipe Storage Yard
b. Schedule 20, API 5LX-46, E.R. Welded B.E. 12.192 m (40 ft.) x 30.48 cm (12 in.)	1,219.2 m (4,000 ft.)	Pipe Storage Yard

2. Flanged Gate Valves

Quantity	Part Number	Size	Rating	Location
2 each	V-205	30.48 cm (12 in.)	1.03 MPa (150 psi)	Main Warehouse, Area C2
2 each	V-206	30.48 cm (12 in.)	1.03 MPa (150 psi)	" " "
2 each	V-105	20.32 cm (8 in.)	1.03 MPa (150 psi)	" " "
2 each	V-105	20.32 cm (8 in.)	1.03 MPa (150 psi)	" " "

3. Valve Tags

Two (2) each 7.62 cm (3 in.) numbered stainless steel valve tags with stainless steel chains for flanged gate valves V-205, V-206, V-105, and V-106 — Main Warehouse, Area C2

Wording for use when transferring custody of Owner-furnished construction material to the Contractor.

Received For Contractor	Signed for Owner
Signature:	Norman Knitpick
Date: Time:	

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.4 Transfer custody of Owner-furnished materials

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 3
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/15/98

In accord with Article 23-b of the General Conditions, two (2) copies each of the Shop Drawings submitted for Owner approval on 07/10/98 are hereby returned. Please proceed with the action shown under the Remarks column.

Shop	Drawing No.	Rev.	Status	Remarks
Key Fabricators	HC-337-20	0	Approved with no comments.	Proceed with fabrication.
Key Fabricators	HC-339-23	0	Approved as Noted.	Proceed with fabrication only in accord with the notations.
Key Fabricators	HC-340-24	0	Not Approved See notations.	Drawing fails to meet design and fabrication requirements shown on Drawing 03-P-103, Rev. 4, Waste Gypsum Recycle-Piping Detail. Refer to Construction Standard AP-12, Rev. 1, refer to notations, correct and resubmit for approval. Do not proceed with fabrication.
Fabricators-R-Us	HC- 10-02	0	Not Approved	Fabricators-R-Us is not on the ANYCO, Inc. Approved Vendor List. Please select another vendor from the list and resubmit..

Typical wording for four different situations that may be encountered on reviewing Contractor Shop Drawings submitted for Owner approval.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

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FIGURE 7.5 Return Contractor shop drawings

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 4
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/16/98

As discussed during our conversation yesterday, we have not received copies of your Daily Force Reports for July 10, 13, and 14. As required under Article 13-b of the General Conditions, submittal of these reports on a daily basis, for work done on the previous day, is a contractual obligation.

Short daily communications meetings with the contractor can be used to address and forestall or resolve problems of this type. If routine reports continue to be withheld or are late in delivery, making such requests formally and in writing as above may correct the problem.

Received For Contractor	Signed for Owner
Signature:	Norman Knitpick
Date: Time:	

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

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FIGURE 7.6 Missing routine Contractor reports

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 5
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/16/98

Attached are four (4) copies of the **ANYCO, Inc.** revised Contract Drawings listed below.

Waste Gypsum Recycle-Piping Plan 03-P-102, Revision 3
Waste Gypsum Recycle-Piping Detail 03-P-103, Revision 5

In accord with Article 16 of the General Conditions and Exhibit A, the Owner requests your proposal within five (5) working days to make the revisions to fabrication of Work Item 1.3.4, valve manifold VM-2, shown on the drawings. Contractor shall furnish all labor, material, supplies, and equipment. Please include your detailed price proposal to make the revisions, your schedule to start and complete the Work, and the net effect of the changes to the Contract completion date.

Typical wording for use when asking for proposals to make changes that fall within the Contract Scope of Work.

Occasionally circumstances arise when this type STM is used to direct and authorize the contractor to proceed with changes before the proposal can be made or a price agreed on. STM wording would then be carefully modified to reflect the situation. The scope of the work including who furnishes what labor, material, supplies, and equipment, must be clearly defined in any case so that fair prices may be developed for the changes.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

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FIGURE 7.7 Proposed changes within scope of work

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 6
Contract Number: A/BR-98-020

Contractor: HARPERCON, INC. Date: 07/20/98

Attached are four (4) copies of the **ANYCO, Inc.** revised Contract Drawing listed below.

Waste Gypsum Recycle Piping Plan 03-G-100, Revision 3
General Plant Layout 03-G-100, Rev. 6

The Owner requests your proposal and schedule to perform the following work:

1. Load, transport (using Contractor-furnished trailer), and deliver the 37,854 L (10,000 U.S. gal) bunker C fuel tank located in the Construction Warehouse Yard, by way of the Sump Road, 304.8 m (1,000 ft.) to within 4.57 m (15 ft.) of Foundation BCF-1.

2. Lift, set, and secure the tank on Foundation BCF-1 anchor bolts in accord with instructions shown on Drawing 03-G-100, Revision 3, using the Owner-furnished lifting gear. Others will level, shim, bolt down, grout, and make the piping connections. Maximum lift is 2.44 m (8 ft.) and approximate weight is 10,886 kg (24,000 lb.).

3. The work shall start and be completed between August 10, 1998, and August 14, 1998.

This activity is outside the Scope of Work covered by your Contract No. A/BR-98-020 and you are not obligated to make a proposal. If you are unable to perform this work, please advise the Owner within three (3) working days after receiving this STM. If you elect to quote on the Work and your price is acceptable, the Owner will issue a Contract Amendment to cover the price. Please verify in your proposal that if awarded this work, it will be completed in the period specified, and that it will not affect the current Contract completion date.

Typical wording for changes and extra work outside the Contract Scope of Work.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.8 Proposed changes outside scope of work

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 7
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/20/98

Your proposal dated 07/20/98 for $2,875 to modify the valve manifold VM-2 as described in STM No. 5, with no change required to the Contract completion date, is acceptable to the Owner.

You are hereby authorized to proceed with these changes. A Contract Amendment will be issued to increase the Contract lump sum amount by $2,875 as authorized by this STM.

Typical wording to acknowledge receipt of a proposed for change within the scope of work of the Contract. Wording may be altered to suit the situation. Check that all requirements of the STM requesting the proposal have been met before giving authorization to proceed. If verbal authorization to proceed is given by the Site Manager, an STM recording the facts is still necessary for the records.

Two methods are used to authorize changes. The first uses an STM to acknowledge receipt of the proposal, and a separate Change Order Form is issued to authorize the work to proceed. The second method eliminates the Change Order Form by acknowledging receipt of the proposal, accepting the charges (additions or deducts), and giving authorization for the work to proceed in the same STM, as in our example. Either method is acceptable and the one chosen will depend on the Owner's procedures and preferences.

Received For Contractor

Signature: _____
Date: _____ Time: _____

Signed for Owner

Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev(04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.9 Accept Contractor proposal for changes

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 8
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/20/98

Your proposal dated 07/20/98 for $2,875 to modify the valve manifold VM-2 as described in STM No. 5, with no change required to the Contract completion date, is unacceptable to the Owner.

Our estimates using unit prices for changes listed in Exhibit A of your proposal show a fair price for the change to be $1,450. Please review your estimate using the unit prices in Exhibit A and resubmit your proposal within five (5) work days.

Typical wording for acknowledging receipt of a proposal for changes in the scope of work of the Contract that is unacceptable. If the contractor refuses to change the price, the Owner has two choices. Owner may award the work to others, or direct the contractor to proceed on a time and material basis in accord with Article 16 D of the General Conditions. Wording may be altered to suit the situation.

Received For Contractor

Signature: _____

Date: _____ Time: _____

Signed for Owner

Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev(04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.10 Proposal for changes unacceptable

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 9
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/21/98

Reference: STM No. 3 dated 07/15/98

Shop	Drawing No.	Rev.	Status	Remarks
Key Fabricators	HC-340-24	1	Approved for fabrication.	Revisions are accepted and approved.
ABC Shop	HC-10-02	0	Approved for fabrication.	ABC Shop is on the Approved Vendor's List.

Your revised Shop Drawings referenced above and received today for approval are hereby approved for fabrication.

Typical wording to acknowledge receipt and status of resubmitted Shop Drawings, not previously approved.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knilpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.11 Return revised shop drawings

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 10
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/23/98

Reference: STM No. 5 dated 07/16/98 and STM No. 8 dated 07/20/98

1. Your revised proposal of 07/23/98 for modifications to valve manifold VM-2 remains unacceptable to the Owner. In accord with Article 16 D of the General Conditions, you are hereby directed and authorized to proceed with the fabrication changes, within three (3) days, on a time and material basis to complete the required changes prior to the date required, 08/24/98.

2. A Contract Amendment will be issued for this change on receipt of the modified valve manifold VM-2 at the work site, and Owner approval of the time and material charges for the modifications.

Typical wording to direct and authorize that changes be done on a time and material basis when the Owner and Contractor can not agree on the price. This action requires close Owner attention to insure that Contractor records for labor, materials, supplies, and equipment are accurate and submitted daily for review.

Received For Contractor

Signature: _____

Date: _____ Time: _____

Signed for Owner

Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.12 Use time and material basis for changes

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 11
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/23/98

Reference: A. Conversation between Owner's Site Manager Knitpick and Contractor Site Superintendent Smith at the 0900, 07/23/98 morning communications meeting.

B. Contract Drawing Waste Gypsum Recycle-Piping Plan 03-P-102, Rev. 3,* and Sketch No. 03-P-102-SK-1.*

The Owner confirms the verbal agreements reached at today's morning communications meeting and you are hereby authorized to proceed with the extra work as described below.

1. Install two additional Type A Foundations, Nos. RF-5 and RF-6 missing from revised drawing 03-P-102, Rev. 3. Locations and elevations are shown on attached Sketch No. 03-P-102- SK-1. The lump sum price agreed to install the two Type A foundations is $1,700 each as established in Article 5.2 c in Exhibit A of your unit price proposal. The added Work shall be completed before 07/31/98 and no time extension to the Contract shall be allowed.

2. Delete the requirement for a lean concrete, dry-bottom pour, for the VM-2 foundation shown on Sketch No. 03-P-102-SK-1. The agreed price deduction for the deleted Work is $850.

3. A Contract Amendment shall be prepared to cover the added cost of $1,700 x 2 = $3,400 for two (2) Type A foundations, and the deduct of $850 for deletion of the lean concrete dry-bottom for the VM-2 foundation for a net increase in the Contract of $2,550.

* *Not included with this Sample STM.*

Typical wording for follow-up STM to confirm verbal agreements. This example concerns an "add" for additional Contract work and a "deduct" for deleted work. Reference all related matter and record each element of such verbal agreements simply and accurately.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.13 Confirm verbal agreements for changes

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 12
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/28/98

Reference: A. Construction Standard Specification AP-12, Rev. 1.
B. General Conditions, Exhibit B, Article 22. g.
C. Recycle Pipeline No. 2 butt weld marked with red paint arrows at Station 2+40.

1. Radiographic film of the butt welds completed on 07/27/98 for the 24.38 m (80 ft.) joints of the Schedule 20 Recycle Pipeline No. 2 was made available for interpretation by the Owner's Welding Inspector on 07/28/98. One of the six welds inspected failed to meet specification requirements.

2. Visual inspection of the weld in question with your Welding Inspector shows cracks, blowholes, and slag in the final pass. The film shows that full penetration was not achieved on the first pass.

3. a. You are hereby directed to remove the faulty weld at Station 2+40 in accord to Article 22. g of Exhibit B, General Conditions, at no expense to the Owner, and with no time extensions.

b. You are hereby directed to radiograph 100% of all butt welds on the waste and recycle pipelines at no expense to the Owner until you can present a plan to be approved by the Owner to insure compliance with all welding specifications and prevent further delays to the work.

Typical wording used to direct that Contractor remove and replace non-conforming work and materials and to present a plan to correct the problem.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.14 Reject defective work

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 13
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 07/29/98

Reference: A. STM No. 12 dated 07/28/98
B. Construction Standard Specification AP-12, Rev. 1
C. General Conditions, Exhibit B, Article 22 g.

The Owner has received and accepts your written proposal to correct the welding problems apparently confined to butt welding on the schedule 20 Recycle Pipeline.

1. The butt weld in question at Station 2+40 was removed on 7/28/98 at no expense to the Owner. It was replaced, 100% radiographed, the film was reviewed, and the new weld was accepted by the Owner and Contractor Inspectors.

2. Welding requirements for Contract A/BR-98-020 and ASME Piping Code B31.3, Latest Edition, were again reviewed at a work site meeting held with the welding crews on 07/28/98.

3. Ten (10) new schedule 20 Recycle Pipeline butt welds shall be randomly selected for 100% radiographic inspection by the Owner's Welding Inspector at no cost to the Owner. The film shall be reviewed daily for conformance by the Owner and Contractor Welding Inspectors.

4. If any of the ten (10) butt welds mentioned in 3. above, are judged defective by the Owner's Welding Inspector, the procedure in 3. above will continue until the Contractor can prove to the Owner that it is in compliance with the welding requirements of the Specification.

5. Correction of defective welding shall have no affect on the Contract Completion Date.

Wording to acknowledge receipt and acceptance of a Contractors proposal to correct defects.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

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FIGURE 7.15 Accept proposal to correct defects

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 14
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 08/12/98

Reference: : A. Your claim dated 08/06/98 in accord with Article 18. b of the General Conditions requesting a five (5) day Contract time extension for delays.
B. The *Zachary Constitution* newspaper article included dated 08/06/98, and headlined "Worst Flooding in Over 100 Years Blocks Access to Parts of City."

1. The Owner hereby denies your claim for a five (5) day time extension to the Contract Completion Date of 09/18/98 due to a flood delay.

2. The Owner has determined that you do have a valid claim for a five (5) day time extension to Work Item 1.3.6, Concrete Pipe Sleepers. This was the only part of your Contract delayed by the abnormal flooding that blocked road and rail deliveries of concrete pipe sleepers to the Work Site. Your employees were able to use the 42nd Street foot bridge for access during the delay period.

3. In accord with Article 18. a of the General Conditions, and Reference Items A. and B., the Owner hereby grants a five (5) day time extension to the milestone completion date for Work Item 1.3.6, Concrete Pipe Sleepers. A Contract Amendment shall be issued to record this time extension from 08/21/98 to the new completion date of 08/28/98.

This is typical wording to acknowledge and grant a claim for a time extension due to an excused delay for abnormal weather or conditions. Owner's must evaluate each delay claim to determine the correct classification and the appropriate response. Site Transmittals for unacceptable or compensable delays require special wording and references to identify the classification, the grounds for denial or approval, and the basis for compensation, if warranted.

Owner's with Contracts having critical completion dates that could delay other work if schedules are not met, may offer extra compensation for approved excusable and compensable delays, rather than time extensions. An incentive of extra pay for overtime or the added labor, equipment, and supervision required to accelerate and complete the work on time is often attractive to the Contractor.

Received For Contractor	Signed for Owner
Signature: _____	Norman Knitpick
Date: _____ Time: _____	

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.16 Claims, delays, and time extensions

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 15
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 08/14/98

Reference: A. Your 08/14/98 Construction Schedule and Progress Report, attached.
B. Communications Meeting held 08/03/98.

As discussed in our communications meeting held at 0900 on 08/10/98, the Owners are still concerned that late starts on Work Items 1.3.5, Concrete foundations, 1.3.6, Concrete pipe Sleepers, and 1.3.7, Steel Pipe Supports were jeopardizing on time completion of Contract A/BR-98-020.

1. Your plan submitted on 08/04/98 to double up on the concrete forming and casting crews for the foundations appears to have been successful and Bid item 1.3.5 now appears to be back on schedule.

2. Your suggestion to barge the last shipment of concrete pipe sleepers at your cost, to the Anyco, Inc. River Loading Dock, in the week of 08/10/98 to bypass the flooded sections of rail and highway access, was accepted by the Owner and completed successfully on 08/12/98.

Please submit a new daily schedule for our 08/17/98 communications meeting to show the daily crew size, equipment available, and the number of concrete pipe sleepers you plan to lay each day to complete that part of the Work by 08/28/98 and complete the entire Work by 09/18/98.

3. Completion of the steel pipe supports on 08/11/98 was two (2) days late but does not appear to have any effect on the final completion date.

4. You are urged to continue to plan and take the necessary steps at once if falling behind to meet each milestone of the schedule so that the Owner's Work, plans, and commitments are not delayed.

Typical wording to advise the Contractor of the Owner's concern with lack of progress and the seriousness of falling behind and failing to meet the schedule. Wording can be revised to suit the situation.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

FIGURE 7.17 Concern with lack of progress

FIGURE 7.17 Concern with lack of progress (*continued*)

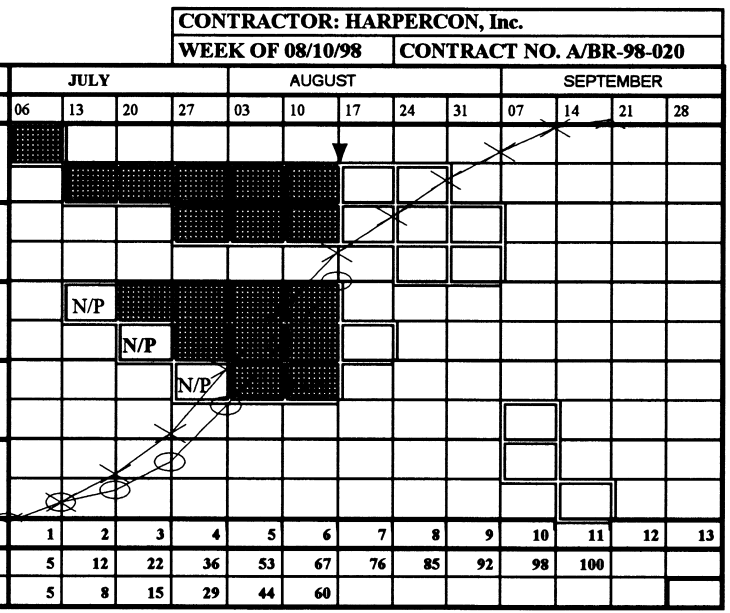
ANYCO, Inc.

CONSTRUCTION SCHEDULE AND PROGRESS REPORT

SPECIFICATION NO: PIPE-101.3
GYPSUM RECYCLE PIPING MODIFICATIONS

CONTRACTOR: HARPERCON, Inc.
WEEK OF 08/10/98 | CONTRACT NO. A/BR-98-020

BID ITEM	WORK DESCRIPTION	BID VALUE $	% OF $ BID	% ITEM COMP.
1.3.1	MOBILIZE, SET UP, LAYOUT	$10,300	4.9	100
1.3.2	NO. 1 WASTE PIPELINE	$43,100	20.7	71
1.3.3	NO. 2 RECYCLE PIPELINE	$41,100	19.7	50
1.3.4	VALVE MANIFOLD VM-2	$13,250	6.4	-0-
1.3.5	CONCRETE FOUNDATIONS	$44,400	21.3	40
1.3.6	CONCRETE PIPE SLEEPERS	$31,000	14.9	20
1.3.7	STEEL PIPE SUPPORTS	$8,450	4	33
1.3.8	FLUSH, HYDROSTATIC TEST	$9,500	4.6	-0-
1.3.9	TIE IN TO PLANT SYSTEM	$3,400	1.6	-0-
1.3.10	CLEANUP, DEMOBILIZE	$4,000	1.9	-0-
	TOTAL	$208,500	100%	42%



SCHEDULED PROGRESS: -X-
ACTUAL PROGRESS: -0-
SCHEDULED, NO PROGRESS: N/P
COMPLETE ON SCHEDULE:
COMPLETE LATE:
REPORT PERIOD:

SUBMITTED BY: James Harper Jr.
DATE: August 14, 1998

FORM PS (Rev. 3/97)

Site Transmittal Memo

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

STM Number: 16
Contract Number: A/BR-98-020

Contractor: HARPERCON, Inc. Date: 08/17/98

1. The Owner wishes to take possession of the substantially completed work, Item 1.3.2, No. 1 Waste Gypsum Pipeline and Item 1.3.3, No. 2 Recycle Gypsum Pipeline between Stations 0+00 and 1+50 at 0700 on 08/19/98 through 08/28/98 in accord with Article 26 of Exhibit B, General Conditions.

2. Inspection of the area conducted with your Site Superintendent on 08/17/98 reveals that Pipelines No. 1 and No. 2 remain to be tied into valve manifold VM-1, and that site restoration and final cleanup are not complete.

3. Possession of this area of substantially completed work by the Owner for the period of eight (8) days will allow setting of the replacement pumps, installation of the pump house electrical controls and instruments, and installation of the cathodic protection system.

4. The Owner does not anticipate any delay to your schedule from the action described. The schedule for Item 1.3.8, Flushing and Hydrostatic Testing and Item 1.3.9, Tie-in to Plant System are currently scheduled to start 09/07/98, five (5) working days after 3. above is scheduled for completion.

5. The Owner has no reason nor intention to operate any of your completed work items during this beneficial occupancy, eliminating questions of extended warranties.

Typical wording to advise the Contractor of the Owner's intention to take beneficial occupancy of a portion of a partially completed work area. To prevent claims take the following precautions. (1) Reference the Article(s) regarding the action to be taken and describe the exact location and limits of the area. (2) Make certain that the Contractor's Representative inspects the area with the Site Manager and agrees on a punch list of items for work remaining. (3) Describe the reason for taking the action and the time required to do the work. (4) Show details of the Contractor's work scheduled for the area. Avoid Contractor delays if possible. If there are delays, keep careful records so costs may be determined. (5) Be prepared to consider questions of extended warranty, if facilities installed by the Contractor are operated for extended periods of time.

Received For Contractor
Signature: _____
Date: _____ Time: _____

Signed for Owner
Norman Knitpick

Instructions: Contractor's Site Representative shall sign to acknowledge receipt. Keep Contractor Copy and return Owner Copy within one working day of receipt.

Form STM Rev. (04/95) **OWNER COPY** **Page** 1 **of** 1

FIGURE 7.18 Beneficial occupancy

Site Transmittal Memo Log

ANYCO Co., Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

Contract No. A/BR-98-020
Contractor: Harpercon, Inc.
Date: 08/21/98

STM	Date	Subject	Reference	Amendment Required	Amendment Amount	Follow-up Required	Follow-up Status
1.	07/06/98	Transmit Contract Documents	no	no	-0-	no	Complete
2.	07/08/98	Transfer Custody of Materials	no	no	-0-	no	Complete
3.	07/15/98	Return Shop Drawings	no	no	-0-	no	Complete
4.	07/16/98	Missing Routine Reports	no	no	-0-	no	Complete
5.	07/16/98	Change within Scope of Work	no	no	-0-	no	Complete
6.	07/20/98	Change Outside Scope of Work	no	no	-0-	yes	In Progress
7.	07/20/98	Accept Proposal for Change	STM 5	yes	$2,875	no	Amendment No. 1
8.	07/20/98	Unacceptable Proposal for Change	STM 5	no	-0-	yes	Await Answer
9.	07/21/98	Return Revised Shop Drawings	STM 3	no	-0-	no	Complete
10.	07/23/98	Time and Material Pricing for Changes	STM 5	no	-0-	yes	In Progress
11.	07/23/98	Confirm Verbal Agreements	no	yes	$2,550	no	Amendment No. 1
12.	07/28/98	Reject, Replace Defective Work	no	no	-0-	no	Complete
13.	07/29/98	Accept Proposal to Correct Defects	STM 12	no	-0-	no	Complete
14.	08/12/98	Claims, Delays, and Time Extensions	Claim No. 1	yes	Five (5) Days	yes	Wait on Amend. 2
15.	08/14/98	Concern with Lack of Progress	Comm. Meet	no	-0-	yes	In Progress
16.	08/17/98	Beneficial Occupancy	no	no	-0-	yes	In Progress

Large construction projects may use several hundred STMs. Basic log sheets, such as this example, help organize and insure if, when, and how each STM has been resolved. For example, STMs No. 6, 8,10, 15, and 16 require follow-up for resolution. More detail may be added to meet individual needs.

Form STMLog (Rev. 11/97)

Page 1 of 1

FIGURE 7.19 Sample site transmittal memo log sheet

CONSTRUCTION CONTRACT AMENDMENTS

Site Managers review site transmittal memo logs periodically for changes they have authorized in the scope of work, the price, or the time to complete for each construction contract. A requisition, with the required approvals, is issued as required to the appropriate group, in this case, purchasing, requesting a contract amendment for changes authorized by the STMs listed. Amendments are issued directly to the contractor in a form similar to that shown in Figure 7.20. Copies are issued to the Site Manager and others according to procedures. Amendments must be numbered consecutively, reference the subject contract and number and the period covered, and correspond with all changes authorized by the STMs listed in the requisition.

PROGRESS PAYMENT AUTHORIZATION

Owners should review their progress payment procedures and requirements with Contractors at each bid resolution meeting. It is important that Owner and Contractor managers meet beforehand and determine the percentage of work completed, value of materials delivered to the work site, and markups to determine a fair amount to submit in the payment request or invoice for the pay period reviewed. Article 23 of Exhibit B in Appendix B illustrates typical payment procedures. Figure 7.21 shows a typical form for initiating progress payment authorizations.

FINAL INSPECTION, TEST RUN, AND ACCEPTANCE

Contractors must give Owners written notification of when they expect to complete their contract and set a firm date for the final inspection and test run. Site Managers then notify their plant contact to alert the inspection team. Members are selected by plant operations and typically include representatives from operations, safety, environmental services, maintenance, engineering, and construction. When specified operating and load requirements are met and any punch list items have been corrected, team members sign off on a form similar to Figure 7.22, recommending that a certificate of completion and acceptance be issued to the Contractor by the purchasing group. The Site Manager starts closing out the contract and takes steps to turn the facility over to the plant operating group.

RELEASE AND WAIVER OF LIEN

Owners protect themselves from liens or claims by requiring sworn, notarized statements from each Contractor that all labor, materials, and services used have been paid in full before making the final payment. Such Contractor statements release and agree to indemnify Owners from liens, claims, and liability arising from a Contractor's work on a project. Release and waiver of lien forms (see Figure 7.23) are initiated by purchasing or accounting, with a signed copy sent to the Site Manager to complete the contract files.

Contract Amendment

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

Contract Amendment No.: 1
Contract No. A/BR-98-020
Contractor: HARPERCON, Inc.

Reference: Contract Number A/BR-98-020 dated 06/26/96 between ANYCO, Inc. hereinafter "Owner" and HARPERCON, Inc. , 200 Muddy Bayou, Ruston, Louisiana 71273, hereinafter "Contractor." Effective this date 07/31/98, the referenced Contract is hereby amended as follows:

1. Site Transmittal Memos issued to change the Contract price.

A. STM No. 7, Dated 07/20/98	
Modify fabrication of Valve Manifold VM-2.	Add $ 2,875
B. STM No. 11 Dated 07/23/98	
Add two (2) Type A Concrete Foundation omitted from Contract Drawing, Waste Gypsum Recycle Piping Plan 03-P-102, Rev. 3.	Add $ 3,400
C. Delete lean concrete dry-bottom pour from VM-2 Foundation.	Deduct $ 850
	Net Add $ 5,425

2. Amended Contract Value:

Original Contract Value	$ 208,500
Increase by Amendment No. 1	$5,425
Amended Contract Value	$ 213,925

3. The following STMs issued are hereby incorporated into this amendment with no change in the Contract price and with no time extensions, STMs No. 1, 2, 3, 4, 5, 9, 12, and 13.

Owner and Contractor agree that prices and time extensions recorded in Contract Amendment No. 1 shall cover the full compensation and time extensions, if warranted, for added, deleted or delayed Work as recorded in STMs No. 1 through No. 13.

Contractor HARPERCON, Inc. Owner ANYCO, Inc.

Accepted: *James Harper* By: *Buyem Lowe*

Title: *Vice-President, Const.* Date: *08/03/98* Title: *Purchasing Manager* Date: 07/31/98

Typical format and wording for a Contract Amendment issued by Purchasing or Accounting on the Site Manager's recommendation.. The status of all STMs must be listed including those that do not add or delete Contract work or require time extensions. Prices that result from changes for work removed from Contracts are referred to as "deducts" and prices for additional work are referred to as "adds." When the Contract Amendment is reviewed with the Site Transmittal Memo Log ,it becomes apparent that STMs No. 6, 8, 10, 14, 15, and 16 still need to be resolved.

Form Amend (Rev. 09/97) Page 1 of 1

FIGURE 7.20 Construction contract amendment form

Progress Payment Request No. 1

To: ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791

From: HARPERCON, Inc.
222 Twenty Second St.
Baker, Louisiana 7079

Contract No. A/BR-98-020
Contract Date: June 26, 1998

Pay Period: 06/06/98 - 06/31/98

WORK ITEM	DESCRIPTION	PAY VALUE	% COMPLETE		MONEY EARNED	
			% TO DATE	% PERIOD	THIS PERIOD	$ TO DATE
1.3.1	Mobilize, Setup, Layout	$10,300	100	100	$10,300	$10,300
1.3.2	No. 1 Waste Pipeline	$43,100	43	43	$18,471	$18,471
1.3.3	No. 2 Recycle Pipeline	$41,100	17	17	$6,850	$6,850
1.3.4	Valve Manifold VM-2	$13,250	-0-	-0-	-0-	-0-
1.3.5	Concrete Foundations	$44,400	40	40	$17,760	$17,760
1.3.6	Concrete Pipe Sleepers	$31,000	20	20	$6,200	$6,200
1.3.7	Steel Pipe Supports	$8,450	-0-	-0-	-0-	-0-
1.3.8	Flush, Hydro. Test	$9,500	-0-	-0-	-0-	-0-
1.3.9.	Tie in to Plant System	$3,400	-0-	-0-	-0-	-0-
1.3.10	Cleanup, Demobilize	$4,000	-0-	-0-	-0-	-0-
CONTRACT VALUE:		$208,500				
AMENDMENT NO. 1 (07/31/98)		$5,425	100	100	$4,575	$4,575
REVISED CONTRACT VALUE:		$213,925	TOTAL EARNED:		$64,156	$64,156
			LESS 10% RETAINED		$6,416	$6,416
			SUB TOTAL:		$57,740	$57,740
			LESS PREVIOUS PAYMENTS:		-0-	-0-
			NET AMOUNT THIS PAYMENT:			$57,740

CONTRACTOR'S INVOICE ATTACHED

Submitted: *Sam Hill* 07/04/98
Field Manager
HARPERCON, Inc.

Typical layout of a Progress Payment Request Form prepared by the contractor for approval, and forwarding for payment, by the Site Manager.

Payreq (Rev.6/95) Page 1 of 1

FIGURE 7.21 Contract progress payment request form

ANYCO, Inc.

INSPECTION for COMPLETION and ACCEPTANCE

Contract No. A/BR-98-020, Contractor: HARPERCON, Inc.
Specification No. PIPE 101.3 Owner's Site Manager: Norman Knitpick
Contract Date: 06/26/98 Required Completion: 09/18/98 Actual Completion: 09/18/98
Initial Cost: $208,500 Final Cost: $213,925

FINAL INSPECTION for COMPLETION

The Acceptance Test Run was scheduled and completed on 08/18/98. All Punch List Items were noted as complete and the following Inspection Team Members have signified their recommendation that a Certificate of Completion and Acceptance be issued to the Contractor by signing below:

Operations	Safety	Maintenance	Engineering	Environmental	Construction
T. h. Johns	*B. E. Careful*	*W. E. Fixem*	*D. E Signer*	*P. L. Antatree*	*I. M. Abuilder*
T. H. Johns	B. E. careful	W. E Fixem	D. E. Signer	P. L. Antatree	I. M. Abuilder

CONTRACTOR PERFORMANCE RATING

(Rate Overall Project Performance (O-5) 0=Unsatisfactory, 3=Average, 5=Excellent)

1. Safety & Health	5	5. Commercial Performance	5
2. Work Quality	5	6. Technical Performance	4
3. Schedule	4	7. Home Office Support	5
4. Housekeeping	4	Overall Rating:	4.65

Comments: Contractor Performance was well above average. Got off to a slow start but managed to regain the schedule and complete the project on time. Had one unacceptable butt weld at start of work on the Schedule 20, Recycle Pipeline No. 2. , reviewed procedures and had no more faulty welds. We were impressed with their safety program and results.

Typical Inspection for Completion and Acceptance Form. Revise to include individual needs.

Do you recommend that this Contractor be kept as a Qualified Bidder? YES X NO

Prepared By: *Norman Knitpick* 09/18/98

Form NICP (Rev. 10/95) Page 1 of 1

FIGURE 7.22 Inspection for completion and acceptance form

ANYCO, Inc.

RELEASE, WAIVER of LIEN and INDEMNITY

(Form Must be Notarized)

Upon full and final payment by **ANYCO, Inc.** (Owner) of Two Hundred Thirteen Thousand, Nine Hundred and Twenty-Five dollars, ($213,925), and in accord with the Conditions of Construction Contract No. A/BR-98-020, Waste Gypsum Recycle Piping Modifications , dated 06/26/98, as amended, between Owner and HARPERCON, Inc., (Contractor), the undersigned acknowledges and hereby releases, indemnifies, and holds harmless, **ANYCO, Inc.**, its agents, employees, officers, successors, and assigns from any and all liens, claims, demands, and liabilities, of any nature, arising or incurring from, or in connection with the Contractor's performance in fulfilling this Contract.

By James Harper
Vice President, Construction

Witness: Rose O'Day
Secretary

State of Louisiana
County or Parish of East Baton Rouge

James Harper, ,being duly sworn, deposes and says: I am the Vice-President of Construction of HARPERCON, Inc. HARPERCON, Inc. has completed construction of **ANYCO, Inc.** Contract Number: A/BR-98-020, Waste Gypsum Recycle Piping Modifications and the said Contractor HARPERCON, Inc. hereby warrants and represents that persons and entities furnishing labor, material, supplies, equipment rental, and services to complete the said Contract, as amended, have been paid in full. Contractor on its own behalf and on behalf of its Subcontractors hereby waives all liens and relinquishes all rights, known or unknown, to file or claim liens which they may now or hereafter have against the Owner or Owner's property, arising directly or indirectly under the said Contract as amended.

James Harper

On this 21st day of September, 1998 personally appeared before me James Harper, known by me to be the person named as the affiant in the above affidavit, who did subscribe and swear in my presence that all of the statements set forth in the above affidavit are true and correct.

My commission expires the 20th day of May 1999

Steve Stephens
Notary Public

(SEAL)

Typical format and contents of a Release and Waiver of Lien Form. If the contractor used subcontractors, they too must submit, through the contractor, similar notarized affidavits. Release, Waiver of Lien and Indemnity Forms must be Notarized.

FORM RelWav (Rev. 04/98) Page 1 of 1

FIGURE 7.23 Release, waiver of lien, and indemnity form

PART 3

Case Studies and Information Systems

CHAPTER 8

Case Studies

The following case studies are composites constructed from personal experiences, media accounts, and press releases.

CASE 1. DEFECTIVE WORK

Company A operates a calcining facility in a Southwestern state. A construction contract for plant expansion was awarded in late 1996 to erect five (5) new concrete foundations: CF-1, crusher base; KF-1, 2, and 3, kiln trunion bases; and FF-1, fuel storage tank base. Construction standards for foundations required that test specimens broken in the laboratory reach 70% of design strength after seven (7) days; those tested after twenty-eight (28) days were required to meet the designed ultimate compressive strength of 20.68 MPa (3,000 psi).

Owner, Contractor, and supplier records showed nothing unusual regarding the material when received, poured, consolidated, or cured. Inspectors' field books recorded that slump tests and test specimens were prepared in accord with the Owner's construction standards for concrete. Ready-mix came from one supplier and was placed over two consecutive days. FF-1 was placed last. The average strength for each foundation, determined by breaking their individual test specimens in the laboratory, was reported as follows.

Foundation	Seven-Day Results	Twenty-eight-Day Results
CF-1	14.82 MPa (2,150 psi)	20.75 Mpa (3,010 psi)
KF-1	14.56 Mpa (2,112 psi)	20.79 Mpa (3,015 psi)
KF-2	14.52 Mpa (2,106 psi)	20.81 Mpa (3,018 psi)
KF-3	14.54 Mpa (2,109 psi)	20.77 Mpa (3,012 psi)
FF-1	14.48 Mpa (2,100 psi)	15.24 Mpa (2,210 psi)

The seven-day break results for foundation FF-1 averaged 70% of design strength as specified: 20.68 MPa (3,000 psi)/14.50 MPa (2,100 psi) = 70%. However, the 28-day break of test specimens for FF-1 averaged only 73.7% of the 20.68 MPa (3,000 psi) ultimate compressive strength specified. New test specimens drilled from FF-1 were tested by a different laboratory. Results confirmed those reported by the first laboratory. The Owner collected and evaluated all the information available on erecting foundation FF-1.

Considerations

1. Contract documents clearly allow the Owner to direct the Contractor to remove and replace defective work at the Contractor's cost.
2. This Contractor and all others associated with the project were on schedule. Replacing the faulty foundation by using Type 1 portland cement, as specified, would delay project start-up by about four weeks.
3. Engineering reported that design and installation of a temporary fuel storage system would take at least three additional weeks.
4. Engineering also reported that all five foundations were designed for rotating loads with a safety factor of 1.25%. New calculations for non-rotating loads, such as fuel tanks, showed that the strength of foundation FF-1 would be barely adequate when the tank was filled (each three to four days).
5. The Owner could invoke Article 22 g. of the General Conditions and direct the contractor to replace the defective foundation as specified. This option could delay the project start-up four (4) or more weeks.
6. The Owner could invoke Article 22 g. of the General Conditions and negotiate with the Contractor to replace the defective foundation to a new design, using Type 3 (high early strength) cement and overtime. This option could add to the Owner's costs and still delay the project.
7. The Owner could negotiate with the Contractor to accept the foundation "as is," with provisions to provide an alternative fuel source at the first signs of foundation failure.
8. The owner's Project Manager and Site Manager met with Contractor representatives to discuss the options available in an attempt to resolve the problem quickly to prevent further delay.
9. The Contractor had reviewed his information and began negotiations with a proposal to extend the warranty period by an additional year if the Owner would accept the foundation "as is."
10. A counterproposal was made by the Owner to accept the added guarantee with provisions. At the first sign of failure (cracking or spalling) in the two-year period, the Contractor would install a temporary fuel storage system for use while either reinforcing or demolishing and rebuilding foundation FF-1, at the Owner's option, to the original design and at the Contractor's expense.
11. The Contractor accepted the Owner's counterproposal.

Discussion

There is often no alternative to removing and replacing defective workmanship or material, regardless of other considerations. If such is the case, get the facts, review the related contract documents, select the most practical option to solve the problem (considering safety, cost, time, and owner commitments), and proceed. By gathering and evaluating all the facts before making decisions and by negotiating in good faith, both parties are often able to define and reach their objective while resolving the contract problem.

In this case, the Project Manager and Site Manager were satisfied that they had made the correct decision based on the facts available. The Contractor was able to collect the final payment and retainage, leave a satisfied customer, and move on to new work. The Owner could still meet the project start-up date with production capacity protected by a

temporary fuel storage system, installed at the Contractor's cost, if foundation FF-1 showed signs of failure within two years.

Note: Two years after the incident, foundation FF-1 remained free of cracks and spalling. No reason was ever found to account for the low strength of the 28-day test specimens. The Contractor who built the foundations is still on the Owner's approved bid list.

CASE 2. CHANGES, DELAYS, AND TIME EXTENSIONS

Company B operates refineries in Western states. In 1993 they awarded a $100 million, lump sum, competitively bid construction contract for an expansion, designed by an outside firm. The Notice to Proceed letter was issued to the Contractor in July 1993, with work scheduled to start November 1, 1993, and to be completed 24 months later on October 31, 1995. The work site was not ready as required in the contract documents and interference by the Owner and other contractors delayed full mobilization by 60 days. Progress was delayed even more during the first two months of work by the issuance of over 100 change orders covering drawing changes and revisions. The Contractor filed a claim for a time extension and compensation to cover costs for the current changes, rescheduling, and delays. The claim was settled after the Owner (1) granted a 90-day time extension; (2) added $2.4 million to the lump sum contract price for changes and delays; and (3) stated that because final design was now complete, the Contractor could expect a minimum number of design changes and revisions for the balance of the work.

The unexpected number of changes and revisions continued. By the time the Contractor managed to complete the contract, it had received more than 1,000 new drawings, some 10,000 drawing revisions, more than 30,000 change orders, and around 3,000 changes in electrical and mechanical bills of material. The changes and revisions were not released in any organized sequence, making it difficult to estimate, plan, reschedule, and complete the work in an orderly and cost-effective manner. On completing the contract, the Contractor filed a claim for added costs due to the unanticipated number of changes and the timing of their release. The Owner refused to honor that claim and the Contractor filed suit for $40 million in damages. The jury agreed that the Owner had violated the terms of the contract by taking control of the work from the Contractor and awarded $30 million in damages. The Owner objected and appealed the verdict.

Considerations

1. It is rare for any type of construction contract to be completed with no changes. It is also rare for a lump sum type construction contract, of any size, to require the number of changes made in this case.
2. The Owner may have had good reason at the time to award a lump sum type construction contract based on faulty or incomplete design.
3. The first claim should have alerted the Owner that design problems still existed. The statement should have been verified before telling the Contractor that final design was complete and the number of design changes and revisions would be minimal for the rest of the work.
4. Documents did allow for suspension or termination of the contract but contained no alternate dispute resolution (ADR) clause.

Discussion

This case is a good example of what can happen when lump sum contracts are awarded before final design is complete. It is difficult to understand how an experienced Owner could allow a contract to be awarded based on an incomplete scope of work, specification, design criteria, and drawings. The number of changes early in the work should have alerted the Owner that uncorrected design problems would lead to added claims and disputes if not resolved. Only the Owner can say if the added costs were worth the risks taken in awarding this contract.

Those facing similar situations should consider the following points.

1. Owners who keep contract changes and revisions to a minimum have the best chance to avoid added costs, claims, and disputes.
2. The Owner could have terminated this contract for convenience and negotiated it as a cost plus type. Final costs may have been the same but it would have averted the cost, time, and bother of a law suit.
3. Juries in civil lawsuits are often swayed by emotion rather than facts. Owners and Contractors find that mediators with construction backgrounds make unbiased and better decisions than juries for construction contract disputes. Both parties should require ADR clauses in their contract documents.

CASE 3. SUSPENSION OF WORK

Company C operates a petrochemical plant in a Gulf Coast state. For some 15 years sludge from its process waste stream had been disposed of in a public landfill as nonhazardous waste. Despite the Owner's request for further study and variances, the U.S. Environmental Protection Agency (USEPA) issued a mandate in early 1997 that by September 30, 1998, the sludge would require additional treatment and neutralization before disposal.

The Owner agreed to construct a dewatering and neutralizing facility for the waste stream. The design called for piping, pumps, two 10-acre dewatering beds, and a leachate and solids neutralization and recovery system. Final design was completed in early August 1997 and a $2.8 million, lump sum contract was issued to a general contractor to start the work on September 1, 1997, and complete it before June 1, 1998.

The Contractor mobilized, moved in, and proceeded with site preparation, earthwork, foundations, and pipe fabrication. The top 3 ft. of each bed were to be excavated and used to build a 6-ft. high berm around the outer edge. Imported clay was to be spread and compacted to the original ground elevation in the excavated areas. Sand lenses running across the beds were uncovered during the excavation. Additional soils testing showed that they extended well beyond the outer edges of the proposed berms between depths of 3.0 to 3.7 m (10 to 12 ft.).

The Owner faced a major problem. It the clay liner failed, the contaminated leachate could migrate outside the work area, requiring an expensive remediation program as well as resulting in bad publicity. Soils consultants recommended that the safest way to ensure that untreated leachate could not migrate out of the dewatering and treatment bed area, should the clay liner fail, was to install a bentonite-cement slurry wall around each dewatering bed into the top of a dense Pleistocene clay formation located 6.1 to 7.3 m (20 to 24 ft.) below the surface.

Considerations

1. There was no alternate location for the dewatering beds.
2. Slurry wall contractors were contacted for prices and schedules. All agreed one backhoe and crew could complete the work in two months.
3. EPA was contacted with the facts and agreed that the slurry wall was the best solution under the circumstances. They agreed to extend the September 30, 1998, compliance date by two months.
4. Bids were accepted and a slurry wall contractor was selected, based on a set price and their agreement to put two crews and backhoes on the job to complete the work in one month rather than two.
5. The Contractor was kept informed as the situation developed because the bulk of its work was centered on the two dewatering and neutralization beds. Because both slurry walls were to be constructed at the same time, it was agreed to suspend work on the earthwork portion of the contract for one month. Pipe fabrication and all other activities outside the excavation, berm, and compacted clay liner could proceed as long as they did not interfere with the slurry wall construction.
6. A formal notice of partial contract suspension for earthwork was hand-delivered to the Contractor's Site Manager as an STM, in accord with the General Conditions, Article 20, pertaining to Suspension of Work. A time extension of 30 days was granted at the same time. After the slurry wall contract took longer to complete than expected, the Contractor filed a claim against the Owner for the direct costs, equipment standby charges, and an additional seven-day time extension, all resulting from the slurry wall construction delay. A second claim was filed for lost profit on the equipment, which would have earned more had it been on rental rather than on standby.

Discussion

Costs for thorough subsurface investigations in construction areas are easily justified. In this case there was no alternate site for the beds, so the slurry wall would have been required in any event. Completing the slurry wall before the general contractor started work would have saved extra costs and rescheduling associated with the suspension.

The Contractor's claim for direct costs and equipment standby charges for time spent waiting to resume work and the seven-day time extension were judged valid and approved. A claim for lost profit during the delay period was refused because the General Conditions Article on Suspensions clearly stated that no claim shall be paid for damages or profits lost as a result of a work suspension.

CASE 4. CONTRACT TERMINATION FOR CAUSE

Company D awarded a tunnel contract for over $150 million to a joint venture formed by several qualified tunneling contractors (Contractor). By July 1995 the Contractor had completed approximately 85% of two tunnels, each 6.1 m (20 ft.) in diameter by 9.7 km (6 miles) long. A large sinkhole developed under a major city street while the contractor was removing part of one tunnel's lining segments to correct minor misalignment of a 24.4-m (80-ft.) section of one completed tunnel. A water main near the surface broke, either before or after the sinkhole developed, worsening the situation and filling a portion of the

tunnel with water and debris. There were no injuries or fatalities. The Owner declared that the Contractor was in default following the incident and terminated the contract for cause. A new contract was awarded to others for clean up and tunnel completion.

Considerations

1. Contract documents provided for a dispute resolution board to resolve Owner/Contractor disputes. Dispute resolution boards are usually made up of one member selected by the Owner, one member selected by the Contractor, and one member selected by both parties. Groups such as the American Arbitration Association provide lists of people qualified in construction and dispute resolution who are willing to serve.
2. The Contractor asked the dispute resolution board to meet and make a judgment on the termination. The Owner refused to attend or present evidence, stating that the board had no power to rule on contract disputes concerning terminations for cause or default.
3. After reviewing the facts, the three board members agreed that the Owner had breached the contract and had not acted in good faith by (1) failing to give the Contractor five days' notice, as required in the contract, before finding it to be in default; (2) not citing the specific problems associated with the alleged default; and (3) not giving the Contractor an opportunity to correct the problems. They concluded that the Owner had no valid reason to terminate the contract for cause.
4. The Owner refused to accept the board's findings and in August 1995 the Contractor filed a lawsuit asking the court to confirm the conclusions of the dispute resolution board and to award them more than $100 million for wrongful contract termination. The Owner countersued for an amount to cover the costs of delays, liquidated damages, cleanup of the inflow of water and debris, and to complete the tunnel construction.
5. The lawsuits continued for several years, with each party bringing in "experts" trying to justify its position. In early 1999 a settlement was announced by the Owner and the Contractor in which (1) both parties agreed to waive all claims against the other; (2) the Owner agreed to release unpaid progress payments and retention, plus other money totaling some $160 million, to the Contractor; and (3) the Owner agreed to change the contract termination classification from termination for cause to termination for convenience.

Discussion

Owners and contractors are expected to meet their contractual and implied obligations. It is not clear in this case if the dispute resolution board guidelines required them to resolve all contract disputes, or if certain disputes were omitted. Acting on the Contractor's claim and making recommendations to resolve the matter does indicate that the board was of the opinion that they were to resolve all disputes.

If the Owner had followed contract requirements and given the five-day notice before acting, cited specific problems associated with the alleged default, and given the Contractor an opportunity to correct the problems, they would have had a better case in negotiating a solution to the problem and may have avoided a lengthy lawsuit.

By finally negotiating in good faith to solve the problem and by settling the case, the Owner estimated that it would save some $3 million per year in legal costs, and the Contractor could erase a blemish on its work record of having a contract terminated for cause.

CHAPTER 9

Information Systems

Access to current project information is one of the keys to completing construction contracts safely, on time, and within budgets. Traditional paper-based systems of record keeping force managers to spend a large part of their time chasing and shuffling the paper required to record and distribute project and site information. Single-entry, integrated systems now available can scan, enter, and combine data from estimates, budgets, schedules, purchasing, accounting, engineering, and construction site activities. That information is stored in a data exchange, sorted, referenced, manipulated, analyzed, updated, transmitted, or displayed on a computer screen or printed out in user-defined presentations.

BACKGROUND

Electronic Numerical Integrator and Calculator (ENIAC), the first all-electronic digital computer, was assembled at the University of Pennsylvania in 1946.* The design used 19,000 vacuum tubes and 130 KW of power and required about 1 million hand-soldered connections, operating in 15,000 square feet of air-conditioned floor space. It weighed about 60,000 pounds and could perform 5,000 additions and 360 to 500 multiplications per second. Operating time was restricted by the need to rewire for each new set of computations. The first major improvement in this system increased operating time markedly when new designs replaced the need to rewire for changes and provided internal storage for computing instructions. United States government agencies used ENIAC for nuclear weapons design and for integrating ballistic equations. When the technology became available for civilian use, corporations recognized the cost savings potential for repetitive clerical tasks and started using improved models for payroll, accounts payable, and accounts receivable activities.

Improvements in computer design and performance have increased at an exponential rate since the introduction of ENIAC. Today's personal computers (PCs) easily fit on a desktop, a lap, or in the hand. They can weigh from a few ounces for palm-size units to 40 or 50 pounds for desktop units. Some contain dozens of integrated circuits, each more powerful than the entire ENIAC unit. Processing or clock speed and power requirements are compared below for ENIAC and a currently available desktop PC equipped with a 500-MHz central processing unit (CPU).

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* *Encyclopedia of Computer Science,* 3d ed., edited by Anthony Ralston and Edwin D. Reilly (New York: Van Nostrand Reinhold, 1993).

ENIAC	Modern Desktop PC
Clock speed 100 Khz (100,000 cycles per second)	Clock speed 550 Mhz (500,000,000 cycles per second)
Power required 130 KW (130,000 watts)	Power required .03 to .04 KW (30 to 40 watts)

Computer program and software development has kept pace with the explosive rate of improvements in computer hardware design and performance. A whole array of general business software for word processing, database, and spreadsheet applications is available for all industries and professions. Specialized software applications have also been developed for the construction industry, and in particular, the project management activities of design, estimating, planning and scheduling, and contract administration and control.

DESIGN

Computer-aided design (CAD), computer-aided design and drafting (CADD), and computer-aided manufacturing (CAM) applications are just one segment of the fast-growing computer software industry. Development of computer-aided design software was made possible only after the introduction of SKETCHPAD and the General Motors DAC-1 system between the years 1946 and 1964.* Computer-aided software is graphics and calculation intensive. Best results require computers with fast CPU or clock speeds, high-resolution graphics, large amounts of random access memory (RAM), and high-capacity data storage and memory units.

Three-dimensional (3-D) CAD/CAM software is in wide use today for designing and testing new products, facilities, and components and for simulating a variety of events. Earthquake research in California and Japan has spawned a whole new approach to structural, bridge, and freeway design and related codes. Simulated earthquake stresses can now be applied to new designs; existing structures; and individual beams, columns, or connectors to show if individual components meet current seismic requirements. Other programs can measure and display the effects of placing seismic dampening devices in various locations of a structure.

The Boeing Company started several pilot programs in the mid-1980s to design and assemble airplane parts digitally, as 3-D solids. The objective was to reduce changes, errors, and rework due to interference, overlapping, and mismatch of parts during assembly (a major problem in airplane production). The three key participants in the study were Boeing, Dassault Systemes of France, and IBM. The study was based on a computer-aided, 3-D interactive application system (CATIA)™, developed by Dassault and marketed in the United States by IBM. After Boeing enhancements for data management, user productivity, and visualization were added, the group confirmed that airplane parts and components could be designed, assembled, and fitted on computer screens and that cases of mismatch and overlapping could be reduced by more than the goal of 50%.†

* Stuart W. Hubbard, *CAD/CAM Applications for Business* (Phoenix: Oryx Press, 1985), 3, 4.

† Boeing press release, August 11, 1997.

In 1990 this application was successfully used to design and construct the Boeing 777 twinjet. Sophisticated computers, using CATIA™ and other software, were linked with eight IBM mainframe computers and 238 design/build teams. Millions of parts and components were designed, assembled, and fitted digitally on computer screens. Interference and fit mismatch problems were identified and corrected on the screen before fabrication. Boeing officials stated that the cost of their pilot program would be more than paid for by the improvment in quality of airplane designs and the reduction in the cycle time required to introduce new airplanes into the marketplace.

CONSTRUCTION APPLICATIONS

One of the first construction companies to recognize the potential for using computers in tasks for other than accounting and design was the H.B. Zachry Company of San Antonio, Texas. In 1959 they began experiments with critical path method (CPM) planning and scheduling for construction projects. By 1962, they had developed a system using "precedence" or "sequence" methods similar to those used in the Program Evaluation Review Technique (PERT). A joint venture was formed with IBM to develop and implement a system around their method. The completed product, "Project Control System," provided organizations with improved methods to plan, schedule, and control project work using scientific management applications such as PERT, linear programming, queuing theory, and Monte Carlo simulation.*

MANAGEMENT SYSTEMS

Construction site managers have the responsibility to organize, coordinate, and direct the finances, labor, materials, and equipment necessary to deliver a specified contract or project. They follow defined plans for costs, quality, action, and schedules. The complaint that they spend too much time on paperwork has been addressed through advances in computer hardware and software, electronics, and communications. New integrated information systems can now store and transmit site data to users by e-mail, webs, and networks.

Modern Systems for Document Organization

It is now possible to electronically access, display, and manipulate all the interrelated project and contract data from multiple sites by using hardware and software that incorporates the latest web and network technology. Information management systems, using one-time data entry, can store, integrate, swap, manipulate, and retrieve data from across all the associated financial, business, engineering, and construction site activities. Some systems can integrate older, single-purpose construction management software used for estimating, quantity take off, finance, accounting, purchasing, or site activities. Most new systems may be learned rapidly because they are Microsoft Windows™ 95, 98, or NT based and use familiar protocols and layout.

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* Letter from Stan Schaefer, Research Manager, H.B. Zachry Company, September 3, 1997.

Selecting a System

New information systems can accept, retrieve, manage, share, track, manipulate, display, and print huge masses of crucial project information. They are based on a centrally located, relational database connected to users over webs and networks. Searches are conducted using structured query language (SQL) to match data across rows and columns of relational database records and fields. Matches are stored in a new table that holds the requested data in customized, user-defined fields, for transmittal, display, or printing. Those purchasing a system should consider adding security measures and passwords that can restrict system access to authorized users.

Features. Project and construction managers can now automatically generate routine and special site reports based on current rather than historical site-related information. This feature alone provides more time for site management. Users at isolated sites are able to enter and retrieve database information instantly, using earth-orbiting satellite wireless telephones. Site managers will have tools to track, spot trends, avert potential surprises, and make forecasts and inquiries concerning changes, delays, costs, labor, progress, schedules, quality, safety, and claims.

Automated report writing is just one improvement that information systems can provide to project and construction managers. Advances in hardware, software, and communications technology have added other useful and time-saving features. Digital cameras can be used to take and publish photographs for progress reports and claims backup, switching between metric and Imperial units of measurement in stored data can be done instantly and easily, and digitizers and scanners are available for quantity take off with direct entry into the database. Costs for overhead, payments, labor, payroll burden, retainage, purchases, and equipment billing can be calculated, matched, stored, reported, and distributed to the correct accounts.

Handheld and notebook computers can store and display project-related reference information such as contracts, codes, schedules, standards, drawings, specifications, and punch lists. Foremen, superintendents, and managers find this useful during site walks and inspections. Data gathered can be transferred easily to the central database, for reference, reports, or follow-up using hard wired or wireless earth satellite system telephones.

New information systems can provide instantaneous access and transfer of current contract and project information to users from one centrally located database using webs and networks. This feature gives construction managers the information they require to make informed decisions, meet the construction project delivery requirements, and spend more time managing and less time chasing paper.

Vendor Sources. Professional organization web sites and the advertising sections of construction industry magazines and journals can provide names and locations of information system vendors. They also give locations and dates for conferences and expositions that feature most construction-related products. Vendors are anxious to discuss their products with potential users and will provide brochures and demonstration disks to those interested.

PART 4

Appendices

APPENDIX A

*Checklist for Processing from Start to Start-Up**

Lester F. Engle

Books have been written, complex charts drawn, great batches of punched cards handled by ever-increasing numbers of computers, and innumerable meetings held—all for the purpose of making effective the ultimate objective of new, revised, or improved process facilities.

It is to the credit of management, engineers, and others that in the vast majority of cases, the outcome of their work has been technically sound and economically rewarding. There is a way, however, to ensure even better results. A premise used in the information presented here is that "There is no substitute for concise and comprehensive lists of things to be considered or to be accomplished." The use of such lists can help make a seemingly impossible project objective more readily attainable. When the project is one where success is probable at the outset, where staff and equipment are theoretically optimum, then lists contribute to even greater productivity.

Explanatory material has been purposely kept at a minimum, for indeed if lists become essays, "how to-do-it" instructions or books, then they would not be useful tools. Additions and/or modifications to the lists ate encouraged to increase their value to individual engineers and to individual situations.

Contractor's Pre-Proposal Investigation for Construction

Planning: Appointments, itinerary, reservations, business development background, use of basic project information lists *as* deemed necessary
Client: Name, address(es), telephone number(s)
Primary contact-name and address
Other contacts (management, engineering, production, maintenance, purchasing)
Site: Access and transportation
Climate factors: Topographical aspect suitability for construction. Ground conditions:
Preparation requirements: Borrow areas, disposal areas, clearing, drainage
Utilities: Water, electricity, gas, steam, communications, sanitation, trash disposal
Existing facilities: Including below grade concrete, piping, electrical
Safety: Possible hazards during construction
Labor: Source, Union info. address(es), business agents, agreements in effect, wage rates, benefits
Relations with client, general attitude, efficiency
Sub-Contractors: Local and relations with client
Equipment: Source of rentals and prices
Materials: Type, availability, price
Local, State and Federal: Laws, permits, bonding, taxes, fees, licenses, sales taxes
Telephone books: Obtain
Follow-up

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* Adapted from *Mining Engineering* (May 1966), pp. 64–68. Reprinted with permission.

Project Checklist

Contractor's Proposal Preparation

Type of project: Study, engineering, turnkey, procurement, construction
Due Date
Contents: Letter of Transmittal
Scope: Including assumptions, exceptions, alternates
Type of contract
Cost data
Drawing list
Specifications
Schedule for each phase
Personnel data
Company experience
Photographs of previous projects
Preparation: Writing, typing, reproduction
Assembly of pages and material
Delivery: Mail or hand carry

Estimating for Construction

Review of Investigation of conditions
Use of project basic information lists as reminders
Use of file data where prior cost information can be applied
Approach: Item number basis or sub-item (type of work) basis-usually a function of completeness of bid documents, especially drawings. With a "complete" set of drawings, sub-item approach is usually best. With an "incomplete" set, item basis minimizes oversights. Complete the estimate by collecting costs in both manners.

Estimate categories:

Site Preparation	Piping
Piling	Electrical
Foundation, roads, drainage	Instrumentation
	Refractories
Other concrete	Insulation
Structural steel	Painting
Plate work	Architectural
Equipment	

Material: Quantities and quantity units
Labor: Unit costs and man hours
Rental equipment costs
Sub-contract costs
Quotations: Obtain promptly
Direct costs: Backup data and designs
Indirect costs: Including engineering if required
Contingency

Project Procedures

1. Owner–Contractor discussion to determine preferences
2. Write up as soon as possible for approval by Owner and Contractor (revision) use, keep current
3. Personnel information–names, functions, addresses, telephone numbers
4. Correspondence distribution
5. Drawings for approval for construction
6. Specifications for approval for purchase for construction. Approvals by client?
7. Handling of vendor's information, prints, instructions, etc.
8. Accounting procedures, definitions of "cost"
9. Final submission of drawings, specs, calculations, other data on "as-built" basis
10. Project notes, meeting notes, progress reports
11. Drawing numbering system and index. Drawing sheet size (Use of only one size is preferable)
12. Item numbering system and index
13. Spec. numbering system and index
14. Bills of material, requisitions, purchase orders, etc., numbering system and indexes
15. Telephone communications–records of confirmations, etc.
16. Files–Information, Drawings, certified prints, procurement, accounting, etc.
17. Preparation of final data books, if any required
18. Internal handling of drawings titles, block, stick file(s), changes notification system
19. Bank accounts
20. Accounting and definition of "costs"
21. Finance
22. Auditing
23. Expediting
24. Inspection
25. Responsibilities

Basic Project Information

1. Bid and contract documents: legal and procedural documents and bonds
   - Advertisement
   - Information for Bidders
   - Proposal
   - Agreement
   - Bid Bond, Performance Bond
   - Labor and Material Payment Bond
   - General Conditions of Contract
   - Definitions
   - Drawings, Specifications, and Related Data
   - Engineer–Owner–Contractor Relations
   - Materials and Workmanship
   - Insurance, Legal, Responsibility, and Public Safety
   - Progress and Completion of Work
   - Measurement and Payment
   - Modifications of the General Conditions
   - Special Conditions of Contract
   - Detailed Specification Requirements
   - Drawings
   - Contract Document Priority: Agreement, addenda, remaining legal and procedural documents, drawings, modifications, general conditions, bonds
2. Basic process assumptions, consideration, and evaluation of alternatives
3. Process description. Function of all components (physical and chemical) and flow diagram. Define "over design" factors.
4. Process materials—quantity and quality, sampling locations, test results
5. Utilities: heat, water, gas, oil, steam, electrical sources of supply, etc. Balances and diagrams. Fuel requirements.
6. Equipment, piping and instrumentation diagram; process flow diagram
7. Plot plan and general over-all area map and location plan
8. General arrangement (planning) drawings
9. Detailed engineering drawings
10. Chart of accounts
11. Item index–basically equipment plus all other identifiable units
12. Company, local, state, federal codes that apply; fire codes, etc.
13. Operating schedule (Continuous-intermittent-combinations)
14. Operating manpower (production, maintenance plus total plant force) and locations of work areas
15. Hazards, hazardous areas, special plant conditions, safety requirements
16. Insurance company's requirements
17. Area information: climate, terrain, transportation, materials, labor, customs, laws, etc.
18. Proposed or desired schedule of all phases
19. Project procedures (Check detailed list)
20. Photographs of site, similar existing plants
21. List of preferred suppliers, materials, etc.
22. Owner's job number. Contractor's job number
23. Time accounting system (drawing status and engineering schedule) and engineering cost report
24. Site survey, property lines, soil testing, etc.
25. Standards for project, specifications, engineering and construction
26. Civil engineering specifications and information.
    - Site ownership–clear title
    - Survey lines
    - Benchmarks
    - Coordinate and grid system (for const. and tie in with existing facilities)
    - Soil testing
    - Earth moving–fill and borrow
    - Surfacing, paving, roads, fencing, gates
    - Drainage and waste disposal
    - Soil modification, piling and piling records
    - Concrete-mix design, test, specifications
    - Rebar schedule
    - Anchor bolt schedule
    - Steel work–structural, ladders, hand rail and stairs, platforms and walkways, toeplate
    - Railroads
    - Seaport facilities
    - Airport facilities

27. Architectural engineering specifications and information
    - Siding and roofing
    - Windows, light panels, louvers, doors
    - Flashing, gutters, downspouts
    - Fasteners
    - Acoustical
    - Building insulation
    - Painting (including surface preparation)
    - Plumbing and accessories
    - Interior floors, walls, ceilings
    - Ventilators
    - Building design and layout, and special decorative treatments
    - Offices, laboratories, library, etc.
    - Interior furnishings
    - Landscaping
28. Mechanical engineering specifications and information
    - Equipment
    - Drive list
    - Belt list
    - Guards and covers schedule (check all codes)
    - Lubrication schedule
    - Plate work-chutes, launders, bin gates, etc.
    - Special devices, cylinder operators, conveyor holdbacks
    - Piping materials, installation, cleaning, testing, hangers, supports, burial
    - Pipe spool details and coding
    - Line schedule
    - Valve code
    - Packing, gaskets, joint compounds, couplings, hose banding
    - Welding and other joints
    - Air, steam, and water hose stations
    - Plumbing–potable water, showers, sanitation
    - Equipment painting (including surface preparation)
    - Equipment insulation
    - Heating and air conditioning
    - Ventilation, dust collection, odor control
    - Fire protection system
29. Electrical engineering; specifications and information
    - Power-feeders, transformers, switch gear, motor control centers
    - Power wiring
    - Conduit, cable and wire schedule
    - Lighting
    - Grounding
    - Control wiring (instrumentation & controls)
    - Control panels and devices
    - Interlock systems
    - Communications: telephone, intercom, radio, microwave
    - Closed circuit television
    - Plant protection system
    - Motors and motor list
    - Electrical equipment list
    - Miscellaneous device list such as solenoids, counters
    - Single line diagrams
    - Emergency (standby) power supply
    - Electrical design concept, in writing
30. Instrumentation engineering specifications and information
    - Instrument list
    - Control panels–design, material choice, colors, tags, piping, electrical
    - Installation, calibration, checkout procedures
    - Sensors, indicators, recorders, controllers
    - Alarms–visual and audio
    - Flow
    - Pressure
    - Temperature
    - Level
    - Mass
    - Weight
    - Speed
    - Color
    - Density
    - Moisture and humidity
    - Composition
    - Movement
    - Instrument tubing, valving, joints, filters, regulators, etc.
31. Geological and mining engineering specifications and information
    - Mineral ownership and rights
    - Ore reserves
    - Ore qualities
    - Mining method
    - Underground facilities
    - Material handling
    - Shaft and entry design and construction
    - Ventilation, heating, cooling
    - Safety program
    - Surface facilities
    - Waste disposal

32. Maintenance engineering specifications
    - Clearances, monorails, hoists
    - Accessibility
    - Spare parts needs and lists, all accounts
    - Vendors equipment catalogs, bulletins
    - Overall standardization program
33. Metallurgical engineering specifications and information
34. Chemical engineering specifications and information corrosion and erosion concerns
35. Construction materials specifications and information
    - Metal (nonferrous and ferrous)
    - Plastic (polymers)
    - Rubber
    - Refractories and ceramic
    - Wood
    - Coatings
36. Construction specifications
37. Auxiliary facilities–offices, shops, garage, laboratories, warehouse, etc.
38. Drawing list. (Optimize numbering system, number as sensible) (Item Ref. to drawings, plans, sections, etc., by area)
39. Use of isometrics, models
40. Special studies required–design, economic, process test work
41. Get reproducibles or plenty of copies
42. Scheduling–all phases (equipment and structural)–these are usually critical items
43. Set up project accounting of design engineering and associated time and costs
44. Project engineering accounting system and engineering cost control based on drawings and miscellaneous work (and dept. report forms)
45. Extent of instrumentation required–all phases and aspects
46. Process sampling–why, where, how, and when; special sampling provisions for startup, performance tests, etc.; handling and use of results
47. Manning the organization chart–Contractor and Owner; manpower schedule
48. Tabular–distribution of job costs by contractor (cost plus contract)
49. Salary range schedule
50. Get samples of materials to be handled for engineering use "to get the feel"
51. Contract development (Letter of Intent)
52. Project procedures and procedure memos
53. Engineering, procurement, construction schedules; use sub-item estimate as general reference and for detail
54. Construction equipment needs and schedule, recapture method of procuring
55. Pre-job labor conference and arrangements
56. Existing facilities and effect on project and tie-ins with existing operations, problems, etc.
57. Required state, county, city taxes, bonds, licenses, etc.
58. Manning office and field
59. List of reports and actions, etc.
60. Copies of agreement to all concerned
61. Copies of original estimate to all–on item index basis and also sub-item number basis
62. Sub-contracts as soon as possible
63. Prompt action on rental equipment
64. Owner to put engineer in residence at contractor
65. Arrange for teletype between owner, contractor, and field
66. Engineering equipment for field engineer's office
67. Drawing status sheet for construction
68. Need for project scheduler, paper shuffler, to help project engineer, spec. writers, expediter, material traffic control, and purchasing
69. Engineering schedule: breakdown to types of specs, drawings, and all general information by areas
70. Owner's needs with respect to reports of all types–forms, frequency, etc.
71. Site photos program at job start
72. All project staff to site and kick-off meeting with client
73. Operating and maintenance manuals
74. Design for ease of cleanup, solids, washdown, liquids, etc.
75. Set up plant on area basis
76. Sparing and growth capacity philosophy (space for future expansion)
77. Owner's engineers to be from engineering, operations, maintenance, etc.

Site Acquisition, Preparation, and Area Characteristics

1. Site selection study and purchasing
2. Soil conditions and testing–rock, mud, swamp
3. Water table information
4. Piling–pipe, shell, concrete, H-beams, caissons, sheet, wood; drive test piles, Armcotype retaining walls
5. Earthquake
6. Hurricanes or other special climatic effects
7. Rainfall records
8. Snow and wind loads
9. Lightning
10. Tidal information
11. Transportation–air, rail, road, river, sea, lake, canal, etc.
12. Temperature records
13. Water supply–type, quantity, reliability; treatment required?
14. Availability of electricity, gas, etc.
15. Temporary facilities for water, electricity
16. Excavation, backfill, compaction
17. Source of fill, grade of fill
18. Grid system or baseline, compass–orientation, coordinates
19. Topographic survey, contour maps, etc., benchmarks
20. Nearness to cities, towns, etc.
21. General map of area
22. Underground obstructions on site–old concrete, piling, piping, wiring, dumps, etc.
23. Area building codes
24. Location–county, etc.
25. Fencing and gates
26. Finished grade elevation(s)
27. Grading plan
28. Drainage
29. Plan of company plot
30. Piling tests loads, etc.

Grading, Paving, and Drainage

1. Concrete areas
2. Asphalted areas
3. Materials specs
4. Waste disposal–fluids and solids
5. Potential to pollute site, rivers, sea, etc.
6. Normal drainage during typical storms, etc.
7. Sanitary wastes
8. Roads, parking, walks, etc.
9. Areas using gravel, shell, or similar
10. Any pumping stations required

Concrete and Foundations

1. Preparation
2. Forms–wood, steel
3. Reinforcement (rebar, mesh)
4. Pouring
5. Waste
6. Curing
7. Form removal and salvage
8. Finishing
9. Grouting
10. Foundation hardware
11. Flooring–slopes, drains
12. Ditches and grating
13. Sumps
14. Pumps and pumping
15. Special equipment required
16. Embedded metal, anchor bolts, conduit, plumbing, etc.
17. Slip forming

Structural and Buildings

1. Supports for: equipment, piping, electricity, etc. (including miscellaneous to reach all equipment, etc.)
2. Platforms
3. Buildings, in general and other particulars
4. Plate work in general
5. Grating and floor plate
6. Ladders
7. Handrail
8. Stairs
9. Kick plate
10. Windows
11. Doors–any power operated?
12. Siding
13. Roofing

14. Insulation–building
15. Masonry or similar
16. Painting
17. Chutes, launders
18. Design to suit area characteristics
19. Live loads, roof loads, wind loads
20. Concrete specifications, minimum compression (*n* lb at *n* days)
21. Architectural aspects
22. Acoustical
23. Monorails, davits, and similar
24. Ventilators
25. Light panels
26. Landscaping
27. Washrooms
28. Storage areas
29. Shops
30. Warehouse
31. Guard houses
32. Fire houses
33. Change room
34. Offices of all types
35. Townsite facilities–all aspects
36. Monorails, trolley beams, overhead cranes

Equipment

1. Standardization
2. Motors
3. Guards for all moving items couplings, drives, shafts, etc.; also conveyer pinch points
4. Drives
5. Brick mortar, special linings
6. Tanks, bins, hoppers
7. Spares, standby units
8. Fuels and systems
9. Hoists type equipment–elect. and manual
10. Rod storage and handling
11. Ball storage and handling
12. Reagent storage and handling
13. Vendors, erection, and startup services

Piping

1. Process
2. Utilities–air, water, gases, steam, oil, etc.
3. Fire, process water
4. Potable water
5. Above ground–at grade–underground
6. Wastes and disposal
7. Yard piping
8. Spool drawings–office, field, special materials, marking drawings
9. Hangers, supports, expansion, contraction
10. Plumbing–all aspects
11. Special linings
12. List of fluids–piping classes
13. Specifications for pipe, flanges, fittings, bolting, gaskets, packing
14. Utility stations–fluids, size, valves, couplings, hoses, signs
15. Materials of construction–alloys, plastics, wood, transite, etc.
16. Joints–screwed, welded, flanged, mechanical
17. Color coding
18. Bolting schedule
19. Cleaning and testing procedures
20. Welding and welder's qualifications
21. Steam trapping
22. Vents and drains
23. Ease of breakout
24. Standby lines–spare lines
25. Eye fountains, safety showers, drinking fountains
26. Line schedule
27. Type of joints preferred
28. Preferred valves, etc.
29. Sample points
30. Startup screens and strainers
31. Trash screens
32. Pump sealing water
33. Gaskets and packings
34. Velocities for various fluids
35. Pipe, launder, and chute shapes
36. Pump sumps
37. Constant head systems
38. Valve and pipe drains from equipment
39. Recovery of cooling water
40. Sluice water for equipment and launders
41. Valve-pits (and drains)
42. Valve access (extending handles, chain wheels, platforms)
43. Depth of burial, freeze protection

Heating, Ventilating, Air Conditioning, Duct Work (All Types)

1. Roof ventilators
2. Louvers
3. Sheet metal in general
4. Associated "equipment"
5. Pertinent insulation, piping, equipment, etc.
6. Soundproofing

Electrical

1. Power wiring
2. Lighting–normal, floods, fluorescent
3. Grounding
4. Feeders
5. Transformers
6. Switch gear and circuit breakers
7. Motor control centers
8. Codes
9. Motors choice–specs, etc., in various sizes
10. Starters
11. Wire
12. Conduit or equal, raceways, fittings, junction boxes
13. Standby system diesel, gasoline
14. Communications–telephone, telegraph, radio, microwave, TWX, intercom, PA
15. Panels and location for control, lighting, etc.
16. Underground, above ground
17. Power factor
18. Receptacles–welding, 110V, 220V (convenience outlets)
19. Single line elect. diagrams, lighting plan
20. Push button locations
21. Poles
22. Motor list–types
23. Switch rooms–location, ventilation
24. Clocks
25. Lighting panel locations
26. Emergency facilities

Instrumentation

1. Panel boards–where construct, location
2. Control valve sizing
3. Instrumentation specs–all types
4. Junction boxes, conduit, hangers, fittings, tubing, multi-tube
5. Vendors–startup help and services

Insulation–Process

1. Specifications
2. Equipment
3. Piping
4. For heat loss
5. For personnel protection
6. See also buildings, heating, etc.
7. Weather barrier

Painting

1. Structural
2. Architectural
3. Safety
4. Piping
5. Equipment
6. Brush, spray, roller
7. Surface preparations–hand, blast cleaning, solvents, etc.

Foreign Projects–Special Items

1. All phases of dealing with national, state or province, and local governments
2. Dealings with engineering societies possible
3. Availability, quantity, quality, foreign materials, labor, services
4. Labor situation, wages, benefits, unions, efficiency, attitude
5. Need for staff people with knowledge of local language, customs, etc.

Drawing Checklist

1. Can item be purchased with information shown?
2. Can item be fabricated with information shown?
3. Can item be erected with information shown?
4. Can item be successfully operated as designed?
5. Can item be efficiently maintained as designed?

(Above items deserve special thought to assist in producing best work)

6. Does item meet approved specification in all details?
7. Has it been checked against the flowsheet?
8. Has it been checked against general arrangements?

9. Has it been checked against concrete drawings?
10. Has it been checked against structural drawings?
11. Has it been checked against platework drawings?
12. Has it been checked against vendor's prints of connected manufactured equipment?
13. Does drawing title block information suit the requirement?
14. Are references complete? Use as checks on design?
15. Do notes refer to paint, etc.?
16. Have standard details been checked against standards sheets?
17. Use of meeting notes and meeting marked-up prints as reference.
18. Is Bill of Material complete, and is it checked against specification and design drawing carefully?
19. Is drawing dimensionally correct?
20. Has all equipment been thoroughly checked against standardization program requirements?
21. Arc calculation sheets in good shape and ready to turn in to project engineer with drawings?

Procurement

1. Drawings, specifications, and Bills of Material
2. Requests for quotation (written proposals, price, weight, delivery, etc.)
3. Bid analysis (compare with estimate)
4. Approvals to purchase
5. Requisitioning
6. Award of order by telegram if necessary
7. Written purchase order
8. Data to vendor, data from vendor
9. Expediting and inspection–vendors and sub-vendors
10. Routing (packing, etc.)
11. Shipment and traffic control
12. Receiving (inspection, checking, shortages, back orders)

(Items 1–12 above–all as per schedule Based on Item Index, Drawing List, and other lists such as Instruments, Architectural, Electrical, etc.)

13. Cost breakdowns
14. Delivery–breakdowns for "packages"
15. Change orders to purchase orders
16. Interchange of "equipment" for mounting or similar

Procurement Status and Control Program

1. Purchase Orders status reports
2. Recover any credits due for changed Purchase Orders
3. Include estimated weight data on all orders and detailed use data
4. Sales tax handling–exemption certificate, refunds, etc.
5. Vendor's data requirements for engineering, construction, operating, and maintenance
6. Tagging of items by vendor
7. Thorough and detailed packing lists by vendor
8. Shipping notices from vendors–copies to district and field offices
9. Damage, shortage, and overage reports and action

Construction

1. Progress reports
2. Progress photos
3. Daily, weekly, monthly
4. Steel up
5. Concrete poured
6. Local labor supply, wages, fringe benefits, contracts, relations
7. License to do the work–permits of all types
8. Professional registration–as a firm, as an individual
9. Codes–local, state, national (building, safety, sanitation, pollution, environmental)
10. Local labor efficiency
11. Housing and hospital
12. Subsistence
13. Travel
14. Recreation
15. Laundry, ice plant
16. Sub-contracting arrangements
17. Safety program and equipment (use insurer's inspections, help, etc.)
18. Site housekeeping–routine and final cleanup
19. Warehousing

20. Tool handling and tool supply–rental, rent-purchase, purchase
21. Fire and plant protection
22. Equipment repair facilities
23. Shops and equipment–all types
24. Welding
25. Field transportation
26. Field trailer a/o office facilities
27. Sanitation facilities
28. Use of pre-fab temporary field office, warehouse, etc.
29. Local Associated General Contractors–join?
30. Safety hats, badges, and glasses
31. Pre-job meetings with all union business agents–pre-plan, set up
32. Local labor contracts needed to negotiate
33. List of rental equipment and handling, cost comparisons
34. Contractors sign for gate(s), offices and equipment decals, etc.
35. Local mailing address and telephone
36. Office furniture and equipment
37. Decals for hats, windshields, signs, etc.
38. Construction staff–hiring and getting them transfers and conditions, etc.
39. List reports–name, dates, etc.
40. Local bank account(s)
41. Release of liens from subcontractors
42. Office bulletin board, print and data storage
43. Vehicle titles, etc. to client at end of job
44. Return all oxygen, acetylene cylinders, and similar items to vendors and suppliers

Accounting

1. Invoices for materials, services, etc.
2. Cost presentation–routine, final
3. Office
4. Field
5. Discounts
6. Sales taxes
7. End of job: "Acknowledgment of Payment" from all vendors

Preparation for Operations

1. Site cleanup
2. Equipment, checkout, startup costs, etc.
3. Lubrication
4. Spare parts program–all phases, standardization
5. Acceptance and release-in writing
6. Crews required for testing equipment, etc.
7. Salaried staff and hourly staff: employment, organization, training
8. Test running of entire plant
9. Operating, maintenance supplies
10. First aid and safety equipment
11. Hand tools and tool boxes
12. Log sheets, paper, log books, office equipment, and supplies
13. Laboratory equipment
14. Fire extinguishers, hose, etc.
15. Need for "experts" to assist start-up and "fine tune" equipment, instruments, process

APPENDIX B

Sample Bid Package

SAMPLE
BID PACKAGE
for
Specification No. PIPE-101.3
Waste Gypsum Recycle Piping Modifications
June 1, 1998

SAMPLE
BID PACKAGE

Specification No. PIPE-101.3
Waste Gypsum Recycle Piping Modifications

TABLE OF CONTENTS

INSTRUCTIONS TO BIDDERS

REFERENCE: Specification Number. PIPE-101.3 Dated: June 1, 1998

INTENT

These Instructions are intended to provide Bidders with the information necessary to prepare and submit proposals to ANYCO, Inc., for the complete installation of the Waste Gypsum Recycle Piping Modifications at the Zachary, Louisiana Gypsum Plant described in the Bid Package for Specification Number: PIPE-101.3. Information and data set forth or referred to are for proposal purposes only and the owner will not be responsible for any interpretations or conclusions drawn therefrom by Bidders.

SUBMISSION OF PROPOSAL

Three sets of the Bidder's sealed proposal for the work, clearly identified by Specification Number PIPE-101.3, shall be delivered to: John Jones, Purchasing, ANYCO, Inc., 16000 Scenic Highway, Zachary, Louisiana 70791 before 4:00 p.m., Monday, June 22, 1998.

QUESTIONS, CLARIFICATIONS, AND DISCREPANCIES

Address all commercial questions to: John Jones, Purchasing, ANYCO, Inc., 16000 Scenic Highway, Zachary, Louisiana 70791, telephone 504-555-1234. Address all technical questions to: Sam Smith, Engineering, at the same address and telephone number. If warranted, the Owner may ask that questions be put in writing so that, if required, a written addendum may be issued for all Bidders.

PROPOSAL FORM, EXHIBITS, AND PRICING

Bids shall be submitted using only the attached ANYCO, Inc., Proposal Form and Exhibits. All blank spaces shall be completed. Pricing must be firm for the duration of the Work and in full accordance with the scope of work, drawings, specifications, and other documents in the proposal, without exception, and particularly with the schedule for the work. Items of work not specifically on the drawings or referred to in the scope of the work or specifications, but necessary to complete the work in accordance with the best practices, are implied and must be included in the proposal price. All taxes applying to the Work shall be paid directly by the Contractor. Sales and use taxes for consumables, tools, supplies, and rentals shall be included in the Proposed Lump Sum Price.

SITE INSPECTION

Submittal of a proposal signifies that the Bidder has carefully examined the construction site and has first-hand knowledge of existing site conditions, structures, obstructions, area access, and other items that may affect the work.

MEETINGS

Pre-Bid Meeting and Site Visit

These meetings are scheduled by the Owner to review the work, the schedule, and site conditions in detail. Invited Bidders must notify the Owner of their intent to attend the meeting and provide the names of their representatives at least 24 hours before the meeting. Failure to attend the meeting or the site visit may disqualify the Bidder.

Bid-Proposal Review Meeting

These meetings with selected Bidders may be scheduled to clarify proposals, schedules, mobilization, prices, and answer questions of Owners and Bidders.

Bid Resolution Meeting

Owner will open and evaluate the proposal and relevant factors privately. A meeting with the apparent successful Bidder will be scheduled to review the entire proposal and resolve any outstanding questions. Bidder's Representative at the Bid Resolution Meeting must have full authority to act on all matters for the Bidder. No verbal authorizations or acknowledgments by anyone present at the meeting shall be binding unless confirmed in writing. When all matters are resolved to the mutual satisfaction of the Owner and the Bidder, a Letter of Understanding is written based on these agreements. A Contract is then issued incorporating the Letter of Understanding.

COMMENCEMENT, PERFORMANCE, AND COMPLETION OF WORK

If awarded a contract, Bidder understands that "Time is of the Essence" and agrees to mobilize, commence, perform, and complete the Work with due diligence as provided in the Specifications, Addenda, Drawings, and Schedule attached.

PROPOSAL OPENING PROCEDURE and NOTICE OF BID STATUS

Owner shall open Proposals privately and may consider other relevant factors in addition to price in awarding a Contract. Owner agrees to notify all Bidders within fifteen (15) calendar days after bids are received of the status of their proposals.

SAMPLE
CONSTRUCTION CONTRACT AGREEMENT

(LUMP SUM CONTRACTS)

Specification No. _____

CONTRACT NUMBER: _____

THIS AGREEMENT is entered into this ___ day of _____, ____, between: **ANYCO, Inc.,** 16000 Scenic Highway, Zachary, Louisiana 70791, hereinafter ("Owner"), and _____, hereinafter ("Contractor").

WITNESSETH

ARTICLE 1. STATEMENT OF WORK

Owner and Contractor agree that as of the above date, Contractor has agreed to perform the work herein and to be bound by the terms of this Contract. Contractor shall provide all labor, materials, tools, and transportation (other than the Owner-furnished services and materials specified) necessary to construct, install, and complete the following "Work" at the Owner's Zachary, Louisiana, Plant _____.

In consideration of the mutual covenants herein contained, Contractor agrees to perform in good faith all obligations set forth in the Proposal and acknowledges receipt of the following Contract Documents incorporated into the Proposal herein by reference.

Bid Package for Specification Number _____
Exhibit A, Lump Sum Price Summary
Exhibit B, General Conditions for Construction Contract Agreements
Exhibit C, Craft Hourly Rates (for Changes in the Work)
Exhibit D, Construction Schedules
Exhibit E, Safety, Health, and Security Requirements
Exhibit F, List of Proposed Subcontractors
Exhibit G, Insurance Requirements
Exhibit H, Execution Plan
Exhibit I, Alternate Proposals
Exhibit J, Specification Number _____ and Attachments
Letter of Understanding dated: _____
Addenda Nos. _____

ARTICLE 2. RESPONSIBILITY FOR COMPLETION

Contractor represents that he has carefully examined all related contract documents listed above and has become fully acquainted with all Work Site surface conditions and surroundings and assumes the risk of any variance between actual surface conditions relevant to the work and those set out in the contract documents. Having fully acquainted himself with the work, Work Site, surroundings, and the risk connected therein, the Contractor assumes full responsibility for completing the work for the compensation proposed in Article 3. Work shall commence on ____, or within ____ days after receipt of the Owner's "Notice to Proceed." Work shall be completed by _____.

ARTICLE 3. COMPENSATION

In consideration of the full performance of all Contractor's obligations herein under, Owner will pay to Contractor the following compensation in accordance with the Contract:

A fixed amount of $ _____

All Federal, State, and Local taxes applicable to the Work are included in the above named compensation.

Witness whereof the parties hereto have caused these presents to be executed as of the date written above.

CONTRACTOR _____OWNER _____

BY _____ BY _____

TITLE _____TITLE _____

ANYCO, Inc.
16000 Scenic Highway
Zachary, Louisiana 70791 Date Submitted: June 22, 1998

BID PROPOSAL FORM*

REFERENCE: Bid Package for Specification PIPE-101.3, June 1, 1998, Waste Gypsum Recycle Piping Modifications

In accordance with the ANYCO, Inc. (hereinafter called "Owner") Invitation to Bid Letter dated June 5, 1998, the Bid Package dated June 1, 1998, the undersigned, (hereinafter, "Bidder"),

Firm Name:	HARPERCON, Inc.
Address:	200 Muddy Bayou, Ruston, Louisiana 71273
Contact:	James Harper, V. P. Const. Telephone: 318-555-1212

proposes to furnish all material, labor, equipment, and services to perform the complete work (hereinafter "Work") described in the Bid Package Documents, in strict accordance with the terms and conditions set forth herein. Bidder's firm lump sum price to perform the Work if awarded a Contract is:

Two Hundred Eight Thousand and Five Hundred Dollars
$208,500.00

CERTIFICATIONS AND AGREEMENTS

1. Bidder certifies that the Work Site has been visited and inspected. All Bid Package Documents have been carefully read, evaluated, understood, and accepted. No exceptions to be taken unless noted in the "Letter of Understanding."

2. Bidder agrees that "time is of the essence" and if awarded a Contract, will commence site Work no later than the date specified in the Owner's "Notice to Proceed With Field Work." Bidder agrees to furnish, with the bid, a detailed Construction Schedule and Progress Report in a Critical Path Method (CPM) form or, if authorized by the Owner, in writing, a Bar Chart Schedule similar in form to Exhibit D. The Schedule shall include the sequence and dates of all major stages of Work, the projected time of completion, and incorporate at a minimum, the Project Milestones identified in Exhibit A. No change will be allowed in the approved Progress Schedule without written Owner approval. If construction progress falls behind the approved schedule, measures shall be taken to regain the lost time and meet the scheduled completion dates so as not to delay other portions of the Work.

3. Bidder understands that the Proposal Price submitted must be based on the Bid Package Documents only. The Owner encourages alternates and will consider them provided that full information with price comparisons are submitted with the proposal and designated as an "Alternate Bid" per attached Exhibit I.

---

* This is a typical Proposal Form, completed by the successful bidder for the sample contract.

4. Bidder is satisfied that the Proposal Price is sufficient to cover all obligations to complete the Work as specified and certifies that all prices and rates quoted are firm and not subject to escalation for the duration of the Work.

5. Bidder agrees that if awarded a Contract, and if required in writing by the Owner, he will, within 15 days, furnish a Payment and Performance Bond, acceptable to the Owner, for the full amount of the Contract price, assuring the Owner that Bidder shall truly and faithfully perform all its obligations under the Contract. Bond shall be furnished in accordance with the General Conditions For Construction Contracts, and Owner will pay all premiums for such bond.

6. Bidder agrees to hold all information pertaining to the Work in strict confidence and, if required by the Owner, to enter a Confidentiality and Secrecy Agreement.

7. Bidder accepts all terms and conditions of the Proposal Documents and agrees to execute and return to the Owner a Construction Agreement in the form included in the Bid Package, within seven (7) days after receipt of the Notice of Award from the Owner. Failure to execute and return the Construction Agreement shall, if Owner elects, release Owner from every obligation of any nature to Bidder.

8. Bidder agrees to start work within 5 calendar days after receipt of the Owner's Notice to Proceed and to complete the work within 81 calendar days thereafter.

9. Bidder hereby acknowledges receipt of all documents listed in Specification No. PIPE-101.3 and any subsequent addenda as listed below and which have been evaluated and considered in preparing this Bid Proposal Form.

Addendum No. 1 Dated: June 9, 1998

Revise the last sentence of Paragraph 1.3.3 of Exhibit J, Specification No. PIPE-101.3 to read as follows: "Maximum allowed flanged joint length shall be 24.384 m (80 ft.)."

GENERAL

1. Bidder's Proposal shall expire: July 22, 1998

2. Bidder shall submit the following with the Proposal if marked with an "X."

[X] Bidder's Execution Plan for the Work.

[X] Bidder's Bar Graph Work Schedule.

[X] Certificate of Insurance.

[X] Copy of Contractor's License for the State(s) of: Louisiana.

3. Documents:

The following listed Documents and Exhibits are attached and constitute a part of this Proposal as though incorporated herein in full:

Exhibit A, Lump Sum Price Summary
Exhibit B, General Conditions for Construction Contract Agreements
Exhibit C, Craft Hourly Rates (for Changes in the Work)
Exhibit D, Construction Schedules
Exhibit E, Health, Safety, and Security Requirements
Exhibit F, List of Proposed Subcontractors
Exhibit G, Insurance Requirements
Exhibit H, Execution Plan
Exhibit I, Alternate Proposals
Exhibit J, Specification No. PIPE-101.3, Including ANYCO, Inc.
Contract and Reference Drawings and Construction Standards

4. Exceptions [X] We take no exceptions to the Proposal.
[ ] Exceptions or clarifications are attached.

This Proposal and Owner's written Notice of Contract Award in accordance with the Proposal Documents constitute a valid and effective interim Contract between the Parties.

BIDDER: HARPERCON. Inc.
BY: *James Harper, June 22, 1998*
TITLE: Vice President, Construction
ADDRESS: 200 Muddy Bayou, Ruston, Louisiana 71273

EXHIBIT A:
LUMP SUM PRICE SUMMARY

Specification Number: PIPE-101.3

Bidder: HARPERCON, Inc.
Date Submitted: June 22, 1998

1.0	Items of Work	Cost	Work Days
1.3.1	Mobilize, set-up, layout	$ 10,300	5
1.3.2	No. 1 pipeline, schedule 40, VM-1 to VM-2	$ 43,100	40
1.3.3	No. 2 pipeline, schedule 20, VM-1 to VM-2	$ 41,100	40
1.3.4	Fabricate and install valve manifold VM-2	$ 13,250	10
1.3.5	Concrete foundations	$ 44,500	25
1.3.6	Concrete pipe sleepers, VM-1 to VM-2	$ 31,000	25
1.3.7	Steel pipe supports	$ 8,450	8
1.3.8	Flush and test all new piping work	$ 9,500	5
1.3.9	Tie-in new piping to plant system	$ 3,400	5
1.3.10	Demobilize, cleanup, restore	$ 4,000	4
2.0	Total Lump Sum Price:	$208,500	
3.0	Estimated sales and use tax included in the bid. (Owner reimbursable on receipt of documentation)	$ 3,325	

4.0 Direct Craft Work Hours: Erect/Install 4,125 W/H
Subcontract -0- W/H

5.0 Bidder shall furnish the following markup and unit pricing information with the Proposal to assist the Owner in evaluating bids.

5.1 Markup (for changes within the general scope of the Work.)
a. Equipment rental, % of AED Rates: 85 %
b. Material, actual cost plus: 15 %
c. Work by Contractor's own forces: Direct Cost plus: 62 %*

(These Rates shall be firm for the duration of the Work.)

* Loaded Hourly Rate = Base Hourly Rate + Fringe Benefits + Taxes and Insurance + Small Tools and Consumables + Overhead and Profit.

5.2 Unit Pricing for Changes

Following are the unit prices for additions that may be required in the construction of Specification No. Pipe-101.3. Price to include cost of materials, supplies, equipment, labor, supervision, and markup. All work shall be done at ground level.

a. Field butt welds: (Welds shall be made in-place and on Work Site only)

Pipe size	Schedule	Price per joint
30.48 cm (12 in.)	20	$ 350.00
30.48 cm (12 in.)	40	$ 440.00

b. Field weld flanges: (Welds shall be made on Work Site only)

Pipe size	Schedule	Price per flange
30.48 cm (12 in.)	20	$ 490.00
30.48 cm (12 in.)	40	$ 580.00

c. Concrete pipe support foundations: Including saddles and supports. (Reference Contract Drawing No. AC-40)

Type	Price per cu. yd.	Price each
"A" Foundation	$ 425.00	$ 1,700.00
"B" Sleeper	$ 425.00	$ 188.85

6.0 Calendar days required for Bidder to:

A. Mobilize and start work. 5
B. Complete the Contract. 76

EXHIBIT B:
GENERAL CONDITIONS FOR CONSTRUCTION CONTRACT AGREEMENTS

TABLE OF CONTENTS

1. Application

These General Conditions for Construction Contracts, herein "General Conditions," shall apply to all ANYCO, Inc. Construction Contract Work. Copies of these General Conditions shall be given to Contractors and their Subcontractors and shall prevail over any other agreements or contracts between said Contractors and Subcontractors.

2. Definition of Terms

"Amendment" shall mean Owner-approved, written Contract changes.

"Contract" shall mean the document headed "Construction Contract Agreement" and all the documents incorporated therein.

"Contractor" shall mean the company awarded the work by ANYCO, Inc. and named on Pages 1 and 2 of the Construction Contract Agreement.

"Owner" shall mean ANYCO, Inc., including successors and assigns.

"Project" shall mean the entire facility referred to in the contract documents.

"Work" shall mean that portion of the project described in the Specification.

"Work day" shall mean any calendar day scheduled for performing contract work.

3. Declaration

Contractor hereby warrants, declares, and assumes responsibility for having made a personal and complete examination of the Work Site, adjacent areas, access, and applicable Contract Documents. Contractor warrants to have relied solely on that evaluation for their Proposal and is fully acquainted with all the related documents, conditions, and facilities.

4. Indemnification

a. Contractor shall indemnify the Owner and their representatives, assigns, and successors and save and hold them harmless from and against any and all liabilities, losses, claims, costs, and expenses, of any nature whatsoever, resulting from claims for injury or death of any person, persons, or property damage arising out of, connected with, or incidental to the performance of this contract on premises owned, leased, or operated by the Owner, except to the extent such damage, injury, or death is caused by the negligence of the Owner.

b. This indemnity expressly includes but is not limited to claims based on strict liability. Owner shall have no liability whatsoever for any special, indirect, or consequential damages incurred or suffered by the contractor.

5. Governing Laws, Regulations, and Entire Agreement

a. All questions and disputes concerning this Contract and pertaining to the Work shall be interpreted in all respects with the laws and regulations of the state in which signed.

b. It is also expressly agreed that this Contract constitutes the entire and only agreement between the parties signing and that there are no other agreements or understandings pertaining to the work, which have not been included herein.

c. Contract changes shall be made only by Owner-approved, written Amendments delivered to the Contractor Superintendent using Site Transmittal Memo (STM) Forms.

6. Precedence and Discrepancies

Anything shown on the Drawings and not in the Specification, or in the Specification and not on the Drawings, shall be understood as if mentioned or shown in both. Should differences be found between the Drawings, Specification, Construction Contract, and Corporate Engineering or Construction Standards, the governing document shall be the Construction Contract.

7. Subcontracting and Assignment

No portion of this Contract shall be subcontracted by the Contractor without the prior and written express approval of the Owner. Approved subcontracts shall contain provisions binding the Contractor's Subcontractor in strict compliance with the terms and agreements of this Contract. Nothing contained in this Contract shall create any contractual relationship between the Owner and any Subcontractor nor any obligation on the part of the Owner to any payments to the subcontractor. Neither this Contract, claims thereunder, nor payments becoming due to the Contractor for performance thereof, shall be pledged by the Contractor.

8. Permits, Licenses, and Taxes

a. Owner to obtain and pay for all permits and licenses required for permanent facilities.

b. Contractor shall obtain and pay for all permits and licenses of a temporary nature required for Contractor's completion of the Work.

c. Contractor shall accept full liability for the payment of any taxes or contributions that are based on wages, salaries, or other remuneration paid to Contractor or Subcontractor employees for the work to be done under this Contract.

9. Safety, Health, Security, First Aid, and Medical Facilities

Contractor accepts sole responsibility for Contractor and Subcontractor employees for compliance with the Occupational Safety and Health Act (OSHA) of 1970 as amended. Contractor accepts sole responsibility for the familiarization and training of Contractor and Subcontractor employees with all federal, state, and Owner Safety, Health, and Security Procedures (Exhibit E) applying to the Work. Contractor shall provide first aid and medical facilities for Contractor and Subcontractor employees. Contractor agrees to indemnify and hold harmless the Owner from any expense or claim resulting from Contractor's failure to comply with the Owner's Safety, Health, and Security Procedures.

10. Bond Requirements

Contractor shall furnish Payment and Performance Bonds in the dollar amount set forth in the Contract prior to starting work on the job site unless expressly exempted, in writing, by the Owner. Premiums for such bonds will be paid by the Owner to the Surety upon receipt of an Owner-approved invoice.

11. Insurance Requirements

Before moving onto the Work Site or beginning any construction, repair, or maintenance work under this Contract, Contractor shall furnish, at his own expense, a Certificate of Insurance listing all coverage, and limits of liability on a form approved by the Owner.

12. Other Work

Owner reserves the right to undertake work and award other contracts related to the Project. Contractor shall cooperate and coordinate his work fully with others within the Project area so that time required to complete their portion of the Project is not delayed.

13. Contractor Site Representative

a. Contractor shall consign a full-time, competent superintendent ("Contractor Superintendent") who shall maintain good order and be in attendance at the Work Site during all working hours. Contractor Superintendent shall have full authority to act on behalf of the Contractor and have such assistance as is necessary to ensure that the Work is carried out expeditiously and meets or exceeds the specification requirements. Contractor shall not remove the Contractor Superintendent from the Work, unless authorized in writing by the Owner. Contractor Superintendent shall, when requested, attend meetings called by the Owner to discuss progress of the Work under this Contract.

b. Contractor shall furnish Owner with a daily force report listing all Contractor and Subcontractor personnel working on the previous day by name, craft, and hours worked.

14. Owner Site Representative

At the Contract signing, the Owner will designate a Site Manager who will be the only person authorized to issue orders, directions, instructions, and changes to the Contractor, through the Contractor Superintendent, pursuant to and within the scope of the Contract.

15. Independent Contractor

Contractor shall be and remain an independent Contractor and not an agent of the Owner.

16. Changes

a. Owner reserves the right to make changes in the Specification and/or Drawings, provided those changes, deletions, or additions are related to the original scope of the Work, by giving written notice thereof. Should such changes cause a material increase or decrease in the cost of performing the Work or the time of performance, and written notice thereof is given by either party, an equitable adjustment in the Contract price and/or time of performance shall be made accordingly.

b. Time permitting, Owner may provide Contractor with detailed descriptions of the changes being considered. Contractor shall submit a written summary of cost and effect of the changes on the Schedule within five (5) working days of the request.

c. Additions and/or deletions for which unit prices have been specified in the Contract will be made solely on such unit prices as found in Exhibit A.

d. Additions and/or deletions for changes where mutually agreed prices are not reached may be directed to be performed on a time and material basis, or awarded to others at the owner's discretion.

17. Claims

a. Claims by the Contractor against the Owner for compensation, damages, or time extension must be filed with the Owner's Site Manager within ten (10) working days after the event upon which the claim is based. Claims shall be written and accompanied by detailed, itemized supporting data for each claim element.

b. No request for added compensation for extras, changes, or damages will be considered by the Owner, without a Site Transmittal Memo (STM) directing the event, issued by the Owner's Site Manager, and duly signed as received by the Contractor's Superintendent.

18. Delays and Time Extensions

a. Contractors may be delayed in completing the contractual obligations by Owner negligence, voluntary acts or omissions, changes in the Work, or events not otherwise avoidable, when using accepted industrial practices, and over which the Contractor has no control. Additional compensation for those actual direct field cost excesses for such delays with no allowance for profit shall be considered by the Owner. Other delays, including but not limited to, floods, fire, explosions, earthquakes, extraordinary weather, or other Acts of God (Force Majeure), strikes, or labor problems shall be considered for time extensions.

b. Delay claims for compensation or for time extensions shall be provided to the Owner's Site Manager for consideration, in writing, within forty-eight (48) hours of start of such delay, together with all supporting evidence, and a revised Construction Schedule.

19. Risk

The Work shall be performed and shall remain at Contractor's risk in all respects until it is fully completed, inspected, and accepted.

20. Suspension of Work

a. The Owner reserves the right, without prejudice to other rights, to suspend the work of this Contract in whole or in part by a written, hand-delivered Notice of Suspension stating the extent and effective date(s) of such suspension to the Contractor's Superintendent.

b. Contractor shall have no claim for damages or profits lost by such action. Owner will pay contractor for actual documented direct costs attributed to the suspension and grant a time extension equal to the time of the suspension.

21. Termination of Work

A. Termination for Cause

a. Owner may terminate this Contract for Cause, in whole or in part, at any time, based on conditions on the part of the Contractor, by hand-delivery of a written Notice of Termination to the Contractor Superintendent, duly signed and stating the extent and effective date of such termination. Conditions for such action may or may not include, nor be limited to, one or more of the following: (a) bankruptcy or insolvency; (b) failure to prosecute the work with the diligence required to ensure progress and completion within the time provided in the Contract Documents; (c) failure or refusal to provide a sufficient number of skilled workmen and supervisors; (d) failure during the progress of the Work to comply with instructions, directions, and requirements of the Owner's Representative; (e) failure to perform the work as directed in the Contract Documents or failure to correct completed work that has been rejected as unsuitable or defective; (f) failure to correct judgments entered against the Contractor within five (5) working days of the date of entry; or (g) failure to comply with terms, conditions, and provisions of the Documents.

b. Rights that may be exercised under the Contract by the Owner under this provision, include but are not limited to, suspending payments, in whole or in part, until the deficiency has been corrected; directing the Contractor to replace the Contractor's Superintendent; withdrawing unfinished work in whole or in part, from the Contractor; completing the remaining work at the Owner's sole discretion with the Owner's forces; and/or awarding the remaining work to a new contractor at the Contractor's expense. If the Owner exercises its rights to complete the Work, Contractor shall not receive any further payment until the entire Project is completed. The Owner may take possession of and utilize Contractor's tools, equipment, materials, plant, and appliances located on the site and deemed necessary by the Owner to complete the Work. Actual expenses for completion of the Work, including Owner's managerial, administrative, and legal expenses for completion, shall be detailed and certified by the Owner and shall be binding on both parties. If the certified expenses to complete the Work exceed the unpaid balance of total compensation, Contractor shall be liable to Owner for the excess. If the certified expense to complete the work shall be less than the unpaid balance of total compensation, the difference shall be paid to the Contractor in accordance with provisions of Article 25, Payment.

B. Termination for Convenience

a. Owner may terminate this Contract for Convenience in whole or in part, at any time, upon hand delivery of a Notice of Termination to the Contractor Superintendent, duly signed and stating the extent and effective date of such termination. Upon receipt of such notice, Contractor shall take steps to discontinue the work as specified in the notice and discontinue ordering materials and supplies concerned with the work, and procure cancellation of existing orders and subcontracts at terms agreeable to the Owner.

b. Contractor shall be entitled to payment, in accordance with the terms of the Contract, and based on its costs and expenses incurred until the date specified in the Notice of Termination, and costs and expenses incurred in following the directions of the Owner, provided, however, in no event shall the total compensation earned, exclusive of termination costs and expenses, exceed the total Contract price plus Amendments.

22. Conduct of the Work

a. Contractor and Owner agree that time is of the essence in the performance of this Contract. Actions taken by both parties shall reflect that agreement to ensure full cooperation and coordination with all concerned so that each activity of the Work is performed and expedited to meet scheduled completion dates or milestones as obligated.

b. Contractor shall provide all supervision, labor, materials, equipment, and services necessary to complete the Work described in the Specification in full accord with and as inferred in the Contract Documents.

c. Contractor shall start Work at the site by the date shown on the Notice to Proceed and complete the Work on the completion date submitted with the Proposal.

d. On receipt, Contractor shall review all contract documents including contract drawings, vendor drawings, and specifications to verify dimensions, measurements, and elevations. Owner shall be notified promptly of errors, omissions, or conflicts found in the review. On confirming such error, omission, or conflict, Owner shall issue revised drawings, specifications, or instructions correcting the defect and consider price and time extension adjustments in accord with Article 16 of these General Conditions.

e. Contractor shall receive, unload, and store all materials, tools, supplies, and equipment delivered to the Work Site, including Owner-furnished items, to prevent damage from the elements or otherwise. Contractor shall verify all bills of lading, shipping notices, packing slips, and invoices for Owner-furnished items received and forward them to the Owner's Site Manager. Any damage to Owner-furnished materials or equipment detected during unloading, unpacking, storage, or installation shall be reported to the Owner promptly and in writing.

f. Contractor shall maintain protection of the Work and materials, tools, supplies, and equipment to prevent damage from all types of extreme weather.

g. Contractor shall remove all work and materials that do not conform to the Contract immediately upon request by the Owner and shall promptly replace such nonconforming work or materials at its expense.

h. Contractor shall be responsible for all surveying and layout required to perform the Work. Owner shall furnish Contractor with an on-site survey benchmark and baseline.

23. Drawings, Product Data, Instructions

a. Contractor shall retain one copy of contract drawings, shop drawings, specifications, change orders, and product data, at the Work Site, marked up ("as-built") to reflect current changes and revisions, and readily available for inspection by the Owner.

b. Shop drawings for Contractor-furnished and fabricated items shall be submitted for Owner approval before purchase or fabrication. Owner shall require a maximum of five (5) work days to make their decision to approve or deny the request. Contractor shall be responsible for the accuracy of all shop drawing field measurements.

c. Parts lists, product data, and instructions required for Contractor-furnished and fabricated items shall be furnished at no cost to the Owner on delivery to the Work Site.

24. Schedule

a. Contractor shall prepare and submit a detailed construction schedule of all Work Items with the bid and update it weekly for progress reviews by the Owner. Submittal of such a schedule indicates (1) that the Contractor understands time is of the essence in the Work and (2) that the Owner shall rely on the accuracy of the schedule and the proposed time of completion to make business decisions and judgments.

b. The preferred construction schedule shall be a critical path method (CPM) type or arrow diagram. If a bar chart type schedule is allowed, it must show the scheduled start and stop date for each bid item, updated weekly, to show progress. Exhibit D shows an acceptable form of contractor schedule.

25. Payment

a. Contractor accepts and agrees that the compensation provided for in this Contract constitutes full compensation for doing all work, furnishing all stipulated materials, and performing all contractual provisions. Contractor further agrees to accept all risks of every description connected with completing the Work of this Contract.

b. As soon as practical after the end of each calendar month, the Contractor shall submit a progress payment request form and invoice to the Site Manager, detailing the value of work completed satisfactorily to date, the value of materials delivered to the Work Site, added or extra work incorporated into this Contract by Amendment during the month being evaluated, all related supporting data, and a current schedule and progress report.

c. The Contractor's Superintendent and Owner's Site Manager shall meet within five (5) workdays to review this submission. The Owner's Site Manager shall make the final determination of the value of each progress payment request and so certify the invoice.

d. The amount of each monthly invoice shall be based upon the percentage of satisfactorily completed Items of Work submitted in the Contractor's Proposal, additional and/or extra work satisfactorily completed and incorporated into the Contract by Amendment during the period, and include only the materials physically delivered to the Work Site during the pay period, less amounts previously billed, and less ten (10) percent retained by the Owner to ensure full compliance of Contractor obligations.

e. Change Orders or Amendments for changes and extras shall be subject to retainage and invoiced only in the pay period following their satisfactory completion. The Owner shall not accept partial billing for changes and extras.

f. Within twenty (20) calendar days after receiving the certified invoice for the preceding month, Owner shall remit a progress payment of ninety percent (90%) of the value for satisfactory completed work and Amendments and Contractor-furnished materials.

g. Owner shall remit the retainage to the Contractor on receipt of an invoice, approved by the Site Manager, within twenty (20) work days after (1) Owner's Certificate of Completion and Acceptance is issued showing that full and final inspection and testing has been completed and the entire Work was accepted by the Owner's Site Manager; (2) Contractor has executed a written general release and waiver of liens for all claims against the Owner, property, agents, and employees arising from, under, or connected to this Contract; and (3) Owner has no outstanding claims against the Contractor.

26. Owner's Right to Occupancy

Owner and Owner's employees shall have the right to use, at any time, any or all portions of the Work that have reached a stage of completion as determined by the Owner allowing such occupancy. Occupancy shall not interfere with the Contractor nor prevent efficient completion of the Work. Contractor shall permit such use and facilitate the Owner in use of such portions of the Work whenever requested.

27. Inspection and Acceptance

a. All workmanship and/or material furnished by the Contractor, before and after installation, shall at all times and places be open to inspection, examination, testing, and approval by the Owner. Contractor agrees to coordinate all inspection matters and shall provide assistance and safe, sufficient, and proper facilities for access and inspection.

b. Inspection or failure to inspect by Owner shall not relieve Contractor of responsibility or liability regarding workmanship or materials, nor constitute Owner acceptance.

c. If upon inspection, any workmanship and/or materials are found to be defective, Owner may reject them and direct the Contractor to make corrections to the Owner's satisfaction and at the Contractor's expense.

d. Owner has the right, at any time, and prior to final acceptance to make an examination of work already completed by removing or tearing out the same. Contractor shall promptly furnish all facilities, labor, and material thereof. If such work is found to meet the requirements of the Contract, Contractor shall be compensated for the costs of such examination and replacement under Articles 17, Claims and 25, Payment. If, however, such work is found to be defective and not up to the required standards, Contractor shall bear all costs and expenses of reconstruction to meet specifications.

e. Should the Contractor fail to start replacement of defective workmanship and material within five (5) work days, Owner shall have the right to replace the defective portion at the Contractor's expense, deducting the expenses from the Contract price.

f. Contractor shall perform testing as specified in the Contract Documents. Copies of all required Certificates of Inspection shall be secured by the Contractor and transmitted to the Owner. Contractor shall coordinate and notify Owner as to time and place for all tests. Owner shall pay the costs for such tests and engineering services, except in the cases where the tests show defective workmanship and materials due to fault of the Contractor, in which event, all subsequent tests necessary, as determined by the Site Manager, shall be at the cost of the Contractor.

g. Within four (4) work days after receipt of the Contractor's notice that the Work as a whole is complete and ready for the final inspection, testing, and acceptance, Owner shall make the inspection and tests deemed necessary to comply with the Contract Documents. If the work is acceptable, Owner shall issue a Certificate of Completion and Acceptance covering the Work.

28. Guarantee and Warranty

In addition to the specific guarantees required for the Work, Contractor hereby expressly guarantees and warrants the workmanship and/or materials furnished hereunder against defects in workmanship and materials for a period of one year after the date of acceptance as shown on the Certificate of Completion and Acceptance, and with respect to any portion of the Work that has been repaired after such date of completion for a period of one year from the date of repair. Should Contractor field forces required for such repairs not be actively working within one week of notice to the Contractor, Owner shall, at its option, make the necessary repairs and charge the costs to the Contractor.

29. Confidentiality

All information furnished to the Contractor connected with this agreement shall remain the exclusive intellectual property of the Owner and be treated as proprietary information, not to be disclosed or used without written approval by the owner.

30. Dispute Resolution

Should any dispute, claim, question, or disagreement arise from or be related to this Contract or any breach thereof, Owner and Contractor shall use their best efforts to settle the matter. To this effect, they shall consult and negotiate the matter in good faith, recognizing their mutual interest in reaching a just and equitable solution that is satisfactory to both parties. If no solution is reached in ten (10) calendar days, then upon written notice by either party to the other, disputes, claims, questions, or differences shall be submitted for settlement by arbitration according to provisions of the Construction Industry Rules administered by the American Arbitration Association. Both parties agree to faithfully observe and abide by the rules and judgment rendered.

Those disputes concerning interpretation and intent of Contract Documents not settled to the satisfaction of the Owner and Contractor or vendor within twenty-four (24) hours of notification, shall be submitted by the Owner to the American Arbitration Association for fast track (2-day) binding arbitration.

EXHIBIT C:
CRAFT HOURLY RATES
(For Changes in the Work)

Bidder: HARPERCON, Inc.
Specification Number. PIPE-101.3 Date Submitted: June 22, 1998

List hourly rates for all crafts and labor required for the Inquiry. Rates shall remain fixed for the duration of the Work.

Craft	Hrly. Base Rate	Markup	Fringes (at Cost)	Billing Rate *
Welder	$16.00	62%	$ 9.92	$25.92
Pipefitter	$15.50	62%	$ 9.61	$25.11
Helper	$12.99	62%	$ 7.44	$19.44
Laborer	$ 8.00	62%	$ 4.96	$12.96
Carpenter	$15.00	62%	$ 9.30	$24.30
Helper	$10.50	62%	$ 6.51	$17.01
Crane Operator	$15.00	62%	$ 9.30	$24.30

* Billing Rate includes Base Rate, all Work Site and home office Overhead and Profit, Fringe Benefits, Payroll Taxes, Worker's Compensation and Employer's Liability Insurance, travel allowance, small tools, consumables, and expendable supplies.

EXHIBIT D:
CONSTRUCTION SCHEDULES

1. Bidders shall prepare and submit a construction schedule with their proposal to show (a) the planned activity and number of employees assigned to work on the site for each week of the schedule, (b) the planned dates to start and complete each bid item, and (c) the scheduled contract completion date.
2. The Owner's preferred type of construction schedule is the critical path method (CPM) or arrow diagram. Bar chart type schedules may be substituted for selected contracts with the Owner's prior approval. If a bar chart type construction schedule is submitted, it shall be similar in form and content to the attached Sample Schedule and Progress Report.
3. The status of each Construction Schedule and Progress Report shall be updated weekly for review at the Site Manager's Progress Meetings and for submittal with monthly progress payment request forms. (Reference Article 24 b. of Exhibit B, General Conditions.)

ANYCO, Inc.

SAMPLE

CONTRACTOR SCHEDULE AND PROGRESS REPORT

PROJECT: GYPSUM PROCESSING PLANT CONSTRUCTION

BID ITEM	WORK DESCRIPTION	BID VALUE	% OF BID	% ITEM COMP.	MONTH / WEEK ENDING	JUN 3	JUN 10
1.0	MOBILIZE	$17,246	1.10	100%	100%		
					% CONTRACT		
2.0	OFFICE/SHOP SITE				COMPLETION		
2.1	EXCAVATE/GRADE	$39,196	2.50	100&	90%		
2.2	COMPRESSED AIR SYS.	$18,814	1.20	100%			
2.3	U/G PIPING SYSTEMS	$48,603	3.10	100%			
2.4	SEWAGE PLANT	$15,678	1.00	100%	80%		
2.5	FOUNDATIONS	$47,035	3.00	100%			
2.6	ELECT./ INSTRUM.	$54,874	3.50	100%			
2.7	PRE-FAB BUILDING	$84,663	5.40	30%	70%		
3.0	HAUL ROADS						
3.1	EXCAVATE/GRADE	$109,749	7.00	100%	60%		
3.2	SOIL CEMENT BASE	$164,623	10.50	100%			
3.3	SURFACE	$210,090	13.40	66%			
					50%		
4.0	PROCESS SITE						
4.1	EXCAVATE/GRADE	$51,739	3.30	100%			
4.2	SPREAD FOOTINGS	$68,985	4.40	100%	40%		
4.3	COMPRESSED AIR SYS.	$40,764	2.60	100%			
4.4	U/G PIPING SYSTEMS	$108,181	6.90	100%			
4.5	FOUNDATIONS, PAVING	$137,970	8.80	30%	30%		
4.6	ELECT. / INSTRUM.	$134,834	8.60	-0-			
4.7	RAW MAT. FACILITY	$197,547	12.60	-0-			
					20%		
5.0	DEMOBILIZE	$17,246	1.10	-0-			
					10%		
TOTALS		$1,567,837	100%		0%		

SCHED. % COMPLETE:	1.1	2.4
ACTUAL % COMPLETE:	1.1	2.4
WORK WEEK NUMBER:	1	2

LEGEND

SCHEDULED PROGRESS:	-X-
ACTUAL PROGRESS:	-O-
SCHED. NO PROGRESS:	N/P
COMP. ON SCHEDULE:	
COMPLETE LATE:	LATE
REPORT PERIOD:	▼

FORM PS(Rev. 3/94)

Page 1 of 2

FIGURE D.1 Sample schedule and progress report form

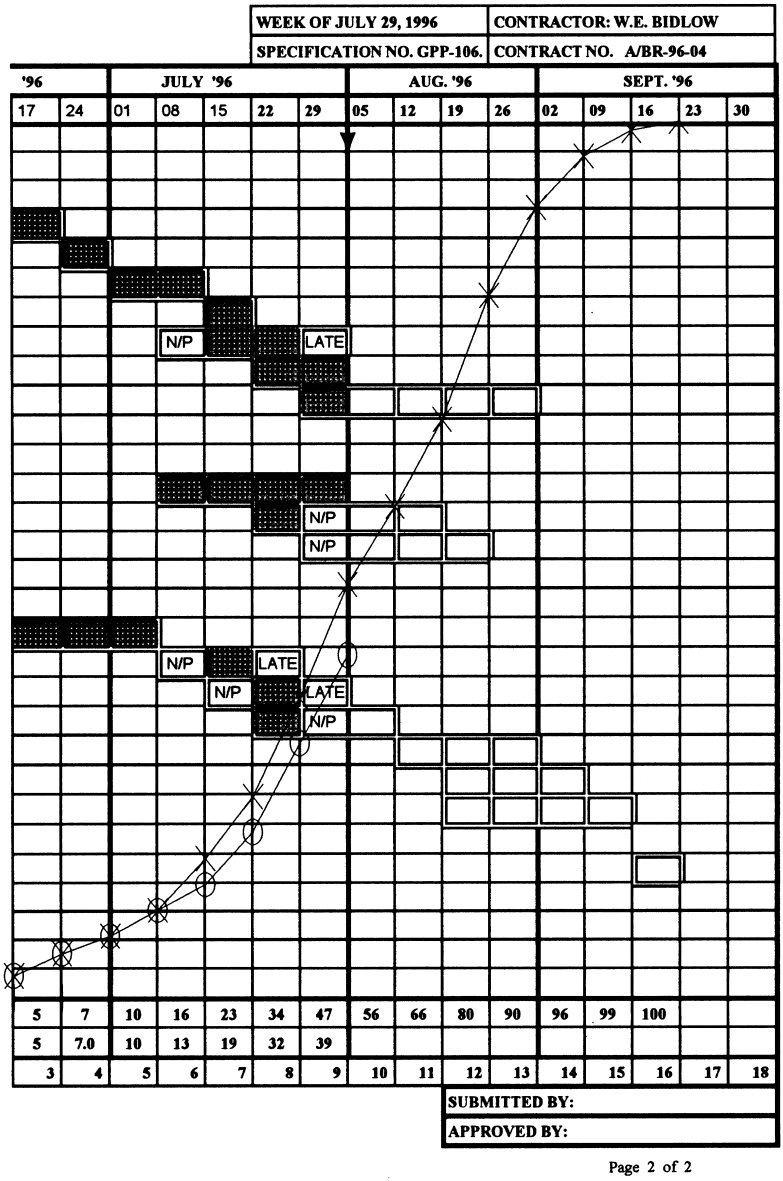

FIGURE D.1 Sample schedule and progress report form *(continued)*

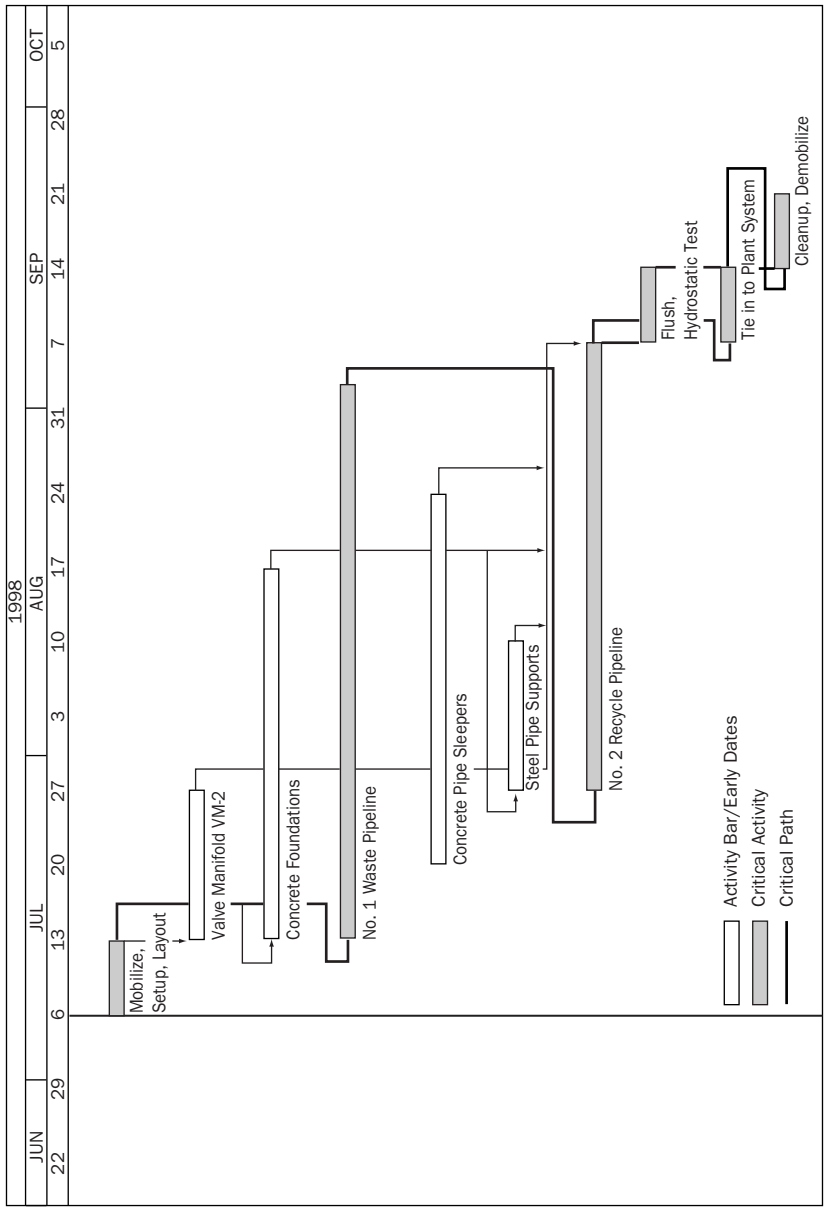

FIGURE D.2 Sample CPM construction schedule

EXHIBIT E:
SAFETY, HEALTH, AND SECURITY REQUIREMENTS

ANYCO, Inc. is committed to a safe work place for employees and Contractors. It shall be a contractual obligation for Contractors to implement a program consisting of not less than the requirements outlined in Exhibit E and to take all reasonable measures to prevent and reduce potential for exposure, injury, or damage from accidents to all personnel and equipment in performing the Work.

Contractors shall sign and return a copy of the attached "Safety, Health, and Security Agreement" with their Proposal. Contractor shall furnish a copy of their compliance plan for all applicable "right-to-know" laws concerning hazardous materials in the work place, and a resumé of their proposed on-site Safety, Health, and Security Coordinator to be responsible for compliance with Exhibit E and accident prevention. Contractor agrees to notify Owner of hazardous conditions or equipment found at the Work Site and not under the Contractor's control. It remains the responsibility of the Contractor to take all necessary precautions against injury from such hazards until corrected by the responsible party.

Contractor alone is obligated and assumes responsibility for the safety and health of its employees and agents at the Work Site. Contractor agrees to perform the Work in a safe manner and abide by and enforce all federal, state, and local safety laws and regulations. Contractor shall insure that their employees, and others authorized to visit the Work Site, observe and are familiar with current requirements, procedures, regulations, and amendments of the applicable Agency in the Code of Federal Regulations (CFR) titles. Included but not limited to are the Occupational Safety and Health Act of 1970 (OSHA), including all applicable OSHA 29 CFR , Environmental Protection Agency (USEPA), and Mine Safety and Health Agency (MSHA) Standards. Contractor shall furnish all apparel, materials, equipment, tools, labor, instruction, and supervision necessary for the safety of their employees and authorized agents.

All Contractor employees and agents shall show proof of completing an approved General Contractor Safety and Health Orientation Seminar administered by approved Industrial Managers Associations, and attend the Owner's site-specific Pre-Job Contractor Safety Orientation before starting work at the Zachary Plant.

Contractor personnel at the Work Site shall at all times comply with the following Basic Safety, Health, and Security Requirements. Personnel violating these Requirements will be refused admittance to the Work Site. Copies of the ANYCO, Site Safety Procedures Manual will be available at the Pre-Bid Meeting.

A. Basic Safety and Health Requirements

1. Contractor personnel shall comply with all federal, state, and local government, and Owner and Contractor safety laws, codes, rules, standards, and regulations. Included are the current requirements of Occupational Safety and Health Act of 1970 (OSHA) and OSHA 29 CFR Standards.
2. Minimum requirements for PPE (Personal Protective Equipment) applicable to the Work being performed in plant operating areas include:
   A. ANSI-approved hard hats and industrial-strength safety glasses with permanently attached side shields shall be worn by everyone while in plant, operating areas; except in offices, control, lunch, and change rooms.
   B. Work shoes or boots with stiff leather uppers shall be worn. No open-toed shoes, sandals, or athletic shoes are allowed within the Work Area.
   C. Substantial work clothing includes long sleeved shirts buttoned at the wrist with a collar and long trousers. No tank tops, cut-offs, or shorts.
   D. No contact lenses are to be worn in plant operating areas. No facial hair is permitted in respirator sealing surfaces of the face.
3. Smoking and eating are permitted only in designated areas.
4. Plant speed limit is 11 miles per hour and strictly enforced. Seat belts shall be worn when riding in electric, diesel, or gasoline-powered vehicles.
5. All safety and health incidents (accidents, injuries, illness, first aid cases, unsafe conditions, and near misses) shall be reported to the employee's Foreman and to the Owner's Site Administrator at the time of occurrence.
6. Alcohol, drugs, firearms, weapons, horseplay, fighting, gambling, cameras, and practical jokes are prohibited on the Work Site.
7. Contractor employees shall be instructed in complying with the Owner's Life Critical Procedures; including, Excavation/Trenching, Confined Space Entry, Elevated Work Practice, Lockout/Tagout, Line Entry, Hot Work, Hazardous Emissions, and Power Equipment Grounding and Use. Life Critical Procedures shall be reviewed and copies shall be made available to Bidders at the Pre-Bid Meetings.

B. Security Regulations

1. Contractor employees shall use their designated construction access gate only.
2. Contractor shall provide photographic identification badges for employees and agents.
3. Contractor employees shall be subject to scheduled and random identification and inspection checks by security guards as are the Owner's employees.
4. Contractor vehicles require a gate pass to enter the Work Site. Employees' personal vehicles shall use the designated parking area near their construction access gate.
5. Contractor shall assume complete responsibility for Contractor tools and equipment. Contractor shall take steps necessary to prevent theft of tools or property by employees from the Work Site.
6. Contractor shall provide their own toilet, first aid, and change facilities.

C. Work Site Access

1. Contractor agrees that the Owner can refuse access to the Work Site to any construction employee violating or deemed to have violated the Safety, Health, and Security Requirements related to the Work. Contractor agrees to so inform its employees and to indemnify and hold Owner harmless for any such action that may be taken.

AGREEMENT
SAFETY, HEALTH, AND SECURITY REQUIREMENTS

I have read and understood the ANYCO, Inc. Safety, Health, and Security Requirements (Exhibit E) for their Zachary, Louisiana, Plant Site.

I have read and understood the ANYCO, Inc. Site Life Critical Procedures applying to Excavation/Trenching, Confined Space Entry, Lockout/Tagout, Elevated Work Practice, Line Entry, Hot Work, Hazardous Emissions, and Electrical Power Equipment Grounding and Use.

If awarded a contract by ANYCO, Inc. for Specification Number: Pipe-101.3, I agree to review these requirements with my employees before starting Site Work and ensure that they understand and are willing to abide by them.

I further agree to abide by the ANYCO, Inc. Safety, Health, and Security Requirements, and all applicable Occupational Safety and Health Act of 1970 (OSHA) Regulations and Standards including those made under OSHA 29 CFR and MSHA while following recognized and generally accepted good construction practices.

Signature:	*James Harper*
Title:	Vice President, Construction
Company:	HARPERCON, Inc.
Date:	June 21, 1998

EXHIBIT F:
LIST OF PROPOSED SUBCONTRACTORS

Bidder: HARPERCON, Inc.
Specification Number. PIPE-101.3 Date Submitted: June 22, 1998

Subcontractor Name & Address	Type of Work	Subcontract Craft Hours	$ Amount of Subcontract

Do not propose to use subcontractors for this work.

James Harper 06/22/98

EXHIBIT G:
INSURANCE REQUIREMENTS

1. Contractor shall furnish Owner an insurance certificate(s) including "Waiver of Subrogation" and "Notice of Cancellation" clauses as in the "Sample Certificate of Insurance" on page 2, with their bid. Certificates shall maintain the following minimum insurance coverage in full force during the term of the Contract and all warranty periods.

Item	Coverage	Limits of Liability
A.	Workmen's Compensation	Statutory limits
	Employer's Liability	$1,000,000
B.	Employer's Liability, Maritime • Jones Act • U.S. L. & H. Compensation Act	$500,000 per occurrence and aggregate where applicable Statutory limits
C.	Comprehensive General Bodily Injury Liability	$1,000,000 per occurrence and aggregate where applicable
D.	Comprehensive General Property Damage Liability	$1,000,000 per occurrence and aggregate where applicable
E.	Automobile Bodily Injury Liability	$1,000,000 each person; $1,000,000 per occurrence
F.	Automobile Property Damage Liability	$1,000,000 per occurrence
G.	Excess Liability Umbrella	$10,000,000

2. Contractor to furnish Builder's All Risk Insurance covering materials and equipment to be incorporated into the Work equal to the amount of the Contract, value of all Owner-furnished equipment, materials, and supplies, and value of tools, machinery, equipment, and vehicles owned or rented by Contractor or his employees.
3. Other special coverage that may be required by the Owner and named in the "Letter of Understanding," "Proposal," or "Special Conditions" sections of the Bid Package and covering non-routine items such as blasting, excavation, subsurface, and hazardous waste activities.
4. Policies in Items 1.C, D, and G above shall include coverage for:
   a. Broad form property damage; b. Contractual liability assumed in the Contract; c. Contractor's protective liability, covering all Subcontractors and Vendors; d. Product liability; and e. Completed operations.
5. Obligations to carry insurance required by this Exhibit G shall not limit nor modify in any way other obligations assumed by Contractor under this Contract.

INSUREMALL INSURANCE COMPANIES

CERTIFICATE OF INSURANCE

Effective Date: Dec. 31, 1997

This certification shows that (HARPERCON, Inc., 200 Muddy Bayou, Ruston, Louisiana 71273) has in force at this time the following Policies of Insurance with the Companies indicated below, covering their operations at any location in the United States of America, in accordance with the contained terms and conditions.

A INSUREMALL WORLDWIDE UNDERWRITERS INSURANCE COMPANY. (IW)
B INSUREMALL INSURANCE OF PUERTO RICO. (IPR)
C INSUREMALL OF LOUISIANA. (IL)

Coverage	Company	Policy No.	Policy Period	Limits of Liability
Workers Compensation &	A	IWWC 98001	12/31/97	Statutory Limits.
Employers Liability		IL 9807	to	$1,000,000 Each Accident.
(All States)			12/31/98	$1,000,000 Policy Limit.
Employer's Liability, Maritime	A	IWELM 98009	12/31/97	$500,000 Each Occurrence.
-Jones Act			to	$500,000 Aggregate
-U. S. L & H.			12/31/98	Statutory Limits.
Comprehensive General Liability	B	IPR 981008	12/31/97	$1,000,000 Combined Single
-Bodily Injury Liability			to	Limit Per Occurrence.
-Property Damage Liability			12/31/98	$1,000,000 Aggregate.
Automobile Liability	B	IPR AL98205	12/31/97	$1,000,000 Each Person and
-Bodily Injury			to	$1,000,000 Each Occurrence.
-Property Damage			12/31/98	$1,000,000 Per Occurrence
(Include Owned, Hired, & Non-Owned Automobiles)				
Excess Liability Umbrella:	C	IL 9821	12/31/97 to 12/31/98	$10,000,000
Other Insurance	NONE			

Waiver of Subrogation and/or additional Insured Provisions provided as required by written contract.

Absence of entry in any space means that the insurance is not afforded to the coverage opposite. This Certificate of Insurance neither amends, extends, nor alters the coverage afforded by the above policies.

Should there be cancellation or material change in one of the policies above, 30 days prior written notice shall be given the Certificate Holder.

WORK LOCATION AND PROJECT DESCRIPTION: All shoreside and marine construction projects within the continental limits of the United States of America.

NAME AND ADDRESS OF CERTIFICATE HOLDER:

HARPERCON, Inc.
200 Muddy Bayou, Ruston, LA 71273

J. Richard Harry, June 18, 1998

AUTHORIZED REPRESENTATIVE
INSUREMALL INSURANCE COS.
P. O. BOX 10, JACKSON, LA 70748
504/555-4321

EXHG (Rev.01/96)

Page 2 of 2

FIGURE G.1 Sample certificate of insurance for bidding purposes

EXHIBIT H:
EXECUTION PLAN

Bidder: HARPERCON, Inc.
Specification No. Pipe-101.3 Date Submitted: June 22, 1998

If requested in the Bid Proposal Form, Bidder shall provide a Project Execution Plan stating how the work would be executed and including at a minimum the following information.

1. Bidder's Project Organization. Include Home Office and Field Personnel.
2. Names and Resumés of key personnel. Include the Project Manager and Site Manager.
3. Project Control Plan for Schedule, On Site Engineering, Costs, Quality Assurance and Quality Control (QA/Q).
4. Project Labor Source(s).
5. Construction Equipment List. Owned and Proposed Rentals.
6. Constructability Review. Consider key items of work, equipment, materials, methods, sequencing, schedule, and alternates.
7. Bidder's Project-Specific Safety and Health Plan.

No Execution Plan was requested and none is being submitted.

James Harper 06/22/98

EXHIBIT I:
ALTERNATE PROPOSALS
(FORM BY BIDDER)

Bidder: HARPERCON, Inc.
Specification No. Pipe-101.3 Date Submitted: June 22, 1998

(Use this Exhibit only if you have alternate proposals for the subject Inquiry.)

We have no alternate proposals for this work.

James Harper June 22, 1998

EXHIBIT J:
WASTE GYPSUM RECYCLE PIPING MODIFICATIONS SPECIFICATION

PIPE-101.3
June 1, 1998

SAMPLE SPECIFICATION

Prepared By: *Thomas Thompson* Date: May 21, 1998

Approved By: *Richard Roads* Date: May 25, 1998

Approved By: *Harry Kerry* Date: May 25, 1998

1.0 SCOPE OF WORK

1.1 Work Included

Work covered by this Specification consists of furnishing supervision, labor, plant and equipment, materials, supplies, transport, and services (except those items listed in Section 3.0 as being Owner furnished) required to complete the waste gypsum recycle piping modification work indicated on the furnished drawings, attachments, and as specified herein at the Owner's Zachary, Louisiana, Gypsum Plant. Work shall include, but not be limited to items further described in Section 1.3, Items of Work of this Specification.

1.2 Work Not Included

Work Not Included consists of all electric and instrument connections, cathodic protection, insulation, mechanical, painting, and that shown as Work Not Included in the "balloons" on Contract Drawings: Waste Gypsum Recycle - Piping Plan, 03-P-102, Rev. 2 and Waste Gypsum Recycle - Piping Detail, 03-P-103, Rev. 4.

1.3 Items of Work

The Scope of Work that the Contractor is to perform under this Specification is described in two places: (a) the contract and reference drawings in Section 2.1.2, and (b) in the language of the Project Specification. Work shall include, but not be limited to, the following items:

1.3.1 Mobilize

a. Mobilize and setup the Contractor's yard area as designated on Drawing No. 03-G-100, Rev. 6, General Plant Layout for the Contractor's equipment, office trailer, and as a secure storage area for the Owner-furnished items transferred to the Contractor's possession.

b. Provide construction electrical power for the Work Site and Provide for disposal of trash in the "Contractor Disposal Area" shown on Drawing No. 03-G-100, Rev. 6, General Plant Layout.

1.3.2 No. 1 Waste Pipeline

a. Furnish all piping, valves, and fittings (except those shown in Section 3.0 as being Owner furnished) and install to complete the installation of the No. 1, 1,219.2 m (4,000 ft.) × 30.48 cm (12 in.), Schedule 40, Waste Gypsum Pipeline from the existing valve manifold VM-1 to new VM-2. Tag new gate valves. Maximum flanged joint length shall be 12.192 m (40 ft.).

1.3.3 No. 2 Recycle Pipeline

Furnish all piping, valves, and fittings (except those shown in Section 3.0 as being Owner furnished) and install to complete the installation of the No. 2, 1,219.2 m (4,000 ft.) × 30.48 cm (12 in.), Schedule 20, Recycle Gypsum Pipeline from existing valve manifold VM-1 to new VM-2. Tag new gate valves. Maximum flanged joint length shall be 12.192 m (40 ft.).

1.3.4 Valve Manifold VM-2

Furnish, fabricate, and install new valve manifold VM-2.

1.3.5 Concrete Foundations

Furnish all material and construct the combination concrete foundations and pipe supports located between the existing valve manifold VM-1 and the waste gypsum disposal area. Furnish and install the anchor bolts, metal shims, and grout to connect the new steel pipe supports to the concrete foundations.

1.3.6 Concrete Pipe Sleepers

a. Fabricate concrete pipe sleepers and embedded steel plate pipe saddles to support Pipelines No. 1 and No. 2.

b. Install sleepers on grades as shown on Contract Drawing 03-P-102, Rev. 2, Waste Gypsum Recycle - Piping Plan.

1.3.7 Steel Pipe Supports

Furnish, fabricate, and install steel pipe supports as shown on Contract Drawing 03-P-103, Rev. 4, Waste Gypsum Recycle - Piping Detail.

1.3.8 Flush and Test System

a. Flush, clean-out, test, repair, and retest if necessary, new piping system.

b. Furnish and dispose of test water, fittings, hoses, gauges, instruments, and pumps required to perform the hydrostatic tests.

c. Maintain and submit written records of tests to the Site Manager.

1.3.9 Tie in to Existing System

a. Connect the new waste gypsum disposal and recycle piping systems to the existing plant valve manifold VM-1 and the new valve manifold VM-2.

b. Tie-in shall be coordinated by the Site Manager with Plant Operations to take place during the scheduled weekly plant maintenance shutdown.

1.3.10 Demobilize

a. On completion, remove Contractor equipment, material, and waste from the Work Site.

b. Grade and restore Contractor's yard area to original contours.

1.4 Commencement, Prosecution, and Completion

a. Upon receiving the Owner's Notice Of Award, the Contractor shall commence immediately to order Contractor-furnished materials and equipment, prepare working drawings for approval, and other work that can be done off site. Site work shall not start until the Contractor has received the Owner's written Notice to Proceed with Field Work. Contractor shall complete the various items of the work within the following number of working days from the date specified in the Notice to Proceed with Field Work.

b. Items of Work	Days to Complete	Work Area Availability
1.3.1 Mobilize	5	At Notice to Proceed
1.3.2 No. 1 Waste Pipeline	40	At Notice to Proceed
1.3.3 No. 2 Recycle Pipeline	30	At Notice to Proceed
1.3.4 Fab. New VM-2	10	At Notice to Proceed
1.3.5 Concrete Foundations	25	At Notice to Proceed
1.3.6 Concrete Sleepers	25	At Notice to Proceed
1.3.7 Steel Pipe Supports	10	At Notice to Proceed
1.3.8 Flush and Test	5	After pipeline completion
1.3.9 Tie in to Plant System	5	Coordinate with Site Manager
1.3.10 Demobilize	5	After Item 1.3.9 completion and Acceptance

c. These completion requirements are based on each area being available to start work as shown. Interim ("milestone") completion requirement dates are as binding a contractual obligation as is the final completion date. The Owner anticipates that the Notice to Proceed will be issued to start the Work on or about July 6, 1998. All Work under this Specification shall be completed as soon as due diligence and good practice permits; but, in any event, not later than 81 calendar days from the starting date specified in the Owner's Notice to Proceed with Field Work.

1.4.1 Area Available to Contractor

The Contractor shall confine his yard, office trailer, and storage activities to the area specifically designated to him and shown on Drawing No. 03-G-100, Rev 6, General Plant Layout, "Contractor's Yard Area."

1.4.2 Layout of the Work

The Owner will provide coordinate base lines and a level bench elevation at the plant site. The Contractor shall lay out all work from such base line and bench elevation mark, and shall be responsible for the accuracy of all lines and grades established by his employees. Contractor shall protect the Owner's coordinate reference points and bench elevations during the progress of the work.

1.4.3 Contractor-Furnished Drawings and Data

a. Contractor shall submit required drawings for the Owner's approval. Owner will approve or note corrections required, and return two copies to the Contractor. If corrections are required Contractor shall make corrections and resubmit the corrected drawings. Two copies of the Owner-approved drawings will be returned to the Contractor. The Owner will require a maximum of five (5) calendar days to review and write comments on the Contractor's submittals for approval.

b. Owner approval of shop drawings or data shall not relieve the Contractor of responsibility for any deviation from the requirements of the contract documents unless the Contractor has called the Owner's attention to such deviation at the time of submission and received the Owner's written approval to the specific deviation. The Owner's approval of any shop drawings or data shall not relieve the Contractor from responsibility for errors or omissions in the shop drawings or data.

c. Contractor shall furnish one (1) set of marked-up "As Built" Drawings to the Owner's Site Manager within five (5) working days of the final inspection and acceptance of the Work.

2.0 PROVISIONS

2.1 GENERAL PROVISIONS

2.1.1 Drawings and Publications

Work performed and all Contractor-furnished materials for this Contract shall conform to the rules and regulations of all Statutory Authorities having jurisdiction over the work, including but not limited to OSHA, MSHA, and EPA. Work performed for this Contract shall be in accordance with ANYCO, Inc. Specifications, Drawings, Construction Standards, and the latest editions and revisions of applicable Industry and Government Standards and Codes.

2.1.2 Contract Drawings

Title	Number	Revision
Waste Gypsum Disposal - P&ID	03-P-101	1
Waste Gypsum Recycle - Piping Plan	03-P-102	2
Waste Gypsum Recycle - Piping Detail	03-P-103	4
Reference Drawings		
General Plant Layout	03-G-100	6

2.1.3 Owner Construction Standard Specifications

Title	Number	Revision
Installation of Service Piping	AP-12	1
Service Piping Test Procedures	APT-1	3
Concrete, General Construction	AC-40	5
Grouting, Non-Rotating Equipment	AG-37	1

2.1.4 Industry Standards and Codes

Title	Number
American Society for Testing and Materials (ASTM)	
Welded and Seamless Pipe	A 53
Structural Steel	A 36
Forged or Rolled Steel Pipe Flanges for General Service	A 181
American National Standards Institute (ANSI)	
Power Piping	B31.1.0
American Concrete Institute (ACI)	
Reinforced Concrete, ACI Building Code	ACI 318

2.2 TECHNICAL PROVISIONS

2.2.1 Codes and Standards

Should any requirements of this Specification be in violation of National, State or Local Codes, such applicable Code requirements shall prevail. However, if any requirement of this Specification calls for a higher quality of material or workmanship than the applicable codes, the requirements of this Specification shall prevail.

2.2.2 Brand Names

The words “or equal” as used in this Specification or any of the referred Construction Standard Specifications shall mean only those brand names and model numbers that have had written Owner approval prior to start of Work.

2.2.3 Piping

All piping installation and welding covered by this Specification shall be furnished, installed, and tested in accordance with ANYCO, Inc. Construction Standards AP-12 and APT-1, except as either may be supplemented or modified hereby and as indicated on the drawings.

2.2.4 Inspection of Premises

By submitting a Proposal to do the Work, Contractor certifies that the work location has been carefully inspected. Contractor further certifies to having first-hand knowledge of the existing site conditions, structures, obstructions, and area access, and that no discrepancies have been found between the drawings, Specification, and the work location conditions. Failure to report such discrepancies, prior to the start of work, constitutes acceptance of the areas as acceptable to perform the work as bid, and no exceptions will be allowed.

2.2.5 Dimensions and Layout

Contractor shall be responsible for verifying all dimensions and layout of Work.

2.2.6 Pipe Supports

All pipe supports and miscellaneous steel shall be furnished and installed as indicated on the drawings and in accordance with ANSI B31.1.0.

2.2.7 Materials

Materials furnished under this specification shall be new, first quality, and free from fins, blemishes, and defects. Substitutions of materials of higher quality or longer service life may be made only if approved by the Owner's Site Manager.

2.2.8 Valve Tags

Valves shall be permanently tagged with the Owner-furnished, stainless steel valve tags and chain as specified on the construction drawings.

2.2.9 Piping Material Specifications

Design Conditions and Service

Pressure: 1.03 MPa (150 psi). Temperature: 65.60°C (1500°F).

Service: Waste Gypsum Slurry, aboveground piping.

Schedule and Material: API5LX-46. E.R. Welded B.E. 30.48 cm (12 in.)

3.0 OWNER-FURNISHED SERVICES AND MATERIALS

Owner-furnished services and materials are listed below. Quantities are not necessarily the total quantity required to complete the work under this specification. All other services and materials, including additional quantities of the materials listed herein, necessary to perform the Work under this Specification, shall be furnished by the Contractor. All of the Owner-furnished material that is not used for this project shall remain the property of the Owner.

3.1 Four (4) sets of Specification No. PIPE-101.3 and four (4) sets of "Approved for Construction" drawings on award of the contract.

3.2 Access to the Work Site and Contractor's yard area will be available on the date stated in the Notice to Proceed with Field Work.

3.3 Potable water shall be available for Contractor personnel not to exceed 190 L (50 U.S. gal.) per day.

3.4 A coordinate base line and elevation benchmark shown on Drawing, General Plant Layout, 3-G-100, Rev. 6, shall be in place and available for use on the date stated in the Notice to Proceed with Field Work.

3.5 Pipe

Description and Size	Total Quantity
a. Schedule 40, API 5LX-46, E.R. Welded B.E. 12.192 m (40 ft.) × 30.48 cm (12 in.)	1,219.2 m (4,000 ft.)
b. Schedule 20, API 5LX-46, E.R. Welded B.E. 12.192 m (40 ft.) × 30.48 cm (12 in.)	1,219.2 m (4,000 ft.)
c. Pipe will be on site and available when the Notice to Proceed with Field Work is issued, and shall be located in the work area within 350 ft. of the existing valve manifold VM-1 shown on Drawing 03-P-102, Rev. 2.	

3.6 Flanged Gate Valves

Quantity	Part Number	Size	Rating
2 each	V-205	30.48 cm (12 in.)	1.03 MPa (150 psi)
2 each	V-206	30.48 cm (12 in.)	1.03 MPa (150 psi)
2 each	V-105	20.32 cm (8 in.)	1.03 MPa (150 psi)
2 each	V-106	20.32 cm (8 in.)	1.03 MPa (150 psi)

3.7 Valve Tags

Two (2) each 7.62 cm (3 in.) stainless steel valve tags with stainless steel chain for valves V-205, V-206, V-105, and V-106.

4.0 ATTACHMENTS

4.1 Four (4) sets of ANYCO, INC. Contract and Reference Drawings:*

Waste Gypsum Disposal - P&ID	03-P-101, Rev. 1
Waste Gypsum Recycle - Piping Plan	03-P-102, Rev. 2
Waste Gypsum Recycle - Piping Detail	03-P-103, Rev. 4
General Plant Layout	03-G-100, Rev. 6

*Used for reference only; not included with this sample bid package.

4.2 Four (4) sets of ANYCO, Inc. Corporate Construction Standards:

Installation of Service Piping	AP-12, Rev. 1
Service Piping Test Procedures	APT-1, Rev. 3*
Concrete, General Construction	AC-40, Rev. 5
Grout, Non-Rotating Equipment	AG-37, Rev. 1

*Used for reference only; not included with this sample bid package.

4.3 Addendum No. 1 Dated 06/10/98.

ATTACHMENTS

ANYCO, INC. Piping, Construction Standards AP-12, Rev. 1

CONSTRUCTION STANDARD SPECIFICATIONS

PIPING, CARBON STEEL, PROCESS, ABOVEGROUND SERVICE

Note: Contents of all Construction Standard Specifications are subject to modifications by either the Project Specifications and/or Drawings. Contractors should review each carefully for possible modifications or changes.

1. SCOPE

Construction Standard Specification AP-12, Rev. 1 is intended to cover the code requirements and procedures for materials, fabrication, erection, and testing for 20.32 cm (8 in.), 25.40 cm (10 in.), 30.48 cm (12 in.), and 35.56 cm (14 in.) carbon steel, process piping systems, installed above ground, at ANYCO, Inc. facilities. Piping systems shall include pipe, valves, fittings, connections, and supports.

2. GENERAL

It is the Owner's intent that all piping systems shall perform their functions in a safe and dependable manner. To that requirement, contractors are directed to review all the bid package and specification documents and drawings thoroughly before fabrication and assembly to identify the applicable codes and operating characteristics required. Items to consider include material to be piped, system operating pressures and temperatures, construction requirements, materials of construction, erection, and final inspection and testing requirements. If questions arise, they shall be directed to the Owner's Site Manager.

3. CODES AND SERVICE

3.1 Welding done under this Engineering Specification shall be governed by the ASME Chemical Plant and Petroleum Refinery Piping Code, B31.3, latest edition. If conflicts arise between the code and the specification or drawings, the requirements of the specification or drawings shall prevail. Conflicts between the code, specification, and drawings and federal, state, and local codes shall be made known to the Owner's Site Manager at once.

3.2 Pipe shall meet ASTM A-53 and A-120 requirements.

3.3 Steel flanges shall meet ASTM A-181 requirements.

3.4 Butt-welding ends shall meet ANSI B16.25.

3.5 Service shall be limited to low-viscosity, non-corrosive, maximum 10.55 kg/cm^2 (150 psi), and 65.6°C (1,500°F) applications only.

4. MATERIALS

4.1 All materials shall be new, free of defects, manufactured within tolerance and limits specified in their respective codes, and capable of fulfilling the functions and purposes specified.

4.2 New gaskets shall be used for every flanged pipe assembly operation unless such assembly is intended for fit-up only. The Contractor shall furnish sufficient gaskets to meet this requirement.

4.3 Flange bolt length shall not exceed ASA B16.5 specified length. All bolts shall extend completely through their nuts. Owner-approved anti-seize thread lubricant shall be applied to the full length of the bolt threads.

4.4 Pipe hangers and supports shall be fabricated in accord with ASME B31.1 and B31.3, latest revision. Maximum unsupported pipe spans for carbon steel, process piping, shall be governed by the following table.

Size: 20.32 cm (8 in.)	25.40 cm (10 in.)	30.48 cm (12 in.)	35.56 cm (14 in.)
Span: 6.1 m (20 ft.)	7.01 m (23 ft.)	7.62 m (25 ft.)	7.62 m (25 ft.)

4.5 Electric Metallic Arc-Welding method electrodes shall be furnished in sealed containers only. Open containers not scheduled for immediate use shall be stored in an Owner-approved holding oven.

4.6 Electric Metallic Arc-Welding electrodes shall be Class E-6010, high cellulose sodium coated, for use with DC-reverse polarity (electrode positive) only. Minimum tensile strength of deposited material shall be 4,358.6 kg/cm^2 (62,000 psi). Pre-approved electrodes shall be Fleetwood No. 5 by Lincoln Electric Co. or Weldarc Type 6010 by Alloy Rod Co. Any requested substitute must be approved by the Owner's Site Manager before use.

4.7 All construction material, (including Owner-Furnished Material assigned to the Contractor's custody), shall be stored, handled, and distributed in a secure manner that prevents damage to the material or personnel.

5. FIELD FABRICATION AND WELDING

5.1 Before starting work, Contractor shall submit a written Welding Procedure to the Owner for approval. It shall identify welding procedures and techniques required for the Work, and describe the provisions to ensure that all pipe welds meet complete penetration and proper fusion requirements.

5.2 The first weld by each welder shall be 100% radiographed at the Contractor's expense and with the Owner's Welding Inspector present.

5.3 Film of each radiographed weld shall be made available for interpretation by the Owner's Welding Inspector.

5.4 Welds failing to meet approval by the Owner's Welding Inspector shall be repaired at the Contractor's expense.

5.5 Striking an arc in other than the weld area shall be prohibited.

5.6 Welding shall not be done during adverse weather. The Owner shall make the determination if work shall continue.

5.7 Templates shall be used to lay out headers, miters, laterals, and other irregular details to assure accurate cutting and fit-up.

5.8 Alignment shall be preserved during welding by tack welds spaced as required, but with at least one tack weld in each quadrant. Tack welds shall be of the same quality and material as the completed weld and shall be thoroughly fused with the weld beads.

5.9 Only those tack welds that penetrate fully to the bottom of the weld groove shall be incorporated into the finished weld. Welds lacking proper penetration shall not be accepted and shall be chipped out and re-welded.

5.10 The root opening of butt welded pipe joints shall not exceed .32 cm ($^1/_8$ in.). Wire spacers may be used during preliminary tack welding, but shall be removed before starting the butt weld.

5.11 Weld edges shall be prepared by any combination of machining, grinding, or flame cutting. Pipe end shaping for butt welding of pipe shall conform to ASME B31.3. Edges shall be cleaned of all oxides and other objectionable matter before welding starts.

5.12 Internal misalignment of pipe shall not exceed .16 cm ($^1/_{16}$ in.). Internal diameter differences shall be adjusted concentrically before tack welding.

5.13 Butt welds shall be started with a .32 cm ($^1/_8$ in.) diameter electrode and electrode size shall be increased as the weld groove fills. Consult the appropriate code as to recommended electrode size, current, voltage, and application.

5.14 Each weld bead deposited shall be completely cleaned of slag, rust, flux, and other impurities before laying the next weld bead.

5.15 Cracks, blowholes, and other defects shall be removed before laying the next weld.

5.16 Peening to improve weld deposit quality shall be prohibited.

5.17 No stress relieving is required under AP-12, Rev. 1 for nominal pipe wall thickness less than 1.9 cm ($^3/_4$ in.), unless required under the Job Specification.

5.18 Hot bending of pipe shall not be permitted.

5.19 The Owner's general requirements for safety and reliability of the system as stated in Article 2 of AP-12, Rev. 1, shall not be achieved with faulty welding. Any of the following defects in quality shall be cause for rejection of a weld: cracks, porosity, slag, rust, scale, and other foreign matter inclusions, lack of proper fusion, cold lapping, and undercutting next to completed welds.

6. INSTALLATION

6.1 Piping systems shall be installed to conform to all the specification and detail drawings and into a safe and complete operating system by qualified craftsmen.

6.2 Piping shall be installed in a manner to keep resultant forces on connected equipment to a minimum. Particular care must be taken at pumps, compressors, and other mechanical equipment where piping forces might cause misalignment. Pipe flange misalignment beyond acceptable tolerance shall be corrected by cutting and re-welding the flange and not by forcing into place by the flange bolts.

6.3 When misalignment in the piping system results from an accumulation of fabrication tolerances, the Contractor shall be responsible to make the corrective adjustments between termination points.

6.4 New pipelines connected to existing operating facilities shall have slip blinds inserted between the systems. The slip blinds shall be tagged and remain in place until the new line is placed in service.

6.5 Slip-on flanges shall have the dimension of 1.59 cm (5/8 in.) from the face of the flange to the end of the pipe or fitting, unless shown otherwise on the drawings.

6.6 Flange bolt holes shall straddle normal horizontal or vertical centerlines unless otherwise designated on the drawings.

6.7 Flange bolts will be tightened and torqued in accordance with the latest edition of ASA B16.5 showing the minimum design seating stress for the gasket material designated.

6.8 Where full couplings are specified to be welded to headers or main lines, the couplings shall be formed to fit the pipe wall and either the pipe wall or the coupling shall be beveled in preparation for welding.

6.9 All pipelines in off-site and unobstructed areas shall be run on concrete sleepers with the bottom not less than 20.32 cm (8 in.) above grade.

6.10 Gate valve stems shall be positioned as shown on the drawings.

6.11 Piping shall be internally cleaned during installation in conformance with Pipe Fabrication Institute Standard Practice ES-5, Latest Edition. Loose material as scale, sand, dirt, welding spatter, cuttings, chips, paper, and other foreign matter shall be removed from inside all pipe assemblies by any suitable and accepted means. All loosed particulate shall be blown out using dry, compressed air.

7. PRESSURE TESTING AND FLUSHING

7.1 The completed piping system shall be pressure tested before final acceptance by the Owner.

7.2 Contractor shall conduct a hydrostatic pressure test per ASME B31.3, Chapter VI, Part 337, unless an alternative is approved by the Owner.

7.3 Test pressure for hydrostatic testing of pipe, fabricated pipe components, and installed piping systems shall be at least one and one-half times the maximum design pressure for which the system is designed, or one and one-half times flange classification, whichever is greater.

7.4 Clean water shall be used for the tests. The temperature of the water shall be no less than ambient temperature.

7.5 Pressure shall be applied gradually and retained for the time necessary for the Owner's Inspector to make a complete examination of all welds. In no event is the test to be considered successful if the pressure has not been maintained for at least 10 minutes.

7.6 All hydrostatic tested systems shall be flushed for at least 10 minutes or until the discharge runs clear. Contractor is responsible for disposal of the test water without flooding or damaging the Work Site.

7.7 After a successful hydrostatic test, Contractor shall submit a copy of the test record to the Owner's Inspector showing the system tested; names of Owner, Contractor, and Test Company representatives attending; and recording charts showing the test medium, temperature, pressure, duration, location of any leaks and failures, and corrective action taken.

CONSTRUCTION STANDARD SPECIFICATIONS

CONCRETE GENERAL CONSTRUCTION

Note: Contents of all Construction or Engineering Standard Specifications are subject to modifications by either the Project Specifications and/or Drawings. Contractors should review each carefully for possible modifications or changes.

1. SCOPE

1.1 Construction Standard Specification AC-40, Rev. 5 is intended to provide construction requirements and procedures for the materials, purchasing, testing, forming, placing, curing, and finishing of concrete at ANYCO, Inc. facilities.

2. GENERAL

Concrete shall be composed of fine and coarse aggregate so graded and proportioned that when thoroughly mixed with the required proportions of cement and water, the resulting mass will be a homogeneous mixture conforming to the design and test requirements of the Project Specification. Construction methods and procedures shall be in accordance with the American Concrete Institute Publication ACI-318-77 and ACI-301-72, latest revisions.

3. MATERIALS

3.1 Contractor shall comply with the latest revised standard specifications of the American Society for Testing and Materials and related Agencies for the following:

Material or Activity	Agency and Specification Number
a. Plywood	Product Standard PSI-66
b. Portland Cement	ASTM C150-72, C175-68
c. Sampling and Testing	ASTM C31, 39, 109, 143, 172
d. Fine Aggregate	ASTM C33
e. Coarse Aggregate	ASTM C33
f. Reinforcing Steel	ASTM A-615
g. Wire Mesh	ASTM A-185
h. Concrete Forms	ACI 347
i. Concrete Curing	ACI 308

3.2 Mix water shall be clean and potable

3.3 Forms shall be plywood, metal, or other pre-approved material.

4. CONCRETE MIX

4.1 Minimum 28-day compressive strength requirements shall be 210.9 kg/cm^2 (3,000 psi) for general construction concrete and 351.5 kg/cm^2 (5,000 psi) for prestressed concrete.

4.2 Minimum cement content shall be 5½ sacks per .7646 m^3 (yd^3) for 210.9 kg/cm^2 (3,000 psi) concrete and 6½ sacks per .7646 m^3 (yd^3) for 281.2 kg/cm^2 (4,000 psi) concrete.

4.3 Lean concrete shall have a cement content of 2 sacks per .7646 m^3 (yd^3).

4.4 Retempering of partially hardened concrete shall not be permitted.

4.5 Contractor assumes responsibility for design of the concrete mixtures. Contractor shall employ the services of an approved independent testing laboratory to make all concrete tests. The costs for testing shall be included in the contract unit price for the various structures required by the proposal.

4.6 Contractor shall furnish one copy of each test to the Owner's Inspector on the same day it is received.

4.7 During each concrete pour, Contractor shall take test cylinders in the presence of, and as directed by the Owner's Inspector, for each 19.12 m^3 (25 cy^3) of concrete (or fraction there of) placed in any one day. One cylinder from each set shall be broken at 7 days and one at 28 days and the results shall be reported by the testing laboratory within 3 days.

4.8 The test specimens shall be made and cured in accordance with ASTM Designation: C31-69. Compression tests shall be made in accordance with ASTM Designation: C39-71.

4.9 The 7-day test specimen shall exhibit 70% of design strength. This test is used to avoid delays in construction and is not an alternate to the 28-day test requirement. To conform to the requirements of this specification, the average of all strength requirements for any class of concrete, as well as the average of any 3 consecutive tests, shall equal or exceed the minimum specified strength. Not more than 1 test in 10 shall have a value of less than 90% of the specified strength.

4.10 Allowable slump values applicable to type of work are as follows:

Type of Construction	Maximum Slump
Footings	7.62 cm (3 in.)
Slabs, beams, columns	10.16 cm (4 in.)
Walkways and area paving	10.16 cm (4 in.)

(Slump tests shall be made at intervals as directed by the Owner's Inspector. No concrete shall be placed when slump tests are outside the above limits.)

5. REINFORCING STEEL, ANCHOR BOLTS, INSERTS

5.1 Reinforcing steel bars, unless otherwise noted, shall be intermediate grade new billet steel, deformed type, conforming to ACI 301.

5.2 Concrete protection for reinforcement shall conform to the minimum requirement of ACI 318. The minimum coverage for reinforcement in concrete subject to weather exposure shall be 7.62 cm (3 in.).

5.3 When specified on the Drawings or Project Specification, the Contractor shall furnish three (3) sets of the reinforcing steel bending and placing drawings for the Owner's approval. After approval, the Contractor shall furnish the Owner with three (3) certified approved prints. Reinforcing bars shall be detailed in accordance with ACI 315.

5.4 Anchor bolts and other steel inserts shall be hot dip galvanized or sherardized steel conforming to ASTM-A307. Anchor bolts shall be fitted with one hex nut and shall be set in hot dip galvanized sleeves.

6. FORMING CONCRETE

6.1 Exposed corners shall be formed with 1.905 cm (¾ in.) chamfers, except where the Work Specification or Drawing calls for corners finished with an edging tool.

6.2 Form ties shall be the rod type that provides a break back 3.81 cm (1½ in.) from the concrete face, leaving a small hole to be grouted. The use of wood spreaders or wire ties shall not be approved.

6.3 Forms shall be cleaned of dirt, chips, or other foreign matter. Forms shall be thoroughly wetted or oiled before placing of concrete. Forms shall be kept sufficiently tight to prevent leakage of fines.

6.4 Construction joints shall conform to ACI 301 Standards.

6.5 Unless otherwise stated on the Project Specification or Drawings, the Contractor may, at his option, eliminate forms below grade and concrete may be poured against the face of the excavation (only when the ground is stable enough to hold until the pour is completed and has prior approval of the Site Manager).

7. PLACING OF CONCRETE

7.1 The Contractor shall give a minimum of two (2) working days notice to the Owner's Inspector before starting to place concrete to permit ample time to inspect and measure forms, reinforcing steel, and embedded items for proper placement and fastening. Only then will the Owner's Inspector give approval for the placement of concrete.

7.2 Concrete shall be delivered to the forms by methods and equipment that ensure its proper consistency and shall be placed directly into its final position. The free drop of concrete shall not exceed 1.524 m (5 ft.). Concrete shall not be dropped through reinforcement steel or deep forms in such a manner as to cause separation of coarse aggregate from mortar hitting bars and formwork as it falls. If necessary to place concrete properly, tremies or windows cut into the side of the forms shall be used as directed by the Owner's Inspector.

ANYCO, INC. Concrete General Construction Standards AC-40, Rev. 5

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7.3 Concrete shall be placed in uniform, continuous, horizontal layers, not to exceed 30.48 cm (12 in.).

7.4 Concrete shall be deposited continuously and as rapidly as conditions permit until the total pour is complete.

7.5 Concrete placement shall be thoroughly consolidated by tamping, spading, vibrating, rodding, or worked with suitable appliances to eliminate all voids and ensure complete encasement of rebar and embedded items as well as proper contact with the form faces.

7.6 Concrete shall not be placed if ambient temperature is below 1.670°C (350°F). Should conditions arise to place concrete under conditions of low temperature, placement shall require prior approval by the Owner's Inspector.

8. CURING CONCRETE

8.1 Standard Portland Cement concrete surfaces normally exposed to the atmosphere shall be protected against too rapid drying by curing for a minimum period of seven (7) days. Exposed surfaces of high-early-strength concrete shall be cured for a minimum period of three (3) days. The curing method will be specified in the Project Specification or Drawings.

8.2 Water curing will be conducted only when specified and under the supervision of the Owner's Inspector. The concrete surface being cured shall be wet down as directed to keep it moist.

8.3 Membrane curing shall be accomplished using an Owner-approved curing compound and following ASTM Designation C156-71 specifications.

9. FINISHING CONCRETE

9.1 See Construction Standard Specification Number: CF-01,[*] Rev. 1 for detail on Cement Finishes for floors, platforms, stoops, steps, walkways, structures, and foundations.

9.2 Honeycomb, voids, and holes left by form ties found after removal of the forms shall be repaired immediately as directed by the Owner's Inspector.

10. SPECIAL PROVISIONS

10.1 When required to place new concrete over existing concrete, the areas of existing concrete to be covered shall be roughened to show aggregate; cleaned of laitance, grease, paint, and loose particles; and wetted down before placing new concrete.

10.2 If an epoxy resin bond is specified between the existing and new concrete, refer to the Construction Standard Specification, Number: AG-37, Rev. 1 for instructions and names of Owner-approved epoxy resins.

* Not included in this sample bid package.

ANYCO, INC. AG-37, Rev. 1

CONSTRUCTION STANDARD SPECIFICATIONS

GROUT, NON-ROTATING EQUIPMENT

Note: Contents of all Construction Standard Specifications are subject to modifications by either the Project Specifications and/or Drawings. Contractors should review each carefully for possible modifications or changes.

1. SCOPE

1.1 Construction Standard Specification AG-37, Rev. 1 is intended to provide construction requirements and procedures for grouting of structural steel, equipment foundations, anchor bolts, and other areas where a grout requirement is shown in ANYCO, Inc. facility Specifications or Drawings.

2. SURFACE PREPARATION

2.1 Type A, Portland Cement & Type B, Nonshrink Water-Bearing Cement

Concrete surfaces to be grouted shall be cleaned of all loose particles, grease, paint, and any other foreign matter. Surfaces shall be thoroughly dampened with no standing surface water before grout is placed.

2.2 Type C, Epoxy Grout and Bonding

Surfaces shall be prepared as for Portland Cement grout except that the surface shall be dry before grout is placed.

3. OWNER-APPROVED GROUTS

3.1 Type A, Portland Cement Grout:

3.1.1 Grout shall be a Portland Cement sand mix developing a minimum compressive strength of 20.7 MPa (3,000 psi) in 28 days.

3.1.2 Surface of the grout shall be finished to drain.

3.1.3 Grout shall be placed by dry packing where ever possible.

3.2 Type B, Nonshrink, Water-Bearing Grout:

3.2.1 Grout shall be one of the following:
Supreme Grout by Gifford Hill & Co.
Por-Rok Ready Mix Grout by Hallemite Mfg. Co.

3.3 Other Non-shrinking Grout

Other non-shrinking grouts may be specified. They shall be inspected, identified, and approved by the Owner's Site Manager before use. All grout shall be prepared and applied following the manufacturer's instructions.

ANYCO, INC. AG-37, Rev. 1

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3.4 Epoxy Resin Grout

3.4.1 Grout shall be either of the following:
Ceilcote 348 Fast Set by Ceilcote Co.
Matstick No. 1-13 by Matcote Co.

3.5 Epoxy Resins for Bonding New Concrete to Old Concrete and for Repairs

3.5.1 Epoxy Resins shall be either of the following:
Ceilcote 348 by Ceilcote Co.
Matstick I-22 by Matcote Co.

CONSTRUCTION AND REFERENCE DRAWINGS

No Construction or Reference Drawings or Sketches have been included in this sample bid package.

ANYCO, Inc.
16000 Scenic Highway
Zachery, Louisiana 70791

Date: 06/10/98

Addendum 1*

Reference: Specification No. PIPE-101.3, Dated June 1, 1998

The following revisions, modifications, additions, or clarifications are hereby incorporated into the above Specifications as a result of discussions with all bidders during the Pre-Bid Meeting and Site Visit held on June 9, 1998.

1.0 Scope of Work

The last sentence of Paragraph 1.3.3 currently reads as follows:

Furnish and install all piping, valves, and fittings (except those shown in Section 3.0 as being Owner furnished) to complete the installation of the 1,219.2m (4,000 ft.) × 30.48 cm (12 in.) No. 2, Schedule 20, Recycle Gypsum Pipeline from existing valve manifold VM-1 to new VM-2. Tag all new gate valves. Maximum flanged joint length shall be 12.192 m (40 ft.).

Revise the last sentence of Paragraph 1.3.3 to read as follows:

Maximum allowed flanged joint length shall be 24.384 m (80 ft.).

* Addenda must be distributed to bidders to ensure receipt well before the bid due date. Additionally, Addenda pages are usually included between the title page and table of contents page of the extra specifications sent to the successful bidder.

APPENDIX C

Major Construction Industry Associations

The American Institute of Archirtects (AIA), Associated Builders and Contractors (ABC), The Business Roundtable, Associated General Contractors (AGC), and Construction Industry Institute (CII) are some of the larger associations dedicated to addressing construction-related issues. Each offers a wealth of useful information for improving cost effectiveness to both owners and contractors in one of the nation's largest industries, construction.

Available are sample contract forms and documents; guides to preparing, managing, and closing construction contracts; supervisory and craft training and productivity; detailed reports; and applications for Construction Industry Cost Effectiveness (CICE) type programs. These cover project management, constructability, health and safety, dispute prevention and resolution, project planning and control, codes and regulations, changes, claims, delays, acceleration, testing, and quality assurance and control (QA and QC). Questions on their available services, publications, membership, and branch office locations may be addressed to any of the groups listed below.

American Institute of Architects
1735 New York Avenue, N.W.
Washington, DC 20006-5292
(800) 242-3837
FAX (202) 626-7523

Associated Builders and Contractors
1300 North 17th Street
Rosslyn, VA 22209
(703) 812-2000
FAX (703) 812-8200

The Business Roundtable
1615 L Street, N.W.
Washington, DC 20036
(202) 872-1260
FAX (202) 466-3509

Associated General Contractors
1957 E Street, N.W.
Washington, DC 20006-5017
(202) 393-2040
FAX (202) 737-5011

Construction Industry Institute
The University of Texas, Austin
3208 Red River, Suite 300
Austin, TX 78705-2650
(512) 232-3000
FAX (512) 499-8108

Glossary

AAA — American Arbitration Association.

AASHTO — American Association of State Highway and Transportation Officials.

ABC — Associated Builders and Contractors.

acceleration — Requirement that contract work be completed at a faster rate than that agreed to in the contract documents.

acceptance — *See* certificate of completion and acceptance.

ACI — American Concrete Institute.

Act of God — An abnormal interruption of progress by a natural cause such as a flood, which experience, foresight, or normal care cannot reasonably forecast or prevent.

add — Term used with contract amendments recording the amount to be added to the contract price for additional work or changes. *See also* deduct.

addendum — Change, addition, or correction to bid package issued before the bid due date.

ADR — Alternate dispute resolution. *See* arbitration; mediation.

AGC — Associated General Contractors.

agreement — A written, legally enforceable document, recording terms of a contract between two parties describing the work and the compensation to be paid.

AIA — American Institute of Architects.

AISC — American Institute of Steel Construction.

ANSI — American National Standards Institute.

all risk insurance — Loss protection for any peril not specifically excluded by name.

alternate proposal — A proposed change in the Owner's bid documents by the Contractor, usually made for reasons of safety or time or cost saving.

amendment — Contract change made after the award of a construction contract.

"approved for construction" — Statement that Contractors should insist appear on all Owner drawings and sketches issued for construction, with appropriate approvals, before starting site work.

arbitration — Voluntary submission of a dispute to a disinterested party or parties outside of a court of law. Both parties must agree that the arbitrator's findings on the dispute will be final and binding. The American Arbitration Association is the major source of information on this subject.

as-built drawing — Revised construction drawing showing how a project was actually built. It is based on "marked-up" or "record" drawings, prints, sketches, and other data furnished by the Contractor to show all changes. Sometimes referred to as *record drawing*.

assignment — Method of specifying that payment for work completed on a contract be paid to persons or groups other than the Contractor.

ASTM — American Society for Testing and Materials.

automobile liability insurance — Protection for the insured for claims from vehicle-related bodily injury or property damage.

AWS — American Welding Society.

bar chart — Also called *Gantt chart.* An early technique designed to schedule and manage projects. Work activities are listed vertically down the left side of the chart in the required sequence of performance. Activities are assigned a bar or line length proportional to their expected duration in days or weeks. The lines or bars are then plotted against time on a horizontal calendar scale located across the top of the chart. The fundamental weakness in bar charts for scheduling is that interrelationships between activities are not clearly shown. Their usefulness is therefore restricted to smaller projects. Owners of larger, more complex construction projects find that CPM or PERT precedence type schedules give them better control over their work. See Appendix B, Exhibit D.1, and Figure 7.1 for examples of a bar chart.

base design — A project design stage between concept design and final design.

beneficial occupancy — Method to allow an Owner to occupy and utilize those portions of work substantially completed, as long as the occupancy does not interfere with the Contractor in completing the balance of the work.

berm — An artificial narrow ridge of earth, often built to hold or exclude water.

bid — Formal offer by a Contractor to an Owner to supply labor, equipment, and materials to complete specified work within prescribed time limits and at a mutually agreed price.

bid analysis — A summary or abstract of each Contractor's formal bid, comparing all the items submitted including costs, exceptions, and schedules. It is usually presented in matrix form and used to select the low or best bidder.

bid and adjusted price comparison forms — Form used by Owner to compare construction bids.

bid bond — Bond issued to protect the Owner from extra costs should the selected Contractor fail to sign a formal contract after being issued the notice to proceed.

bid documents — All the bid package contents, including addenda.

bid list — An Owner's listing of the names of their bidders or prospective bidders.

bid package — The complete set of bid documents and forms, including the Invitation to Bid, Instructions to Bidders, Proposal, Cost Detail, Contract Form, General Conditions for Contracts, Contractor-Furnished Insurance Requirements, Contractor-Furnished

Bond Requirements, Safety and Health Requirements, Job Specifications, Engineering and Construction Standards, and Addenda.

bond — An agreement whereby a bond company (Surety) protects an Owner (Obligee) from damage or default by a Contractor (Principal).

builders risk insurance — Insurance provided by the Contractor on an "all risk" basis to cover all conventional perils. Coverage is generally the sum of the amount of the contract plus the value of all Owner-furnished equipment, materials, and supplies, plus the value of all the tools, machinery, and equipment owned or rented by the Contractor, Subcontractors, or employees that are not becoming a part of the completed work.

cash flow analysis — A projection of the amount of money to be spent and earned for a specific project or plan over a specified period of time.

certificate of completion and acceptance — Document issued by the Owner to the Contractor confirming that the work is complete, has been tested, and is acceptable to the Owner.

certificate of insurance — A document demonstrating that an insurance policy has been issued to the Contractor showing the types of insurance and the amount of coverage for each.

CFR — Code of Federal Regulations.

change order — A written document authorizing additions, deletions, or revisions within the general scope of the contract. It may or may not include agreed adjustments to the contract price and schedule. The change orders are authorized and written by Site Managers and conveyed to the Contractor by STMs (site transmittal memos). *See also* amendment.

changed condition — Circumstance that occurs on a construction site or during a construction project that is other than that agreed to in a contract or described in the bid package. Contractual conditions would change if a Contractor were to be directed to complete a certain portion of the work early for the Owner's convenience. An excavation site found to actually contain 50% rock and 50% soil instead of 25% rock and 75% soil as described in the bid package would also present a changed condition. If the Owner feels that the claim for a changed condition is valid, a change order or amendment is issued to the contract explaining the terms of agreement. If the claim is refused, the Contractor may elect to pursue the matter in court or by arbitration.

CICE — Construction Industry Cost Effectiveness. A long-term project sponsored by the Business Roundtable and their Local User Councils to identify problems and to make recommendations for improving cost effectiveness in the U.S. construction industry.

claim — Demand made by Contractor on Owner or by Owner on Contractor for things due or believed to be due, such as extra pay, time extensions, or damages. Claim procedures should be addressed in the Owner's General Conditions.

code — Government- and industry-developed statutory ordinance, requirement, or standard adopted and applied to construction industry activities to protect public health, safety, and welfare. *See also* standard.

competitive bidding — Process by which two or more bidders compete for the award of a construction contract by making their best offers to complete the work specified for a price based on the their estimates.

comprehensive automobile insurance — Automobile insurance coverage for perils excluding collision or upset.

comprehensive general liability insurance — Broad form of coverage for third-party liability claims for bodily injury or property damage caused by Owner or Contractor facilities or actions.

concept design — Preliminary design often based on minimal information and used to illustrate the basics and "order of magnitude" costs of a project.

conditions — *See* General Conditions for Construction Contracts; supplemental condition.

consequential damage — A loss resulting from, but not caused directly by, an insured peril. A boiler explosion may be directly covered by insurance for the replacement costs, while lost production from the resulting lack of process steam would be a consequential loss.

construction code — *See* code.

construction management (CM) — A procedure for constructing a project in which the Owner elects to hire a skilled, experienced professional construction group to perform the entire construction project function from the concept proposal through feasibility studies, cash flow analysis, design, bid, award, and site management of the project.

construction manager — *See* Site Manager.

construction specification — *See* specification.

construction standard — *See* standard.

contingency — A monetary sum included in a construction estimate to allow for unknown items or events that occur during construction. Contingency sums may vary from 0% for small, simple repetitive type project estimates to as much as 20 or 30% for more complex green site project concept estimates where little or no groundwork has been performed.

contract — Legally binding agreement (oral or written) between two or more parties. Construction contracts are defined as legally binding agreements executed between Owners and Contractors for construction and/or maintenance work done for compensation.

Contractor — The entity (individual or organization), qualified by license and experience, that supplies labor, material, equipment, and services to perform work for compensation, under the terms of a contract.

contract administrator — *See* Site Manager.

contract documents — Bid package documents on contract award. Included are instructions to bidders; sample contract; proposal; exhibits; general, special, and supplemental conditions; specifications; and attachments, including drawings and standards.

contract manager — *See* Site Manager.

Contractor's performance evaluation form — A form developed by an Owner used to rate or evaluate a Contractor's performance.

Contractor's qualification questionnaire — A form developed by an Owner used to determine if prospective contractors can qualify for the Owner's bid list.

Contractor's representative — Person representing the Contractor on site who directs the work and makes decisions for the Contractor.

cost benefit analysis — A procedure used by Owners to determine if a proposed construction project will be profitable.

cost plus contract — A type of construction contract, often used in emergency situations, in which the Owner reimburses all the Contractor's direct and indirect costs plus a negotiated fee.

CPM — *See* critical path method.

critical path method (CPM) — One of several construction project control techniques developed in the late 1950s, based on network flow theory and illustrated using a network or arrow diagram. The entire scope of a project is laid out as a series of arrows, each representing a construction activity and located on the diagram by considering each element's logical place in the construction sequence; the time required to complete; and activities that must precede, be worked concurrently, or follow. The critical path is identified by the arrows representing that sequence of activities requiring the greatest working time between project start and finish on the diagram. CPM and Gantt or bar charts all provide for construction planning and scheduling; but CPM provides an additional tool to display, monitor, adjust, correct, and control construction progress before delays and problems arise.

damage — Loss or harm to a person or property. *See also* consequential damage and liquidated damage.

deduct — Term used in contract amendments for the amount to be deducted from the contract price for work deleted. *See also* add.

default — Failure by a Contractor or Owner to comply with the obligations of a construction contract.

delay — The acts of a Contractor or an Owner that impede or slow progress on a construction project.

design-build — A type of construction contract in which the Contractor provides project engineering and design as well as the construction.

design criteria — Those bounds or restrictions set by an Owner for construction project design to ensure that the project and individual elements meet the proposal requirements and are not over- or under-designed.

documents — All bid package items, including addenda and attachments, as well as forms and memos used during the course of the project construction.

drawing — Contract document that shows graphically what work is necessary to complete a construction project by showing details, location, and dimensions.

E+P+C contract — A type of construction contract in which the Contractor is asked to provide the project engineering and design, purchasing, and construction. *See also* turnkey contract.

economic analysis — An Owner's study summarizing the economic potential of a proposed construction project. The analysis may include the order of magnitude cost estimate, cash flow, rate of return on the investment, life of the facility, and sensitivity and break-even analysis.

employer's liability insurance — Insurance coverage that is used when an injured employee is not covered under workers' compensation law.

estimate — The process of predicting or forecasting construction costs.

exception — Contractors' request that specific bid package requirements be modified or excluded as a part of their proposal.

exculpatory clause — Provision included in contract documents intended to prevent unwarranted claims from arising, usually from negligence.

expediting — Following the progress and keeping track of the status of materials, supplies, and equipment ordered, manufactured, and shipped for a construction project to ensure that arrival is in the proper sequence and at the time necessary to meet contract schedules.

experience modifier — A factor used to measure and rate the actual past loss experience and the expected loss experience of those insured for a specific type of business. The factor may be a debit or a credit. Debits increase insurance premiums and credits decrease them; therefore, Contractors with experience modifier rates greater than 1.0 will pay more for their insurance.

extra — An item of construction work requested by an Owner in addition to that agreed to in the contract. If added compensation is required, an amendment is issued by the Owner.

field order — A special form used by some Owners to authorize and direct that extra work be done on a construction contract.

final design — The design stage following the base design stage in which the Owner has determined that the project was feasible to build. Changes are rarely allowed after the final design because they would delay the bidding process and contract award.

final payment — Payment made by the Owner to the Contractor after a facility has been tested and a certificate of completion and acceptance is issued. Retainage money may or may not be included, depending on the terms of the contract.

fixed price contract — *See* lump sum contract.

flowsheet — A shorthand type of diagram used to give a pictorial description of a procedure or process. Icons or names describe individual stages or activities and connecting lines and arrows show direction, time, and material input and output. May also be referred to as *flowchart* or *flow diagram.*

Force Majeure — *See* Act of God.

Gantt chart — *See* bar chart.

General Conditions for Construction Contracts — An Owner's document used to define in detail the basic rights, responsibilities, and obligations of both parties on signing a construction contract.

general liability insurance — Type of insurance coverage relating to claims arising out of liability of the insured for injuries or damage caused by ownership of property, equipment, facilities, contracting operations, or services.

guarantee — A legally enforceable agreement that assures the performance, quality, and expected life of a product or service provided for remuneration.

guaranteed maximum cost — The maximum cost agreed to by the Owner and Contractor for specified work on a cost plus type contract. It will include the Contractor's cost of labor, materials, equipment, overhead, and profit. Also referred to as *upset price.*

hold harmless agreement — A contractual agreement whereby one party's legal liability for damages is assumed by the other party to the contract.

indemnity clause — Language included in a construction contract in which the insured agrees to secure others against loss or damage from specified liabilities.

Instructions to Bidders — A bid package document used to instruct bidders about Owner requirements for submitting bids. They usually include a specification number; Owner contacts and telephone numbers for technical and commercial questions; the date, time, and place for bid submittal; forms to be used; and information on site visits, meetings, and other topics selected by Owners.

insurance — A system whereby individuals and organizations are guaranteed compensation for their losses, in exchange for a sum of money (called the premium), from certain causes occurring under specified conditions.

Invitation to Bid — An Owner's letter inviting selected bidders to offer proposals to complete a construction contract.

laitance — An accumulation or layer of weak, non-durable particles containing cement and aggregate fines brought to the surface by the upward movement of water through fresh concrete. Often caused by overworking the surface.

leachate — Liquids and soluble constituents removed from solids by dewatering.

Letter of Understanding — A letter or memo issued after a bid resolution meeting is concluded recording detailed minutes of discussions, comments, and mutually accepted term changes in bid documents.

Letter of Intent — A letter issued after a bid resolution meeting stating that the Owner and Contractor agree to the terms of a contract as modified by the Letter of Understanding and intend to enter a formal, signed agreement later.

liability insurance — Insurance used to cover the policyholder's legal liability for injuries to persons or damages to their property.

lien — A legal document whereby a charge is lodged against a construction project to satisfy unpaid debts. *See also* release and waiver of lien.

liquidated damage — Added costs suffered by an Owner when contracts are not completed on the date specified in the documents. A typical contract clause for liquidated damages states that should the Contractor fail to complete the contract within the time required in the contract and time extensions granted, the Contractor shall pay the owner a fixed sum for each calendar day lost until the work is completed or accepted. Costs established for this sum must reflect actual and verifiable amounts, not some arbitrary figure.

lump sum contract — A type of agreement in which the Contractor bids or quotes a single, guaranteed price as total compensation to provide all supervision, labor, materials, equipment, and services necessary to construct a facility as described and stipulated in the construction contract documents

master development plan — A plan setting the agenda for an entire construction project by providing clear, concise, and attainable goals, definitions, and activities, including a project goal, schedule, scope of work, design criteria, and budget.

mediation — Use of a neutral person or "mediator" to assist Owners and Contractors to reach a settlement in disputes. Differs from arbitration in that the mediator does not have authority to make a binding decision.

milestone — Intermediate completion date for individual element of work that is a part of a total construction project and is identified on the schedule.

mobile equipment — Self-powered equipment used on construction projects that moves about on wheels or crawlers.

mobilization — The act of marshaling resources such as moving a Contractor's personnel and equipment onto a construction site to commence work.

MSHA — Mine Safety and Health Act.

negotiation — The act of trying to come to terms through discussion, bargaining, and compromise to settle a matter of interest to the parties involved.

network diagram — *See* critical path method.

Notice of Award — A letter or memo issued after the bid resolution meeting advising that the Owner will award the best bidder a contract for work as defined at the meeting, in the bid package, and in the Letter of Understanding.

Notice to Proceed — A letter written by the Owner's Site Manager directing the Contractor to move onto the work site on a certain date and start the work described in the bid package and proposal, and as may be amended by the Letter of Understanding.

obligation — Legally binding agreement assumed by Owner and Contractor on the signing of a construction contract. Contractual obligations are those written in the contract documents. Implied obligations are not always written but are indicated by inference, association, or accepted practice.

obligee — The individual or organization protected by insurance or bond.

OSHA — Occupational Safety and Health Act.

Owner — An individual or organization issuing a construction contract for remuneration.

Owner's representative — *See* Site Manager.

payment bond — An arrangement in which a surety guarantees that a Contractor will pay its costs for labor, materials, and services. It may be combined with the performance bond for the same contract.

payment request — The formal request for payment for work performed and material purchased by the Contractor in accordance with contract terms.

performance bond — An arrangement in which a surety, on behalf of a Contractor, guarantees that the work will be performed in accordance with the contract documents.

peril — The cause of a loss that a person or organization is insured against.

PERT — *See* program evaluation review technique.

plan — *See* drawing.

pre-bid meeting — A meeting convened by the Owner with all invited bidders to review the entire bid package, including commercial and technical documents, attachments, schedules, milestone dates, conditions, standards, sketches and drawings, and site-specific procedures and safety requirements. Questions and comments are addressed and matters requiring more detailed explanations are clarified by issuing addenda.

program evaluation review technique (PERT) — A project control technique similar to CPM and also based on network flow theory, illustrated using an arrow or network diagram. Whereas CPM is applied to well-defined projects with few unknowns and a single-time estimate for each activity, PERT is applied to larger programs with difficult to define objectives and uses early, probable, and late finish times. *See also* critical path method.

progress and performance report — Written or graphical report issued periodically, usually monthly, by the Site Manager to keep Owner management informed about progress and spending for a construction contract.

progress payment — *See* payment request.

project — The total construction, of which the work provided under the construction contract may be the whole or only a part.

project documents register — The form used to show the originators and recipients of the myriad documents required for a construction contract.

proposal — An offer, by a bidder, to furnish all necessary supervision, labor, materials, supplies, services, and equipment to complete the work described in the Owner's bid package and proposal form for the price submitted.

provision — The portion of a bid package specification used to establish technical requirements for workmanship, materials, and services by citing contract and reference drawings and established engineering, construction industry, and Owner codes and standards.

punch list — A final list made during inspections of all the accumulated work needing to be completed or corrected before the contract can be certified as complete and acceptable to the Owner.

QA/QC — *See* quality assurance; quality control

quality assurance — Procedures and programs used to ensure that levels of quality established in design criteria for each work or project element are met.

quality control — Procedures and programs used by Owners and Contractors to monitor and ensure that design criteria have been met in the completed work.

record drawing — *See* as-built drawing.

release and waiver of lien — An article in a contract's General Conditions requiring the Contractor to promptly release liens or claims, by payment or bond, for any claim filed against it in relation to the work. After receiving the final payment for the work, the Contractor waives and relinquishes any and all claims, rights, and liens against the Owner's property in connection with labor, services, materials, or equipment furnished in connection with the contract.

retainage — Money held back by an Owner from each monthly progress payment as insurance that the Contractor will work in full compliance with the obligations of the contract. The amount is usually 10%, although individual Owners may use different amounts and procedures. Retainage is remitted to the Contractor within a specified number of days after the work has been certified as complete and accepted by the Owner and the Contractor has executed a written general release and waiver of lien for all claims against the Owner.

risk — Term referring to the personnel or property covered by an insurance policy.

sealed bid — A bid for a construction contract submitted in a sealed envelope.

secrecy agreement — Agreement included in some contracts by Owners in an attempt to protect proprietary information.

shop drawing — Secondary drawing prepared by a Contractor, fabricator, or supplier illustrating specific details of work to be fabricated or installed and not shown on the contract drawings. Written Owner approval of this is required.

Site Manager — The person appointed by the Owner as its on-site representative.

site visit — A visit to the proposed construction site to familiarize bidders with the actual site conditions before they submit bids.

sketch — Any hand-drawn construction detail or plan. May be included as a contract drawing.

slump — A test for measuring the workability of concrete or mortar. Freshly mixed concrete is placed in a standard 12 in. (30.48 cm) high truncated cone form in three layers, rodding each layer to compact it. The filled and compacted form is placed on a level surface, large diameter down, and the form is lifted gently and removed. Slump is then measured as the vertical distance from the top of concrete to the original 12-in. height.

specification — Detailed, written description of "how" the work for a construction contract is to be accomplished and the expected results. Topics addressed are the scope of work, work included, work not included, work detail, provisions, time frame, Owner-furnished services and materials, and addenda.

standard — Rule establishing the required quality of workmanship and materials for construction contracts. Drawings are used to show what work is to be done, while specifications give a written description of how that work is to be done. Standards may be written and approved by construction associations or government agencies such as ACI, AWS, AASHO, and ASTM or produced by individual Owners. They are included in the conditions section of a bid package under supplemental or special conditions, in the provisions section of a specification, or in the attachments section.

Subcontractor — An entity (individual or organization), qualified by license and experience, that performs a part of a Contractor's work.

subrogation — A legal process whereby an insurance company, after paying a loss to the person or organization insured against that peril, seeks to recover the amount paid out from those legally liable.

supplemental condition — Contract document used to modify or add to the Owner's General Conditions.

supplier — Vendor of material and equipment used or incorporated into the work.

surety — A firm or organization executing bonds.

surety bond — A bond guaranteeing performance of a contract or obligation.

suspension — The act of halting work on a construction contract temporarily with the intention of resuming at a future date.

termination — The act of ending work on a construction contract permanently with no intention of resuming in the future.

time extension — An allowance of additional time from an Owner for a Contractor to complete a contract beyond the original completion date. Usually awarded as a result of extraordinary circumstances or delays caused by the Owner.

"time is of the essence" — Phrase used in construction contracts to show that both parties agree that prompt completion of each phase or milestone as well as the entire contract is an obligation of the Contractor. Failure to complete each milestone and the entire contract promptly, as scheduled, becomes a breach of contract.

tremie — A pipe or conduit through which concrete can be placed under water or in places that require special handling.

turnkey contract — A type of construction agreement assigning the functions of design, purchasing, and construction for an entire project to a Contractor. *See also* E+P+C contract.

underground obstruction — Object and condition uncovered during required excavations for construction and not identified in contract documents. Could include abandoned waste disposal areas, foundations, hazardous waste sites, pipelines, electrical conduit, and soil conditions differing from those described in the contract documents, such as excess water.

unit price contract — A type of construction agreement in which price or cost for the work is based on pre-agreed determinate prices such as price per square yard or square meter for concrete poured in a parking lot or price per pound or kilogram for fabricated steel for a structure.

upset price — *See* guaranteed maximum cost.

USEPA — United States Environmental Protection Agency.

warranty — *See* guarantee.

Worker's Compensation insurance — A provision required by all states to provide for the cost of medical care and payments to employees or to their dependents for job-related injury, sickness, disease, or death. Employers are required by law to purchase this insurance for their exposure unless they have qualified as self-insurers.

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About the Author

Charles S. Phillips, has been an SME member since 1952. He served in the U.S. Navy in the Pacific during World War II aboard the USS LSM 337. He has worked as an underground coal miner, surveyor, and draftsman. He was an instructor in the coal preparation laboratory while attending Virginia Polytechnic Institute and State University in Blacksburg, Virginia, where he graduated with a Bachelor of Science degree in mining engineering.

Phillips has authored a number of award-winning articles in *The Business Roundtable* annual call for papers on examples of public and private construction projects that follow the precepts of their construction industry cost-effectiveness (CICE) program. Included were unique projects such as experimental thin highway concrete overlays, "top down" construction over environmentally sensitive wetlands, hazardous waste site remediation, and strengthening of trusses and redecking of a Mississippi River bridge while maintaining traffic flow. Phillips has also contributed articles to the SME publication *Mining Engineering.* He is a registered professional engineer and a member of the Louisiana Engineering Society.