VIRGINIA
CONSTRUCTION INDUSTRY GUIDELINES

Joint Cooperative Committee
AIA-AGC-CEC-VSPE

CONTENTS

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This publication is offered by the Joint Cooperative Committee to the participants in the construction process, the contractors, the design professionals and the project owners, to provide them with logical, experience— tested guidelines to avoiding common industry related problems.

While these guidelines are intended to clarify the usual functions and duties of the various segments of the Virginia construction industry so the participants can work together more harmoniously, efficiently, and cooperatively, they also serve to acquaint the owner (who is the purchaser of construction services), the design professional, and the construction contractor with what are considered to be fair and equitable practices in the construction process. Where appropriate, they offer cautionary comments concerning practices which, because they are departures from traditional industry practices, require special understandings on the part of the participants.

These guidelines are not intended to supplant the agreed responsibilities of contracting parties, nor do they preclude the inclusion of adjustments or modifications to establish suitable controls in a specific contract. The terms and conditions of each contract must be determined by the contracting parties to suit the needs of the individual project.

The use in these guidelines of imperative type words or phrases is not intended to describe a legal mandate or to create an obligatory standard. Such duties are created only by law or by the terms and conditions of the contract documents. All such word choice in these guidelines should be understood to represent what is considered to be essential to the achievement of the result sought.

Where appropriate, the masculine, as used in these documents, shall be understood to include the feminine and neuter, the singular and the plural pronouns.

These guidelines include references to various standard documents and forms that are widely available and generally accepted throughout the construction industry. We are grateful to the American Institute of Architects (AlA) and to the Engineers Joint Contract Documents Committee (EJCDC) for permission to quote segments of standard documents published by each. These standard documents have been developed over many years and offer the advantage of experience in addition to that of skilled counsel in their formulation. Similar documents and forms sponsored by other technical and engineering societies may be used when they are deemed to serve the objectives of the contracting parties.

We are also indebted to the Construction Industry Affairs Committee (CIAC) of Chicago, and to the Associated General Contractors of America (AGC), American Subcontractors Association Inc. (ASA), and the Associated Specialty Contractors (ASC) for permission to use portions of their published guidelines and recommendations that were considered appropriate for inclusion.

These are guidelines for practices generally accepted and applicable in the Commonwealth of Virginia. The Joint Cooperative Committee of the sponsoring organizations has published each of these guidelines after consideration of a need for it and of the appropriateness of its content. The work of the Committee is on—going. New guidelines are formulated and revisions to existing guidelines are undertaken in response to requests received from members of a sponsor organization or from other interested parties in the construction industry.

The Joint Cooperative Committee recognizes the inspiration for this overall revision of the Construction Industry Guidelines provided by Sheldon J. Leavitt, AlA, P.E., the editor, and for his leadership and guidance in their preparation.

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TRADITIONAL INDUSTRY PRACTICE

Over the past two centuries, as the design and construction of buildings became more and more technically complex, the roles of the major participants in the process have become more sharply defined. What is now considered the traditional relationship between the owner (developer), the design professional (either an architect or professional engineer depending on the nature of the project) and the builder (general contractor) has evolved from the far earlier patron – master builder/master mason teams – that gave us the great buildings of our architectural history. The trend toward specialization generated by ever increasing technology has led to legal concerns and economic pressures, but the traditional three—part framework continues to be the dominant organizational structure within the building industry.

THE OWNER

The owner is usually both the instigator and beneficiary of a construction project, and therefore also the entity that pays the bills. It may be an individual, a government agency, a private institution, a corporation, a limited or unlimited partnership, or some other entity with the right to own property.

The owner begins the process by identifying the need for a project and the means of paying for it. At some point in the determination of the detailed requirements of the project, the owner selects a design professional to assist him by translating his requirements into graphic and written documents (drawings and specifications). These documents describe the proposed project in sufficient detail to enable local jurisdictions to issue building permits and one or more prospective general contractors to determine the cost of constructing it. The owner then contracts with a general contractor for the construction of the project for an agreed—upon price; the general contractor builds the project in accordance with the drawings and specifications; and, the owner pays the general contractor for the work as it progresses to completion.

THE DESIGN PROFESSIONAL

The design professional, a licensed architect on most building projects designed for human occupancy but often a licensed professional engineer on projects that are predominately engineering in nature (power plants, heavy industry facilities, wastewater treatment plants, etc.,) assists the owner to obtain the completed project by applying his professional expertise to the project from its conception until the end of construction. The design professional confirms the project program requirements with the owner and prepares schematic plans and elevations for the owner's review and approval.

Once approved, the drawings are further developed in detail, and written specifications are prepared describing the materials and workmanship required. These documents are further reviewed and approved by the owner at agreed upon intervals and eventually become the documents upon which the contractor's proposal and contract agreement are based and from which the project is built.

During construction, the design professional periodically observes the work and keeps the owner advised as to progress and general conformance with the drawings and specifications. He advises the owner regarding payments to the contractor, reviews the contractor's shop

drawings answers questions concerning the drawings and specifications, and recommends equitable changes in the contract price for any changes ordered by the owner during construction.

Interpretations and decisions of the design professional are required to be consistent with the intent of and reasonably inferable from the contract documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the design professional will endeavor to secure faithful performance by both owner and contractor, but will not show partiality to either. He will not be liable for results of interpretations or decisions so rendered in good faith.

THE GENERAL CONTRACTOR

The general contractor may be selected by the owner before the designer completes the drawings and specifications to provide advice on probable costs, but is generally selected by submitting the lowest responsible competitive bid or a negotiated price, based on the completed project drawings and specifications.

The general contractor is solely responsible for the construction methods he employs and for safety procedures on the job site.

RELATIONSHIPS

There are many variations of the traditional relationships, but seldom does one party assume a major portion of the duties or responsibilities of one or both of the others. The traditional roles of each of the parties are described in greater detail in the standard forms of agreement and other documents published by the American Institute of Architects (AlA), by the Engineers Joint Contract Documents Committee of the American Consulting Engineers Council (ACEC), American Society of Civil Engineers (ASCE), Construction Specifications Institute (CSI), the National Society of Professional Engineers (NSPE), and by the Associated General Contractors (AGC).

Common variations of project delivery systems are discussed in Guideline Nos. 1—2, 1—3 and 1—4 of this publication.

MAJOR ADVANTAGES OF TRADITIONAL INDUSTRY PRACTICE

1. The participants usually fully understand their roles; roles which are codified by the use of time—tested standard documents published by the national professional institutes and societies, and by the established trade associations.

2. This general understanding simplifies the process of communication, cooperation and action that is vital to a successful project.

3. The competitive bidding process for construction is perceived by the public as assurance that a publicly funded project is fairly priced and that all qualified bidders have an equal opportunity to obtain the construction contract.

SOME CRITICISMS OF THE TRADITIONAL PROCESS

1. The time required by the sequential process frequently is longer than other methodologies for construction of the project, particularly with publicly funded projects subject to many reviews and approvals.

2. Unrestricted competitive bidding for construction may create adversarial relationships among the owner, the design professional and the general contractor.

3. Adapting to changed requirements can be more difficult and time consuming than with other delivery system methodologies.

An uninitiated owner contemplating a major construction project should contact the executive offices of the organizations sponsoring this publication for additional information concerning industry practice.

GUIDELINE I-2

CONSTRUCTION MANAGEMENT

Construction management is a variation of the traditional construction procedures described in Guideline No. I—i. It is a method for organizing the construction of a project that, with careful administration, may enable an owner to achieve a specific objective. Before entering into a construction management process, however, the owner should carefully consider the advantages and disadvantages.

CONSTRUCTION MANAGEMENT CONCEPT

The construction management concept requires an owner to select a construction manager prior to or during the conceptual stage of a project to work with a team of design professionals, assist the owner in the control of the design, monitor probable costs, evaluate alternatives, schedule the work, and maintain a close liaison among all parties throughout design and construction. When properly administered, this approach can work for economies, accelerated operations, more effective control of the work, allow selective advance purchasing of components, and provide other benefits.

CONSTRUCTION MANAGER

The construction manager is usually a general contracting firm or a design professional, but may be an individual or a corporate entity with experience and expertise in the field of construction management.

For his services throughout the duration of the project, the construction manager is paid either a fixed fee or a percentage of the cost of the work, with or without a maximum amount stipulated. When the fee paid by the owner is his only compensation, the construction manager acts purely as the owner's agent, with all trade contracts and purchase orders held by the owner but administered by the construction manager. Where the construction manager is a general contractor, in most instances the construction manager determines all costs and holds the trade contracts and purchase orders. In this event, the construction manager frequently provides the owner with a guaranteed maximum cost for construction, including the fee for services. The construction manager may provide certain construction services such as the general conditions of the contract and the work of some trades.

CONSTRUCTION INDUSTRY STANDARDS

Standard forms of agreement published by the AlA, the Engineers Joint Contract Documents Committee of the ACEC, ASCE, CSI and NSPE, and the AGC include in greater detail the frequently contracted functions of the construction manager. Professional advice in the utilization of any of these standard forms is advised.

DESIGN-BUILD

As its name suggests, design—build is a process for producing a completed construction project by employing a single organization, the design—build team, to provide the design and to construct the project according to a detailed program of requirements provided by the owner.

A design—build project may be performed under a lump sum, a cost plus fee, or a guaranteed, maximum price contract. It is best negotiated, but it may be competitively bid. If competitively bid, it is extremely difficult to compare proposals and for the owner to be assured that he is selecting the proposal which will best meet his requirements. For this reason, the design— build process is more widely used in the private sector than in the public sector.

OWNER'S REQUIREMENTS

The owner must produce requirements with as much definition as possible. A design professional often is employed by the owner to assist in developing a definitive program of requirements.

Of primary importance in reviewing the qualifications of the design—build team, is the evaluation of the team's capabilities and experience, and its ability to control all phases of the project from initial planning through completion.

DESIGN-BUILD CONTRACTOR

The design—build contractor selected by the owner may be a construction firm with licensed design professionals on its staff and licensed by the state to provide design services, or a team consisting of an architectural and/or consulting engineering firm and a construction contractor joined by a contract or joint venture agreement to provide the design—build services.

Construction documents prepared by the design—build team may be less definitive than the documents prepared for use in the traditional design and construct method. Special responsibility is assumed by the design—build contractor to ensure that all of the owner's requirements are met. Timely and complete communication among all design—build team members and the owner is of paramount importance.

ADVANTAGES

Possible advantages of the design—build process are that the owner can work directly, closely and continuously with one contract entity, experienced in both design and construction. Construction may be started and the work phased before all detail construction documents are complete. This may produce a time savings for the project, especially if some of the owner's needs are not fully determinable at the start.

CAUTIONS

In the traditional industry practice with three contracting entities (the owner, contractor and design professional), a certain check and balance system exists that does not exist under the design—build method. If the owner desires to pursue the design—build process but does not possess the experience, technical competence and/or necessary personal time, the owner may be well advised to retain an experienced consultant to help formalize requirements, establish design and construction criteria for the project, assist in evaluating competing design—build proposals, and monitor the construction process for compliance with the established criteria.

GUIDELINE 1-3

The responsibility of the owner to select a single contractor qualified to provide the entire range of design and construction services becomes more important than selecting a general contractor in the traditional method of contracting.

The liabilities of the parties to a design— build contract are somewhat different from those encountered in the traditional method of construction. The legal, insurance and bond requirements should be developed by appropriate professionals.

CONSTRUCTION INDUSTRY STANDARDS

Parties to design—build agreements are encouraged to consult and use standard documents (modified as necessary) which have been developed by the construction industry. Standard forms of agreement published by the AlA, the Engineers Joint Contract Documents Committee of the ACEC, ASCE, CSI and NSPE, and the AGC include in detail the frequently contracted terms and conditions for providing design—build services. Professional legal advice is advisable in adapting any of these standard forms for a particular project.

FAST TRACK CONSTRUCTION

When an early start of construction is an overriding consideration for early completion of a project, concurrent design and construction, termed fast track construction, may be chosen by the owner. The intended advantage over the conventional, sequential design and construction method is that contracts for prioritized segments of the work can be awarded and construction commenced before the detail design of the entire project is completed. This may require special considerations to obtain building permits.

PI-IASED CONSTRUCTION DOCUMENTS

The design work on fast track projects is usually taken to the design development stage, at which point separate work packages are defined and separate construction documents prepared by the design professional for each package. The number and timing of each package varies; early ones may include land clearing or demolition and site preparation, foundations, structural frame, and long lead time items. Exterior closure and major mechanical systems can follow. Interior construction, casework and finishes may not be bid or negotiated until late in the construction process. There may be a few or many work packages depending on the size and complexity of the project. The various segments of the work may be bid competitively, negotiated as independent lump sum contracts, or awarded on cost or unit price bases as best suits the specific items of work and the nature of the project.

IMPLEMENTATION OF FAST TRACK PROCESS

Fast track is best implemented by utilizing an independent design professional and employing a general contractor or construction manager who will work with the design professional in establishing and coordinating the scope of the work packages. The general contractor or construction manager serves most effectively if he participates throughout the fast track process from the conceptual stage to the end of the project. He is responsible for coordinating the timing of the completion of each phase of the design and awarding the contracts for each package of construction work to avoid delay, congestion or interference.

When employing the fast track construction procedure, it is judicious to use a cost plus fee basis contract for the general construction. A fixed price agreement covering the total price for the work may not be cost effective to the owner since the general contractor or construction manager would need to set the price of the project high enough to protect himself against the unknown costs which are inherent in assuming a fixed sum contractual obligation prior to completion of the designs for the construction package. Alternately, if the fixed price were set too low, the owner must expect to be burdened with renegotiated agreements or the contentions which accompany num-erous change directives and change order requests.

CAUTIONS

Owners are advised to be aware of the design and construction risks which are inherent in the fast track effort. The owner must understand that the design of the project will not be complete at the time construction commences and, as a result, there will be changes during construction that will affect the final cost. While the advantages to the owner in this type of

construction may include lower interest cost to finance the project because of a shorter design and construction period and financial benefits resulting from earlier use or occupancy of the project, the owner must understand the corresponding risks involved with fast track construction. Design changes and corrections are probable and may result in field modifications which will increase the final cost. This liability sometimes can be ameliorated or offset because fast track procedures also offer the opportunity to modify successive bid packages, permitting some control of the total cost.

The owner must be prepared to make prompt decisions, sometimes on the basis of incomplete information. He should understand the cost implications and budget appropriate contingency funds. Fast track construction procedure works best with construction—wise owners assisted by experienced industry professionals.

TIME IN CONSTRUCTION

Time is a resource that may be used effectively or wasted, but unlike money, time lost is not replaceable. If it is to be effectively used, its allocations must be considered throughout the planning, design and construction phases of a project. The opportunity to manage time by allocation procedures should not be delayed until the award of the contract for construction. By then, valuable time may have been squandered, lead time lost, and favorable seasons and advantageous bidding periods passed, all of these placing undue time pressure upon the project's construction phase. Time pressures, inappropriately managed, may adversely affect the quality of the work and the working relationships among the members of the construction team.

GENERAL CONSIDERATIONS

Time usually is named "of the essence" in the construction contract. Because of the significance of time, its actual monetary worth should be estimated realistically and the effects of early and late completion evaluated. If excessively tight time constraints are placed upon a project, the costs of those constraints will inure to the owner in one form or another. Where late completion will cause the owner to suffer damages, **the** contract terms should address how the damages will be assessed. When early completion benefits the owner, the contractor should be appropriately rewarded.

Time intervals are not of equal import at different stages of the work, or at different seasons. One day may be of critical value to the project whereas another day at another phase of the work may be worth only routine construction overhead costs. For work which is weather sensitive, a day
in the month of June is not equal to a day in the month of January. For these and comparable considerations, a well prepared critical path project schedule can be of great value.

PROJECT SCHEDULE

A carefully conceived and documented schedule of activities is essential to the orderly execution of a project. Not only does it aid in planning and controlling the project construction, it also provides a basis for evaluating the effect of project delays or acceleration. Contemporary computer capabilities make the creation and updating of a critical path project schedule economically attainable. The project schedule is of most value when it is created early in the project, then monitored and modified to reflect real time activities.

The temptation for establishing construction completion schedules that cannot be met on a normal straight time, hourly rate basis should be discouraged. For large projects, such practice can disrupt the economy and the availability of labor in the local area, and is detrimental to orderly construction processes. To cope with an unrealistic completion schedule, a contractor must do everything possible to attract adequate labor from the limited supply of workers. The contractor's proposal must also include anticipated per diem costs for overrunning the completion date. The contractor must also include overtime work rates, which run from one and one—half to two times the normal rate. Unrealistic completion requirements also force the bidder to guess about the availability of materials and equipment over which he has no control. Unrealistic completion dates, coupled with exorbitant liquidated damage charges against the contractor for failure to comply, impose severe

financial burdens and risks on the contractor so the owner pays more than the building is worth with no guarantee that the job will be completed by the stipulated deadline.

When construction completion dates are unrealistic, claims for time extensions alleged to be due to causes outside the control of the contractor are probable. Extensive paperwork and disputes are the result.

Unrealistic completion schedules tend to occur with large industrial entities that, in order to meet a predecided production schedule, decide that a project must be completed by a certain date. To accomplish this goal, they are willing to pay higher than normal market prices in negotiated contracts for equipment, materials and labor.

Establishing unrealistic requirements for project completion tends to have the following effects on labor:

1. Due to the necessity of working overtime, the labor productivity for all hours worked is reduced. Statistics show that as overtime increases, productivity decreases.

2. Labor markets in the immediate area are seriously disrupted because overtime projects syphon labor from those on straight time. Transient labor, usually less efficient and less skilled, is drawn to the area by high wages.

3. Labor becomes accustomed to lower efficiency and premium overtime rates. These expectations can lead to demands for higher wages.

The factors which negatively affect meeting the scheduled completion date of a project are many and complex. The typical causes include:

1. Inappropriate time allocations for individual tasks and overall completions.

2. Unforeseen or changed conditions at the worksite.

3. Unusual inclement weather.

4. Unexpressed expectations of the parties, including access, partial occupancy and partial shutdown.

5. Ripple effects of change orders and field orders which may bring into play changed seasons and weather, and conflicts in subcontractors' schedules.

6. Delayed decisions or information.

7. Delayed progress payments.

8. Poorly planned or unrealistic production schedules.

9. Delayed orders for materials and equipment.

10. Scarcity of materials, equipment and labor.

11. Errors or omissions in the construction documents.

12. Insufficient or inefficient work forces employed.

SUGGESTIONS FOR THE POSITIVE CONTROL OF TIME

1. Define the monetary value of time early in the planning process and redefine the value at critical stages in the work. Doing so will alert the

owner and the design professional to the financial consequences of the time expended at the initial, preconstruction phases of a project. Judgments then can be made concerning the appropriateness of implementing fast track methods, planned overtime and other special procedures to achieve the completion of work by the desired date.

2. Take early, pre-bid action on certain administrative processes, including plan reviews by authorities, building permit ap-plication and verification of com-pliance with governing ordinances.

3. Limit the number of contractor submittals to be reviewed by the design professional to essential items only.

3. Establish procedures for the rapid resolution of job related questions

4. and conflicts. Where appropriate, authorize the work to proceed pending formalization of replies.

5. Act within the critical path of time on all shop submissions and reviews, for clarification, proposed orders and other submittals.

6. Consider allowing the contractor to bid time in the proposal. The time factor would be evaluated along with the price in awarding the contract.

7. Set a practical date for substantial completion of the work. If the owner desires to establish liquidated damages for late completion and offer bonuses for special efforts or for early oc-cupancy, such monetary con-siderations should be realistic. The imposition of arbitrary liquidated damages is not recommended.

8. Consider allowing bidding con-tractors to provide separate pricing for early and late completion dates.

GUIDELINE 11-2

OWNER RESPONSIBILTIES AND FUNCTIONS PRIOR TO CONSTRUCTION

The owner is the prime mover in any construction project and must be prepared to put forth the necessary efforts during preconstruction procedures in order to have his requirements met in the completed project.

While it is obvious that design occurs prior to the start of construction, it should be recognized that project cost and construction scheduling are also substantially determined during the design stage. Decisions made by the owner in the selection of the design professional and determination of the project delivery system are extremely important to the project and should be made with care and knowledge to obtain satisfactory results.

The design professional and ultimately the contractor must clearly understand the owner's requirements in order to fulfill their obligations to him. While all parties involved in creating the completed project have definite responsibilities, the owner bears the risk and has all the responsibilities for the work until he has contracted or assigned a specific responsibility to others. The owner is responsible for providing to the contractor construction documents that are adequate for the construction proposed.

For a successful project, the owner should, prior to the start of construction:

1. Initiate and define the project concept.
2. Select appropriate design professional(s).
3. Provide a program of requirements and performance criteria.
4. Establish a budget for design and construction.
5. Determine general schedule for design and construction.
6. Arrange financing for timely progress payments.
7. Appoint authorized representatives.
8. Make timely, informed decisions.
9. Review and approve design documents.
10. Decide construction contracting method.

Decisions made during the preconstruction period have an impact throughout the project work. The owner must thoroughly understand his preconstruction responsibilities and act accordingly. He should plan to expend appropriate time during the preconstruction phase of the project to enable the design professional and contractor to be provided with the necessary direction and information to meet their obligations.

For an overview of the owner's typical responsibilities during all phases of the construction project, refer to Guideline 11—6, *Construction Project Responsibilities.*

PROJECT PAYMENT INFORMATION

Prior to soliciting bids or proposals for construction, the owner should determine and confirm his method for financing the project. He should be prepared to verify such financing to the contractor before the contractor ex-ecutes the agreement for construction.

PROGRESS PAYMENTS

The owner should plan to make progress payments on the basis of the contractor's monthly applications for payment with the understanding that requests are submitted by the contractor on or about the first of the month with payment, less any agreed upon retainage, expected by the tenth, but not later than the thirtieth of the same month for work completed during the previous month. Final payment is normally due from the owner to the contractor within thirty days of completion and acceptance of the project by the owner.

If the owner has engaged the design professional to review and approve monthly applications for payment, the design professional must do so in an expeditious manner to allow the owner and lenders sufficient time to process the application so that payment is received by the contractor in accordance with the contractor's agreement with the owner. Provisions are usually contained in the owner—contractor agreement for interest on payments that are late.

PROTECTION FROM LIENS

Customarily, the general contractor's certification with each application for payment is accepted by owners as evidence that the con-tractor is paying his subcontractor and supplier bills in a proper and timely manner. If the owner needs to be certain that the contractor is paying the subcontractors and the subcontractors are paying the suppliers in a proper and timely manner, each application for payment after the first application should include a "long form" partial lien waiver for payments to date. If the owner requires additional assurances he may require the contractor to provide a bond or other financial instrument that any liens filed on the project by his subcontractors or vendors will be dealt with expeditiously and the owner indemnified accordingly. The cost of the bond is added to the contract cost.

See Guideline IV—12, *Payment,* for a discussion procedures.

GUIDELINE 11-4

FUNCTIONS AND RESPONSIBILITIES OF DESIGN PROFESSIONALS PRIOR TO CONSTRUCTION

The design professional in the construction process is retained by his client who is usually the owner, but may be another interested party involved in the business arrangement for the project. Design services are contracted for and rendered to the extent that such activities are agreed upon with the client. The services of the design professional frequently include such related activities as assistance in site selection, programming of requirements, planning, documentation, and assistance in preparing the contracts for construction.

In most instances, the contracts for professional services follow the form or incorporate portions of standard forms that are accepted by broad segments of the construction industry, such as the standard forms promulgated by the AIA and the Engineers Joint Contract Documents Committee. These forms, which may be modified and augmented to address the specific needs of the project, are recommended to be followed concerning the responsibilities of each party, the services that are to be provided, and how charges are to be determined and payments made for services rendered and expenses incurred.

Preconstruction services that design professionals may be contracted to provide include:

1. Determining the feasibility of constructing a project.

2. Providing guidance to the owner in translating his objectives into a written program for construction.

3. Preparing preliminary budget estimates.

4. Acquisition of site information.

5. Developing and evaluating alternatives with respect to design, location and types of construction.

6. Furnishing information to assist owner in obtaining financing for the project.

7. Assisting the owner in selecting other consultants and specialists (geotechnical, environmental, health, safety, insurance, etc., as may be necessary for the project.)

8. Preparing schematic design(s) for the project.

9. Providing coordination with building code officials.

10. Providing construction documents to the extent agreed with the owner. The agreement(s) with design professional(s) should provide for the aggregate of the completed drawings and specifications, bid information and forms, to be adequate for the construction of the project.

11. Assistance in developing the contract(s) for construction.

LIMITATIONS OF SERVICES

The design professional should convey to the client that the development of a design concept depends on a complex assembly of schedules, drawings, symbols and words that are intended to transfer the necessary information to the many people who will be

involved in the construction process. Some inconsistencies and incomplete-ness among the documents are to be expected. These may necessitate change orders which may result in additional costs and time.

All conditions may not be accurately foreseen or pre—determinable. It is reasonable to expect contingencies to arise and allowances must be made and funds budgeted accordingly. The design professional cannot accept responsibility as the guarantor of the outcome, since execution of the work is assigned to others under the contract and is beyond the control of the design professional.

GUIDELINE 11-5

DESIGN PROFESSIONAL RESPONSIBILITIES AND FUNCTIONS DURING CONSTRUCTION

The function of the design professional during construction is defined in the contract between the owner and the design professional and in the general conditions of the contract for construction. The following discussion has been based on the assumption that the design professional has been retained by the owner to provide the construction phase services recommended by the standard form contracts published by the AIA and the Engineers Joint Contract Documents Committee.

ADMINISTRATION

The design professional, pursuant to traditional industry practice, is responsible for the timely and impartial administration of the contract between the owner and the contractor. The specific duties, responsibilities and limits of authority are defined in the owner—design professional agreement and reiterated in the general conditions of the construction contract.

The general administration of the construction contract by the design professional is not to be confused with the detailed superintendence of the work which is required of the contractor. The design professional is not responsible for: 1) Establishing construction means, methods, techniques, sequences and procedures; 2) Establishing safety precautions and programs in connection with the work; 3) Determining that the requirements of the construction documents are carried out.

CONSTRUCTION PHASE RESPONSIBILITIES

1. Interpreting the construction documents and any changes made in **a fair** and equitable manner.
2. Providing supplemental information and construction details as necessary.
3. Providing objective communication between the owner and contractor. Addressing delays and disputes.
4. Coordinating the professional services of design consultants.
5. Initiating change orders.
6. Judging the performance of the parties to the contract.
7. Making on—site observations to become acquainted with the progress of the work, the materials installed and the general workmanship being provided.
8. Reviewing the contractor's submittals, shop drawings and product data for conformance with the design concept expressed in the construction documents.
9. Informing the owner and the contractor of the status of the project.
10. Issuing certificates authorizing payments to the contractor in accordance with work performed and materials supplied.
11. Making on—site observations to determine the dates of substantial and final completion of the work.

The decision of the design professional on matters relating to aesthetics are final if consistent with the intent expressed in the

construction documents.

For a detailed discussion of these functions, refer to Chapter 2.8, *Construction Contract Administration,* of the Architect's Handbook of Professional Practice published by the AlA. The design professional determines in general if the contractor's work conforms to the construction doc-uments, but compliance with the requirements of the contract documents is the ultimate responsibility of the contractor. The design professional is not responsible for the contractor's failure to carry out the work in accordance with the contract documents.

The design professional endeavors to guard the owner against defects and deficiencies in the work of the contractor and may reject work as failing to conform to the contract documents. The design professional's right to reject work enables him to fulfill this duty. The right to reject work is not intended to extend to the areas of safety precautions and programs in adequacy of construction means, methods, techniques, sequences or procedures, all of which are solely the responsibility of the contractor.

The design professional has the duty to use due care and to meet a reasonable standard of skill and competence in observing the progress of the work and in endeavoring to determine if it is proceeding in accordance with the requirements of the contract documents.

CONSTRUCTION PROJECT RESPONSIBILITIES

Construction projects involve a number of responsible participants, including the owner, design professionals, general contractor and his subcontractors and vendors, local building officials and occasionally a construction manage-ment firm.

The successful project requires cooperation and teamwork from all parties. As with every team, all members must recognize, accept and carry out their individual responsibilities.

The following chart, while by no means complete, outlines these basic responsibilities and is intended to provide a brief overview of typical responsibilities for a typical construction project. In this chart the design professional designated as prime is the design professional of record who bears the overall professional responsibility for the project.

The chart is for use by any entity utilizing the construction industry guidelines, including those who may be unfamiliar with the construction process. As with any outline, there are overlapping responsibilities that cannot be easily illustrated. Exact responsibilities of each part must be defined in the contract documents prepared for the specific project.

CONSTRUCTION PROJECT RESPONSIBILITIES

Task and	Owner	Design Professionals			General	Code
Responsibilities	of CM*	Prime**	Architect	Engineers	Contractor	Official
Needs & concept	PRIMARY	Advisory	---	---	---	---
Finance	PRIMARY	Advisory	---	---	---	---
Selection of design professionals	PRIMARY	Secondary	---	---	---	---
Building program, site selection	PRIMARY	Secondary	Advisory	Advisory	---	---
Environmental	PRIMARY	---	---	Advisory	---	---
Hazardous materials	PRIMARY	---	---	Advisory	---	---
Geotechnical	PRIMARY	Secondary	---	Advisory	---	---
Site planning, studies	Secondary	PRIMARY	Secondary	Secondary	---	---
Drawings & specs	Secondary	PRIMARY	Secondary	Secondary	---	---
Design quality	Secondary	PRIMARY	Secondary	Secondary	---	---
Contract documents	Secondary	PRIMARY	Secondary	Secondary	---	---
Pre-bid conference	---	PRIMARY	---	---	Advisory	---
Bid eval. & award	PRIMARY	Secondary	---	---	Advisory	---
Code review	---	Secondary	---	---	---	PRIMARY
Permit application	PRIMARY	Secondary	---	---	Secondary	---
Permit issuance	---	---	---	---	---	PRIMARY
Change order preparation	Secondary	PRIMARY	Advisory	Advisory	Secondary	---
Construction scheduling	Secondary	---	Advisory	Advisory	PRIMARY	---
Submittal data	---	Secondary	Advisory	Advisory	PRIMARY	---
Construction safety	---	---	---	---	PRIMARY	Advisory
Quality program	PRIMARY	Secondary	Advisory	Advisory	---	---
Quality control	---	---	-----	---	PRIMARY	---
Quality control monitoring	---	PRIMARY	Secondary	Secondary	---	---

Task and	Owner	Design Professionals			General	Code
Responsibilities	of CM*	Prime**	Architect	Engineers	Contractor	Official
Site observations	---	PRIMARY	Secondary	Secondary	---	---
Required special inspections	PRIMARY	Secondary	Secondary	Secondary	---	Advisory
Occupancy permit application	PRIMARY	Secondary	---	---	Secondary	---
Record drawings	---	Secondary	Advisory	Advisory	PRIMARY	---

* Construction Manager

** Architect or Engineer

ALLOCATION OF RISK IN CONSTRUCTION

By: Norman F. Jacobs, Jr., CSI, and Stephen C. Weisensale AIA, CSI

Construction is a large, volatile industry. While it requires capital outlays, construction generally offers low rates of return, particularly in relation to the amount of risk imposed. The construction industry is affected by the same business cycles and economic influences that affect other industries, but construction imposes an additional element of risk and volatility that generally does not exist in other major industries. This is due to the lengthy and complex construction process involving financiers, designers, material providers, constructors and end users. This plethora of parties involved in the process entails risk on the part of each party, in such areas as finance, safety and exposure to various forms of liability. Risks are woven through the fiber of the construction process. While risk should be mitigated, it cannot be eliminated.

PROJECT RISK ANALYSIS

Risk analysis is an essential preliminary step in the representation of any party in the construction process. There are a variety of risks that may affect the participant's interests and obligations in a construction project. They need to be identified and evaluated. Some factors affecting the time or cost of performance, such as weather or the general economic conditions are usually beyond any party's direct control. However, the risks associated with these conditions fall on one of the parties to the construction contract.

The actions or inaction of the parties to the contract may result in the unintended allocation of a particular risk.

RISK MATRIX

A risk matrix should be used with procurement specifications to properly identify the risk assumed by the various parties to the procurement contract. This is especially important in construction projects. Each party should refer to the matrix and evaluate the extent of risk it is willing to undertake. Parties also should ascertain who is to bear the responsibility for other risks not listed in the matrix.

Regardless of the type of contract employed, all parties should strive to maintain a synergistic attitude as they review the allocation of risk and responsibilities as reflected in the contract documents.

GUIDELINE II-7

EXAMPLE OF A RISK MATRIX SHOWING RISK & RESPONSIBILITIES OF THE PARTIES INVOLVED *

ACTIVITY	**OWNER**	**DESIGN PROFESSIONAL**	**GENERAL** CONTRACTOR
Outside Influences			
Weather (Ordinary)			X
Weather (extreme) And "Acts of God"	X		
Cost Escalation	X**		
Site Specific Influences			
Existing hazardous waste	X		
Differing subsurface conditions	X		
Existing environmental conditions	X		
Resources	X		
Adequate funding	X		
Adequate manpower			X
Adequate and non-overlapping insurance	X		X
Site Access	X		
Performance			
Sufficiency & coordination of Construction Documents		X	
Labor productivity			X**
Delays presenting & addressing problems	X***	X***	X***
Compensation for delays in the Construction process	X***	X***	X***
Schedule			X
Use a float			X
Utility relocation and coordination	X		
Design errors		X	

ACTIVITY	OWNER	DESIGN PROFESSIONAL	GENERAL CONTRACTOR
Means & methods			X
Safety			X
Coordination of various trades and contracts			X

* Assuming Traditional Fixed Price Contract
** Except where directly attributed to others
*** Assigns responsibility for the particular delay

Some of the noted risks are discussed in the following text, however this discussion is not intended to be inclusive of all possible risks. For a more complete listing of the elements of risk, refer to the *Guidelines* table of contents.

RISK AND INSURANCE

What happens to the contractor's insurance coverage when it is found to be in default under the terms of the construction contract? This question sounds simple, but the answer is more complex and requires some preliminary discussion about what insurance is and how it works. While the condition of the contract usually require the contractor to purchase and maintain liability and general operations insurance to cover the operations of the contractor and sometimes others in the performance of the work, this insurance is intended to protect the parties to the contract in the event of accident, injury, or death. The owner, allocating various risks under certain conditions to various contract parties also may carry builders risk insurance.

Neither of these types of insurance, however, are remedies in the event of the insolvency of the owner or contractor. For this purpose, all public owners and most private sector owners will require the contractor to purchase payment and performance bonds in the amount of the value of the contract. While they may add a small percentage to the cost of the work (usually between 1 and 3 percent), they are considered a worthwhile form of insurance in the event the contractor is found to be in default. The contractor's surety must therefore be prepared to assume the same risks that have been previously assigned to the contractor. For more discussion, refer to Guidelines III-1 and III-9.

ENVIRONMENTAL RISK

A well-defined scope of work can address environmental problems that may be encountered on the work site, such as asbestos, poor soils, lead paint, or hazardous wastes. This scope may be defined in the contract by the findings discovered in build code-mandated preconstruction investigations, such as soils or hazardous waste studies. Building codes may require the owner to mitigate these problems before the start of sitework or the release of building permits. Though the known extent of such conditions may be expressed in the construction documents, the contract should provide a means by which unanticipated environmental hazards are to be addressed during

construction The contract should designate the party responsible for this work, should the need arise. This type of clause could also include unmarked or unknown underground utilities, and the procedure for dealing with problems they may cause. See Guidelines IV-6 *Unanticipated Subsurface Conditions* and Guidelines IV-7 *Hazardous Substances Found at the Project Site* for additional information in this area.

INDEMNIFICATION RESPONSIBILITY AND RISK

A well-written indemnification agreement can be either an equitable source of protection for contract parties or an open invitation to legal action. In drafting any indemnification clause, all parties should comply with state law provisions that may limit the nature and extent of indemnification agreements that are acceptable under public law. Such clauses should therefore be reviewed carefully by the legal counsel to each party, prior to their acceptance into the conditions of the contract.

CONFIDENTIALITY AND RISK

Contracts should avoid clauses that prohibit any party from reporting to state or federal agencies, information required by state or federal law or regulations. A responsible confidentiality clause can authorize the various parties to make necessary reports to the relevant agencies after giving reasonable notice to other parties to the contract.

RISK IN SCHEDULING

Every construction project faces a multitude of “risks” that can significantly affect the project schedule. The form of the procurement structure itself (i.e. fast track, design-build, invited bid, or open-bid procedures) will have a strong influence on project risk allocations, as well as the duties assumed by the individual parties with respect to the schedule.

CONTRACTURAL RISK ALLOCATION

The first line of defense against the unnecessary assumption of risk for either party act that contains a fair and equitable assignment of the various risks. Various statutes among the states may not to permit assignment of risk to a particular party in favor of another.

RISK FACTORS IN CONTRACT DOCUMENTS

The time-sensitivity of construction work is one factor contributing to risk. Time is money, especially in the construction industry. Construction projects typically extend over long periods and there are many time-related costs that may increase in proportion to increases in the construction period. The cyclical nature of the construction business also increases risk. While many costs are variable and may be avoided during periods of low construction activity, many capital costs are not. These inherent costs must be dealt with regardless of whether the rate of work or the amount of alternate work is sufficient to support them.

The predominance of performance and payment bonds in the construction industry is evidence of the high-risk nature of the industry, and distinguishes it from most others. The construction business is undoubtedly exciting, but it is truly an excitement born of risk. Schedule management will help mitigate time-related risks. During the design development phase, the owner and design professional must develop and maintain a project

schedule, noting major milestone dates through occupancy. Before the start

of construction, the contractor must develop a detailed schedule of the work of all trades. This schedule must be updated regularly to indicate any deviation from the milestone dates noted in the contractor's original schedule. Furthermore, the owner must keep the contractor apprised of any changes to his schedule or program.

Another factor related to risk is the manner in which disputes are managed and resolved. The general and supplementary conditions of the contract must clearly define the process by which disputes are to be addressed. The use of standardized contract and general conditions documents, such as those published by AIA, EJCDC or AGC, and with job-specific modifications via sup-plementary general conditions is a common, industry wide practice. Widely familiar standard documents such as these have been tested and modified through many years of use and litigation. Therefore, they are more familiar and accepted throughout the developed by specific owners, design professionals and contractors. All parties should carefully review the general and supplementary conditions with legal counsel before incorporating them into the contract.

RISK ALLOCATION IN CONSTRUCTION DOCUMENTS

The most effective technique for avoiding unnecessary construction claims is the allocation in the con-struction contract documents of the financial risks for the various types of situations from which claims have traditionally arisen. Anticipating and assigning responsibility for all forms of risk to one party and thereby "bulletproofing" other parties against any claim is neither possible nor desirable. However, substantial protection against known risks can generally be achieved by employing contractual language that places the risk of loss from anticipated conditions on the appropriate party.

Common risk allocation clauses found in contract documents may include, but not be limited to:

- No damage for delay,
- Site investigation,
- Reciprocal insurance requirements, and
- Indemnity obligations

Closely analogous provisions might include those that limit the amount or type of recoverable damages from the owner, contractor, architect or other design professionals. These provisions may include liquidated damages, clauses capping the amount of recoverable damages for breach of the agreement, control of the contractor's right to finish early on his schedule and clauses precluding recovery of consequential damages. These clauses are intended to protect a particular party from risks, which it might otherwise bear. All parties to the contract must study the proposed contract documents, including the general and sup-plementary conditions, to under-stand the "risk" allocation in the contract documents and endeavor to assign the risk to the proper contract parties.

RISK & RESPONSIBLE MANAGEMENT

A prudent contractor adjusts its construction administration methods to coordinate with the requirements of the owner and design professional. In addition to differences in the contract

documents of different projects, there are varying interests, organizational philosophies, and legal rights and responsibilities.

GUIDELINE Ill-1

INSURANCE

Insurance requirements for each project will vary. The insurance should reflect the needs of the specific project. With the advice of an insurance specialist, the owner should clearly define what types and amounts of insurance he needs and incorporate these require-ments into the contract documents.

INSURANCE TYPICALLY REQUIRED OF OWNER

Usual practice is for Property Insurance (builder's risk) and Owner's Liability Insurance to be purchased and maintained by the owner as outlined in AIA Document A201 . *General Conditions of the Contract for Construction.*

INSURANCE TYPICALLY REQUIRED OF CONTRACTOR

Insurance of the contractor typically required comprises: (1) Workers' Compensation, including employer's liability; (2) Comprehensive General Liability (Bodily Injury and Property Damage) including Completed Operations; (3) Automobile Liability including owned vehicles and non—owned vehicles; and, (4) Special provisions for hold harmless clauses and any exclusions for nuclear and hazardous materials must be identified and coverages established.

The contract documents should stipulate the types of insurance, coverage and monetary limits of that insurance. Special conditions that need to be insured, such as hold harmless and indemnification provisions, should be defined and clearly identified. The term of the insurance coverage should be adequate for the work intended and should provide extended coverage for any warranty period beyond construction completion. The insurer should be obligated to notify the owner and the design professional prior to the lapse of any required insurance coverage. It is preferable to have subcontractor's underlying limits the same as the contractor's.

NON-TRADITIONAL CONSTRUCTION

In design—build, construction manage-ment, and other non—traditional forms of construction operations, professional liability and other forms of insurance should be considered by the entities which may share some design responsibility.

GUIDELINE 111-2

OWNER-FURNISHED MATERIALS OR EQUIPMENT

In some construction projects, the owner may elect to furnish certain materials or equipment to be incorporated into the work. Using owner—furnished materials or equipment requires shared responsibility of the owner, design professional and contractor. Risks associated with owner—furnished materials or equipment include responsibilities for scheduling, liabilities for timely delivery, handling liabilities, storage responsibility, effect on the project of defective or unsuitable material, transfer of title and risk of loss. The owner furnishing materials or equipment should carefully consider all elements of benefit and risk. The contract should include equitable provisions to cover benefits and risks to all parties.

ACCOMMODATING OWNER-FURNISHED MATERIALS OR EQUIPMENT

The furnishing of materials or equipment by the owner usually is justified only in rare instances such as the need to meet the owner's special requirements or technical needs. In these circumstances, it is recommended that the contract documents include the dates for selection, coordination and delivery of owner-furnished materials and equipment and that the purchase order will be assigned to the successful bidder who must include the cost of the owner— furnished materials or equipment in his proposal and become responsible for the handling, installation, performance and guaranty in exactly the same manner as if he had been the original purchaser. If the costs of the owner—furnished items are not known at the time of bidding, the costs can be included in the contract by change order when determined. The vendor of the owner—furnished items must be bound by the same terms and conditions of the contract documents as the contractor to whom the materials or equipment will be assigned.

CAUTIONS

The contracting parties are cautioned that the furnishing of materials or equipment by the owner may lead to:

1. Dispute as to who is responsible for the warranty, guaranty and performance of the equipment, as well as when the guaranty period commenced.

2. Difficulty in determining whether deficiencies and improper performance are the result of equipment defects or of incorrect installation. When the installing contractor furnishes the equipment, the overall responsibility is his.

3. Disagreement over payment for damaged equipment. Manufacturers usually ship F.O.B. their plant, occasionally with freight charges allowed. If the equipment is purchased by the owner and is damaged enroute, the manufact-urer can disclaim responsibility and require the owner to seek redress from the shipper. In any case, responsibility to pay the supplier still rests with the owner, since title has passed when the equipment left the manufacturer's plant.

4. Disagreement over labor costs involving defective equipment. Manufacturers invariably and historically have refused to furnish labor as a part of their warranty and will agree to replace defective parts if they are returned, freight

prepaid, to their plant. When the installer furnishes the equipment, no such problem arises because, by agreement, complete responsibility rests with him.

5. Dispute regarding responsibility for schedules and delays. When the installing contractor furnishes the equipment, he is solely responsible for job scheduling, delays and penalties. When separate purchases are made, the contractor's obligations become narrowed and owner—related delays are often voided.

GUIDELINE 111-3

CASH ALLOWANCES

Allowances are fixed sums determined in advance of bidding and stated in the contract documents to be included by the bidders in their bids. Allowances are intended to cover the cost of items whose exact character or level of quality is not known at the time of bidding and therefore cannot be accurately bid.

TYPES OF CASH ALLOWANCES

There are two basic types of cash allowances: cash allowances for products and cash allowances for contingencies. Artwork for later selection, special hardware, custom carpeting and similar items are examples of items that may be covered as cash allowances for products. Unknown sub—surface conditions, unknown existing conditions or unknown extent of known conditions in renovation projects and similar situations are examples of items that may be covered as cash allowances for contingencies.

Cash allowances for products usually require the contractor to include in his bid the cost stipulated for the purchase of the product plus the cost for installation and other cost to complete the work. Cash allowances for products should be priced, identified and defined in the contract documents with responsibility for selection clearly designated. It should be made clear whether the allowance includes overhead, profit, delivery, unloading, storage, installation, sales tax, insurance, bonds, warranties or retainage costs.

Cash allowances for contingencies provide a readily available cash reserve for the owner to cover unanticipated costs. The reserve in the contingency allowance normally is owned by the owner and used only on issuance of a change order with the work to be performed negotiated by the contractor. The contractor's costs for -labor, products, transportation, equipment rental, overhead and profit are incorporated in the negotiated cost.

If the actual costs exceed the allowances, the contractor is entitled to additional payment. If the actual cost is less, the owner receives a credit.

USE OF CASH ALLOWANCES

Allowances should be avoided if possible. Allowances can cause unanticipated extra expenses and disappointment. They extend the design process into the construction period and can cause delay and hardship to both contractor and owner. The use of allowances withholds from the contractor some control of the work and places that control with the design professional or owner. Because of the number of variables involved during construction, the lack of full control by the contractor can lead to delays and therefor to claims for extras during construction.

GUIDELINE III-4

UNIT PRICES

Unit pricing is a practice which seeks to arrive at the average cost for a specific unit of work and then to establish it as a fixed cost for all such units to be used on the job. The method may be helpful in pricing items of work where precise quantities of certain work cannot be determined in advance, but it is frequently used where it should not be. An ill—defined scope of work, and projects which include wide variations in working conditions, compel the cost estimator for building construction to engage in a guessing game in establishing an average cost. The inaccuracy of such estimates too often damages either the contractor or the owner. Requiring bidders to submit a schedule of unit prices as a part of the bid proposal can also place an unjustifiable hardship and considerable expense on the bidders. This practice also complicates and can confuse the evaluation of bids. This guideline provides procedures for determining when and how unit pricing should be used.

USE OF UNIT PRICES

In certain types of construction, such as highways, heavy construction and underground work, unit pricing is essential at the time of bidding. Such is not usually the case in building construction where unit priced work generally constitutes a very small part of the total and is usually limited to the following categories:

1. Deviations from bidding conditions which might be encountered due to unanticipated characteristics and/or quantities of excavation and changes in foundation or con-struction requirements.

2. Future tenant work.

3. Extensions of owner's facilities for work, and to equipment contemplated but not specifically defined at the time of bidding.

RECOMMENDATIONS FOR UNIT PRICING

1. Unit prices should not be requested unless the scope, approximate quantity or depth and character of work, working conditions, stage of job completion, and all other critical items or information, are established to enable the preparation of an accurate and equitable price quotation. If any one of these conditions is changed, the applicable unit prices should be equitably adjusted. Changes in the underlying costs upon which the unit prices are based justify unit price adjustment.

2. Unit prices should not be part of the bidding documents, but instructions to bidders may provide that a statement on scheduled unit prices will be required within 72 hours after a request is made to the selected bidder.

3. Requests for unit prices should be limited to the selected bidder only, and negotiations should be conducted only with that bidder.

4. Unit prices should be established for both additions and/or deductions as applicable.

TEMPORARY JOB UTILITIES AND SERVICES

Utilities and services at the job site to implement the construction process are customarily addressed under the general conditions section of the contract documents. The manner in which these items are managed may have a substantial effect on the cost of the project and deserve careful consideration. Some of these services are undertaken by the general contractor, while others may be delegated by him to the mechanical and electrical trades. It is advisable to assign these services to the respective trades for pricing and implementation. An effort should be made to address the needs for temporary services in the appropriate sections of the specifications to better define the scope and the level of performance that is required of the specialty trades.

EXISTING JOB SITE UTILITIES

Where some utilities are already available at the job site, as for alteration and/or additions to existing buildings, it frequently is desirable and logical for the owner to provide or pay for the cost of water, light and power and sometimes for sanitary facilities. In such event, the contractor normally provides all extensions of those services required for the execution of the work. Where there are facilities at the site which can be used by the contractors, by permitting their use, the owner can reduce the contract cost. It is prudent to stipulate the conditions and limitations of such use in the agreement.

RESPONSIBILITIES

The scope, complexity of the project, site conditions and duration of the project should be considered in establishing the requirements and assignment of responsibility for the services.

Costs for shared services can be budgeted on the basis of time for such items as rentals and service contracts, while items such as water, sewer, fuels, and electricity can be metered. This can permit the contractual arrangement whereby the contractor provides stipulated amounts of these services within the contracted allowance. Further costs can be negotiated with the owner.

UTILITIES AND JOB SITE SERVICES TO CONSIDER

1. Allocation of on—site storage and work areas

2. Waste management and disposal.

3. Weather protection and temporary heat.

4. Sanitary facilities and drinking water, including portable or fixed facilities as appropriate.

5. Job safety. Special provisions for specialty trades.

6. Water and sewer connections.

7. Heating, ventilating, air condition-ing and process operations, including operation of equipment for installation and testing, and operation of equipment to accom-modate other trades and owner needs, prior to acceptance of utility charges by the owner.

8. Light and power, including lighting and power for construction operations and power for operation of the building during the fitting out and finishing operations.

GUIDELINE 111-5

At some point in the construction process, the owner's need to operate his equipment and utilize functions other than those included under the construction contracts will require the use of some of the utility services. It is desirable to address the details of the transition use so that costs can be recognized and assigned.

BIDDER QUALIFICATIONS

It is unfair to both bidders and owner for the owner to wait until after the bids have been received before determining whether the low bidder will be awarded the contract. A bidder risks the expense of preparing the proposal and the embarrassment of being disqualified; the owner may be forced to award the contact to a low bidder who is not capable of performing the work. By prequalifying prospective bidders, the owner predetermines that the low prime bidder will be competent, responsible, experienced, and will have adequate resources to handle the job without becoming overburdened. It is imperative that pertinent information concerning the current status of prospective bidders be made available to the owner in ample time for a proper evaluation of their qualifications before the bidding documents are issued. If this practice is followed, contractors who have limited financial resources, inadequate or inexperienced organizations, or commit-ments that already involve them to the limit of their capacity, may be eliminated even though they may be able to obtain a performance bond. As a corollary benefit, the number of bidders will be under reasonable control, so the best qualified bidders will not withdraw or refrain from bidding.

INFORMATION REQUIRED

A prospective bidder should be examined on the basis of information supplied not only by the bidder, but also by others. A confidential bidder qualification form for this purpose should include requests for the following information:

1. Financial Information
2. Organization
3. Experience
4. Availability
5. References
6. Work in Progress

CONSTRUCTION INDUSTRY

- STANDARDS

The use of AlA standard form A305, Contractor's Qualification Statement, is recommended for this purpose. It is particularly important that the data be current,- although experience and organization may not be as subject to change as other factors. Information related to the contractor's recent performance is the best indicator of what can be expected. Financial information should be based on a letter from a surety which specifies the bondability of the firm and/or an abbreviated financial statement from a CPA which lists, in summary fashion, assets and liabilities. Since availability of key personnel to supervise the job will depend on how much work is in progress or under contract, it is very important to know whether the applicant is the low bidder on a major job not yet awarded.

PREQUALIFICATION

It is vital that in whatever prequalification process is utilized the selection procedure be as objective as possible. In addition, care should be exercised to make certain that prequalification criteria are not developed in an overly restrictive manner which would tend to unfairly limited competition. The owner may also wish to consider prequalifying major subcontractors prior to bid.

Finally, but not the least important, is the nature of the comments received from references, such as owners, bankers, design professionals, bonding companies, sub-contractors and ven-dors of material and equipment.

GUIDELINE 111-7

PREBIDDING PROCEDURES

Competitive bidding is undertaken in an effort to obtain the best price proposal(s) for construction of a project or of parts of it. It is a technique by which the owner obtains proposals from prospective general contractors and whereby the most acceptable subcontractor proposals to the general contractor can be combined into one single proposal for the project.

Owners need to be aware that the ability of prospective general contractors, vendors and subcontractors to prepare accurate and responsive competitive price proposals depends on the bidding documents furnished to them.

CONSIDERATIONS

1. Lengthy bid proposal forms consisting of various alternates, unit prices and listings of subcontractors or vendors tend to confuse the bidding procedure and greatly enhance the possibility of misunder-
   standings and mistakes in -bids.

2. Bidders' intention to supply sub-stitutions for specified products frequently causes confusion in the preparation and evaluation of a bid. Therefore, substitutions should be approved by a written addendum to the bid documents prior to bid when possible.

   Alternates may be submitted with the basic bids or negotiated with the successful bidder after opening of bids.

4. Bidding procedures for publicly funded projects must follow regulatory procedures established by these authorities.

5. Bidding documents should include provisions for withdrawing bids, if substantially lower due to computational mistakes or unintentional omissions. The procedure for withdrawing bids should be in accordance with Section 11 —54A(ii) of the Code of Virginia.

6. The bid documents should include or require general contractors and subcontractors to submit with the bid mark-ups for changes in the work.

BIDDING DOCUMENTS

The owner will obviously benefit by having competitive subcontractor and vendor prices available to the bidding general contractors at bid time. Still, time and money are factors in deciding on the number of bidding documents to be issued. The owner may want to find the optimal balance between adequate distribution of the bidding documents and return on the cost of these documents. Deposits for bidding documents, refundable to all bidders, helps to generate bidding interest by moderating the bidding costs. Owners who limit the availability of bidding documents may discourage some general contractors and subcontractors from preparing proposals.

The reproduction and distribution of the bidding documents places a responsibility on the issuing party to make certain that all-bidders have the same information, including all addenda, on which to base their proposals. Sets of bid documents should not be broken. Any use of broken sets may not relieve bidders of their responsibilities under the contract.

Once bidding documents have been issued, modifications normally come about because of discoveries made by the various parties while reviewing the documents prior to bid. It is in everyone's interest that documents are reviewed early so that, wherever possible, all corrections and ambiguities can be clarified by addendum. The design professional should require all bidding parties to request clarification early enough to allow an addendum to be mailed to each bidder (preferably at least five days prior to the bid opening). Recognizing that lack of time sometimes may preclude mailing such addenda, the design professional may transmit, by facsimile machine or telegraph, addenda up to two days prior to the bid opening. All addenda must be clear and concise.

PLAN ROOMS

It is suggested that, when the scope or complexity warrants, local plan rooms receive four sets of documents: two sets for loan periods not to exceed 48 hours; and two sets to remain in the plan room at all times. The plan room is responsible for holding and returning contract documents. Plan rooms in other geographic areas may be allocated bidding documents at the discretion of the owner.

LISTING OF MAJOR SUBCONTRACTORS

General contractors should not be requested to submit a list of subcontractors with the submission of bids. Listing of subcontractors and major suppliers should be in accordance with Article 5, paragraph 5.2.1 of AIA Document A201, General Conditions of the Contract for Construction, pertaining to award of subcontracts and other contracts for portions of the work.

PREBID CONFERENCE

Prebid conferences are desirable to clarify the intent of the bidding documents. The prebid conference is a tool for identifying the ambiguities, errors and omissions in the bidding documents. The process allows the general contractor, subcontractors and suppliers to alert the owner and design professional to problems encountered by the bidders so that questions can be answered and errors or omissions corrected prior to bids being received. To maximize the effectiveness of the prebid conference, subcontractors and material suppliers, as well as the bidding general contractors, should be welcomed to meet with the owner and design professional. The prebid conference should be held at the project site whenever feasible. It is also important that the complete design team of the design professional be present, including civil, architectural, structural, mechanical and electrical engineering representatives.

TIMING OF CONFERENCE

The prebid conference should be held sufficiently in advance of the bid date to allow for appropriate utilization of the information obtained. Prebid conferences which are held too early in the bid process do not allow the bidders proper time to prepare their questions and find gaps in their understanding of the requirements for the project.

ANSWERS TO QUESTIONS

All questions, written or verbally received by the design professional prior to the prebid conference, should be restated, and should be answered by the owner and the design professional at the prebid conference. Deferred answers defeat the purpose of the prebid conference and do not allow for follow up questions to enable a full understanding of the answers.

Minutes of the prebid conference should be recorded by the design professional or other officially designated party and distributed to all parties in the form of an Addendum to the bidding documents.

ISSUES FOR DISCUSSION

The prebid conference can provide the forum for a review of issues which typically arise, such as: ...

1. Contract conditions which are viewed as unfair or inequitable.
2. Discrepancies or conflicts between or among the general of special conditions.
3. Discrepancies among the proposal form, drawings and specifications.
4. Consideration of equal items due to unavailability of the specified materials.
5. Acceptability of substitutions.
6. Explanation of alternates.
7. Explanation of unit prices and reasons therefor.
8. Clarification of requirements.
9. Production scheduling and completion dates.
10. Need for additional details required to estimate the project.

BONDS

BID BONDS

Several options are available to an owner who requires some protection against disadvantages that may occur if a contractor refuses or is not able to sign a contract after submitting a bid proposal. Bid bonds, certified checks, cashier's checks and sometimes negotiable securities are accepted as bid security. Because a cash security frequently imposes a financial burden on the bidding contractor, the bid bond is the preferable form of security. The amount of the bid bond should represent at least five percent of the contractor's bid proposal.

PERFORMANCE BONDS AND PAYMENT BONDS

A performance bond obligates the surety to the owner for any additional costs to complete the contract because of the contractor's failure to comply with the contract requirements. Therefore sureties will be interested in the financial condition as well as other qualifications of a contractor before writing a performance bond.

A payment bond guarantees payment of all legitimate labor and material bills that result from the contractor's performance of the contract. The surety has an obligation to the owner for the additional costs that result from the failure of a contractor to pay the labor and material bills due to his performance of work on the contract.

Combination performance and payment bonds have resulted in difficulties and delays in claim handling. Separate bonds issued by surety as a "package," for which no additional charge is made, are preferable to the combination bonds. Under the two—bond system, the surety is able to make payment without awaiting a determination as to owner's priority. Each bond should be in the amount of 100 percent of the contract price.

SUBCONTRACTOR BONDS

When prime contractors require surety bonds from their subcontractors, the prime contractors' position is similar to that of an owner. Prime contractors should obtain bonds from their subcontractors that are of the same form and not less than the guaranty the prime contractor is giving the owner under his own bond.

SUMMARY

Performance and payment bonds are not guarantees of a trouble—free job, but they do protect the owner up to the face value of the bond when a contractor fails to complete a contract. Wherever possible, however, the requirement for surety bonds may be eliminated by limiting bidding to properly qualified contractors whose record of financial stability and satisfactory performance makes the additional cost of bonds unnecessary. The owner should consult his bonding or insurance professional and/or legal counsel for advice concerning bonds.

SPECIAL INSPECTIONS

Special inspections is the monitoring of the materials and workmanship which are critical to the integrity of a building structure and warrant special attention as required by the Virginia Statewide Building code. Special inspections apply to the structural components of a building – compacted fill, deep foundations, steel, concrete, masonry, and fabricated structural assemblies. The BOCA National Building Code, the basis for Virginia Statewide Building Code, has required special inspections since 1988. The Virginia Statewide Building Code adopted the Special Inspections of 1993 BOCA for all building construction that requires the services of a design professional. The purpose of the special inspections is to protect the public by mandating the monitoring of the material and workmanship involved with the structural components of a building.

INDEPENDENT INSPECTOR

The Code places the responsibility for providing and funding the special inspections directly on the owner, not through the contractor. This maintains the complete independence of the special inspector. Applicable portions of the design and construction contracts should provide that the owner employ and pay for the testing and inspection services required for the special inspections.

OFFICIAL OVERSIGHT

The building official has the authority and responsibility to determine that the provisions of the special inspections are carried out. The building official reviews the owner-provided drawings and specifications and a statement of special inspections to verify that the requirements of special inspections have been specified prior to issuing a building permit. The building official has the authority to approve the parties involved in the testing and inspection and to review the interim and final inspection reports for compliance with the building code. The building official's final approval and issuance of the certificate of occupancy is based, in part, on the final report of special inspections.

REQUIRED INSPECTIONS

During design, the project structural engineer (who may or may not be the special inspector) determines the specific materials and components that require special inspection and lists them in the drawings and specifications. During construction, the project structural engineer responds to problems indicated by the special inspection reports.

The owner should review the special inspections required and retain the services of competent party(ies) to conduct and report upon these inspections. The owner may choose to use the project structural engineer as the special inspector.

DETECTION AND CORRECTION OF DEFICIENCIES

The contractor needs to give adequate notice to those providing the special inspections so that they may properly schedule and perform the required inspecting and testing. The contractor provides access to the approved construction documents and safe access to the work for required observation or testing.

The special inspector performs the necessary inspections and testing, and provides reports to the owner, the contractor, project structural engineer, and code official in a timely manner. All discrepancies and work not conforming to the contract documents should be identified in these reports. The contractor, with the advice of the project structural engineer, must correct deficiencies

identified in the inspection reports prior to the final report of special inspections. A list of discrepancies should be maintained until all non-conforming work has been corrected. The final report summarizing the special inspections must be submitted to the contractor, project structural engineer, and accepted by the code official.

RELATED CONCERNS

Compliance with building code special inspection requirements does not relieve the contractor of responsibility for meeting the specified quality of materials, testing, and certifications stipulated in the contract documents. Those requirements may, and frequently do, exceed building code minimums.

See the discussion of inspections and testing of materials and systems in Guideline IV-17.

GUIDELINE IV-1

SUBCONTRACTOR ASSIGNMENTS

Traditional industry practice allows the general contractor to decide on the allocation of portions of the work to subcontractors, to decide which subcontractors are employed, and to determine the amounts to be paid to each. It is generally more economical to the owner to follow this practice.

The owner sometimes reserves the right to select not only the general contractor, but various subcontractor trades as well. In these cases, the specialty subcontractors bid and negotiate a price directly with the owner or his agent. The successful specialty bidders are then assigned to the general contractor who is expected to assume full responsibility for the completion of the entire project and handle the direction, scheduling, processing of payments and overall performance of these assigned subcontractors. The assigned sub-contractors in turn are expected to accept the authority of the general contractor, including the same duties and obligations that the general contractor imposes upon his other subcontractors.

All pertinent information assigned subcontractors included in the general documents.

Unless there are overriding reasons for assigning specific subcontractors to the general contractor, it is strongly recommended that the general con-tractor be left free to contract with subcontractors of his choice. Previous and/or concurrent positive trade relationships, compatibility of personnel and business styles, and work experience of the general and sub-contractors, all present advantages to the construction of the project. The
division of the work among specialty subcontractors is best left to the judgment of the general contractor. Should this recommendation not be followed, the following understandings and procedures are encouraged so that the construction process may be efficiently performed.

1. ASSIGNED SUBCONTRACTOR

An assigned subcontractor is a prime subcontractor trade bidding directly and separately to the owner, and then assigned to the general contractor as though initially solicited as a subcontractor by the general contractor. The general contractor should then execute a subcontract agreement with the assigned prime subcontractors in the same manner as though directly solicited as a subcontractor by the general contractor.

2. CONTRACTUAL RELATIONSHIP

The bid documents should, as for traditional industry practice, contain the form of contract between the general contractor and the owner. The assigned contracts between the assigned subcontractors and the general
contractor should include the same terms and conditions as those contained in the contract between the general contractor and the owner, and without more stringent requirements than those imposed in same. Should the general contractor require additional protection and remedies not found in the contract between the general contractor and the owner, the general contractor should consider any additional costs attributable to those items in his assignment fee. The assigned contract should require the subcontractors to be bound to the general contractor by

the terms of the contract between the general contractor and the owner, and similarly should afford the subcontractors all the rights, remedies and redresses against the general contractor that the general contractor has against the owner.

3. PERFORMANCE

The general contractor should be responsible for supervising, coordinating and expediting the entire project, including the work of assigned subcontractors. The assigned subcontractor's duties are the same as any other subcontractor chosen by the general contractor, including the responsibility for scheduling his work in accordance with the general contractor's construction schedule. The general contractor should inspect the assigned subcontractor's work and recommend substantial and/or final completion of the work as he would for all subcontractor work.

4. MUTUAL ACCEPTANCE OF GENERAL CONTRACTOR AND ASSIGNED SUBCONTRACTORS

At the time of bidding, the design professional or owner should make available a list of general con-tractors and prime subcontractor trades being invited to present bids. These bidders should advise the design professional or owner in writing if they object to the assignment process with any particular general contractor or prime subcontractor. In the absence of such notification, it should be assumed that each general contractor and each prime subcontractor is agreeable to working on an assignment basis with any of the bidders in the respective trades.

5. ASSIGNMENT CLAUSE

The actual language of assignment should be included in the bid documents for both the general contractor and the prime subcontractors.

6. ASSIGNMENT FEE

The bid documents for the general contractors should contain information as to the approximate value of the work of the various assigned prime subcontractors, and also a provision in the general contractor's proposal for an assignment fee. This should be a blank percentage of the contract dollar value of the assigned prime subcontractors, which is to be filled in at the time of bidding. This fee should include all the general contractor's costs for administering the assigned contracts.

7. BONDING

Bid documents for the prime subcontractors who are to be assigned should require that the prime subcontractors include in their proposals the cost of payment and performance bonds covering their work. Prime subcontractors assigned to the general contractor should furnish to the owner, for delivery to the general contractor, performance bonds and payment bonds naming the owner and general contractor as dual obligees with joint and several rights. Such bonds should contain provisions protecting the assigned sub-contractors against performance completion in the event of non—payment to the assigned subcontractors.

Bid documents for the general contractor should include the requirement that the general contractor provide a performance

bond and a payment bond for the all assigned subcontractors. The bid documents should also include information as to the approximate value of the work of the various prime subcontractors. The general con-tractor's bid may then be prepared in either of the following manners:

(a) Provide a lump sum amount to be added to the base bid for general work to cover the costs of the bond premiums for the prime sub-contractors to be assigned.

(b) Bid a "blank" percentage as a fee to be applied to the value of all assigned contracts to cover the cost of the bond premiums for the contracts to be assigned.

It is recognized that the above provisions for bonds result in the "double bonding" of the assigned portions of the work. This is justified, however, because the general contractor has the protection he needs from the separate assigned subcontract bonds and the owner need only look to one surety (the general contractor's) for the full performance of all the work.

Bonding requirements may be waived by mutual agreement of all involved parties.

8. PAYMENTS

The general contractor should be responsible for processing the periodic progress payment requests and the final payment requests of all assigned subcontractors assuming that the general contractor has reviewed and approved those payment requests and that the design professional has certified completion of the work. All payments becoming due by the owner for any work performed by an assigned subcontractor should be promptly paid either directly by the owner, jointly paying the general contractor and the assigned subcontractor, or by the general contractor who pays the assigned subcontractor conventionally.

9. CHANGE ORDERS

The general contractor should review and process all assigned subcontractor's proposals for changes in the work (such proposals should include overhead and profit for the assigned subcontractor who is performing the work). The general contractor should be allowed a fee for this service equal to that which he receives for processing proposals of his other subcontractors.

SUBSTITUTIONS

Substitutions proposed by bidders and contractors can disrupt the normal bidding and construction processes. Too often valuable time and effort of key personnel are wasted by considering such requests which may be motivated solely by financial benefit to the proposer.

Contractors should keep two factors in mind before proposing a substitution. First, there may be several valid but undisclosed reasons for the original selection or specification. Second, time and effort will be required for the design professional and owner's investigation of the proposed substitution, for which personnel must be paid and during which time other necessary activities concerning the work may be delayed.

Owners must recognize that limiting the consideration of substitutions can result in the stifling of competition and loss of economy to the owner. This may be valid if the efforts of everyone concerned with the problem were without cost and if economics were the only interest of the owner. The situation is not this simple, yet reasonable competition leading to economy is an important consideration for almost every owner.

In the specifications, the design professional should state precisely what is to be provided by the contractor. Use of brand names may be appropriate when the specific characteristics of the product are important to the owner. In any case, clarity is essential; a vague specification serves to encourage, not limit, substitution requests.

The following principles are suggested in order to limit substitutions and yet maintain competition and promote economy. It is also recommended that these principles be incorporated in the contract documents and enforced for the benefit of all the parties involved in the construction project.

SUBSTITUTIONS DURING BIDDING

Where products or manufacturers are named, the following practices will permit the consideration of other products or brand names during the bidding period and/or during the period prior to award:

1. Consider any requests received from prime bidders up to six days before the bid opening. Issue addenda to all bidders no fewer than five days prior to bid opening.

2. Require that base bids comply strictly with specifications, with an alternate proposal form submitted at the same time to indicate any proposed substitutions. The alternate products are not to be considered in selecting low bidder, but may be evaluated before award.

SUBSTITUTIONS PRIOR TO AWARD

When the successful bidder has been selected, allow a limited period of time to submit any requests for substitutions.

SUBSTITUTIONS AFTER AWARD

The design professional should not consider substitutions except under one of the following conditions:

1. When a substitution is required for compliance with a final interpretation of code requirements or insurance regulation.

2. When specified products are unavailable through no fault of the contractor.

3. When subsequent information discloses that specified products may not perform properly or fit in designated spaces.

3. When a manufacturer/fabricator refuses to certify or guaranty performance of specified product as required.

4. When it is clearly seen, in the judgment of the design professional, that a substitution would be substantially to the owner's best interest in terms of cost, time or other considerations.

CONSIDERATION OF SUBSTITUTIONS

A substitution request should be timely and accompanied by adequate technical and cost data. The design professional should be under no obligation to consider untimely or inadequately documented or exploratory submissions.

EQUIPMENT SUBMITTAL DATA AND QUALITY CONTROL

It is imperative that equipment submitted for approval meet the specified criteria and design intent. This goal can be achieved if accurate and current project specifications are stipulated by the design professional and if correct and complete submittal data are furnished by the contractor. Manufacturers are responsible for furnishing equipment that meets the design specifications and for providing accurate data on that equipment. The design professional and the mechanical or electrical or other specialty contractor can help to ensure that the proper equipment is provided.

DESIGN PROFESSIONAL

It is advisable for the design professional to include the following requirements for submittals and quality control in the specifications:

Manufacturer's submittal data as applicable, including:

1. Dimensions and weights of components and assemblies.

2. For mechanical equipment, performance data consisting of capabilities, RPM, BHP, pressure drops, design and operating pressures, temperatures, performance curves, noise level curves, power characteristics and consumption. The data shall conform as closely as possible to the design criteria incorporated in the drawings and specifications.

3. Where necessary, certified shop drawings and certification of performance. This certification should apply to major equipment such as boilers, refrigeration compressors, chillers, large motors, service switchgear, pumps, fans, air-handling units, and fan coil and induction units. It is necessary for this certification to be signed by an officer of the corporation which manufactured the equipment.

Tests of equipment, including:

1. Tests conducted by the manufacturer.

2. Tests required to be performed by an independent testing laboratory.

3. These tests normally are witnessed by the design professional or certified by the testing laboratory.

CONTRACTOR

It is advisable for the specialty contractors to include in the purchase agreement with the manufacturer provisions which have the following effects:

1. All materials and equipment shall be in strict accordance with the drawings, specifications and general conditions, and subject to the approval of the design professional or other party specified.

2. Manufacturer shall furnish the required number of submittal data or samples for approval.

3. Should the equipment or materials submitted by the manufacturer not meet the requirements of the drawings and specifications and not receive the design professional's approval, the manufacturer shall immediately resubmit, using such equipment or materials that will comply, without cost to the owner or contractor.

4. Should the equipment not meet the contract requirements, the manufacturer shall immediately, on notice, pay all costs to replace that equipment or remedy any deficiency, and shall further assume responsibility for consequential loss or damage.

PRECONSTRUCTION COORDINATION CONFERENCE

A preconstruction coordination conference should be stipulated in the contract documents.

ORGANIZATION

The number of persons attending should not exceed that required to establish policies and procedures. The conference should include the owner, design professionals for all phases of the work (including civil, soils, structural, architectural, mechanical and electrical), essential personnel of the general and independent specialty contractors directly connected with the project (including project manager and job superintendent), and at the contractor's judgment, principals of the major contractors. These attendees may be termed the "construction team.

The preconstruction coordination conference should be held prior to the beginning of actual construction to enable all members of the construction team to understand fully the intended operational plan. An agenda for the conference should be prepared by the general contractor and disseminated to all individual prospective attendees.

Principal representatives of the construction team should be represented at this meeting. Their attendance will enable all parties to better appreciate the potential operational problems anticipated by the individual members of the team. The owner's presence will aid the contractor's building team gain greater insight into specific owner needs, and so help the design professionals to secure the building team's cooperation and to translate that insight into quality results consistent with the scheduled time and costs.

The primary purpose of the conference is to establish acceptable ground rules for the management of the project and to help the contractor in achieving a full understanding of the job requirements. The conference provides the basis for coordinating the work to produce a completed job in a minimum amount of time, with maximum economic efficiency, and with harmony among all parties. Since the preconstruction coordination conference is primarily concerned with managerial or operational considerations, it is in the areas of contract interpretation and clarification that the conference's greatest value can be achieved.

AGENDA

Topics for discussion at a preconstruction coordination conference depend upon the nature, size and complexity of the project. Certain factors, however, are common to all types of construction. The following topics are suggested.

1. General and special conditions of the contract documents.

2. Progress payments and retainage. Define in exact terms and stated clearly when, how and to whom, so that no question remains about requirements and responsibilities of each individual in the process. This should apply also to the areas of retainage at substantial completion and of final payment. Refer to Guidelines IV-11., Retainage, and V-1, Substantial Completion.

3. Shop drawings and sample submittal data. The form in which data re to be submitted, the number of copies required, the number to be returned, and the

types of disposition, actions. Refer to Guideline IV-8, Shop Drawings.

4. Procedures for resolving interference's and conflicts among trades. Responsibilities for the preparation of composite drawings.

5. Insurance requirements and reporting responsibilities.

6. Job progress scheduling, including the essential involvement of subcontractors in the development and correlation of the individual specialty schedules that make up the general construction schedule. Large or complex projects are best conducted with an overall project construction schedule using CPM methodology. Such scheduling is effective unless thoroughly understood and utilized by all parties.

7. Temporary facilities and controls. Refer to Guideline III-V, *Temporary Job Utilities and Services.*

8. Construction change orders. Refer to Guideline IV-10, Construction Contract Changes. Typical items for discussion include:

   (a) Charges for overhead and profit to be applied to the various types of change orders. Categories of costs that will or will not be included in the change order price.

   (b) Length of time that a change order proposal price is to be considered firm.

   (c) Designation of the individuals authorized to request, promulgate and approve change orders.

   (d) Procedures to be followed when submitting change order proposals.

   (e) Change order forms to be used. Function and force of design professional's supplemental instructions, construction change authorization, field orders and construction change directives.

   (f) Time extension requests made by the general contractor resulting from changes in drawings or specifications.

   (g) The detail required of subcontractors when submitting change order proposals.

   (h) Overtime due to change orders. Consideration of decreased productivity.

   (i) Ownership of materials or equipment which are to be removed due to a change. Which party owns it, and who removes it from the job site.

   (j) Record drawings due to change orders.

1. Guaranties and Warranties. Refer to the general and special conditions of the contract as well as to Guideline IV-14, *Guaranties and Warranties.*

2. Testing procedures.

3. Job site safety.

4. Other items, such as the effect on bonds, of changes in the work, punch list preparation, substitutions, job site security, debris disposal, hoisting and employee facilities.

GUIDELINE IV-6

UNANTICIPATED SUB-SURFACE CONDITIONS

Prior to the preparation of the bidding documents, a geotechnical engineer should be retained by the owner to make a sub-surface investigation and submit a report interpreting the data and presenting conclusions as to the conditions likely to be encountered. The bidding documents should include the geotechnical engineer's reports and should provide for access to such samples, data and supplemental information as is available. Such a complete disclosure of the information at hand will assist the general contractor in evaluating the probable conditions that may affect the execution of the work required under the contract.

PRECONSTRUCITON INVESTIGATIONS

Preconstruction investigations of sub-surface conditions as required by the Uniform Statewide Building Code, may not disclose all of the conditions that may exist. Furthermore, some conditions, such as ground water level, may vary substantially between the time of investigation and the time of excavation or other operations.

VARIATIONS IN CONDITIONS

In recognition of the fact that variations may occur, a clause should be included in the contract to provide a means of equitable adjustment or compensations and/or completion time if unanticipated adverse conditions are encountered or if more favorable conditions than were anticipated are found to exist. Should concealed conditions encountered during the performance of the work below the surface of the ground be at variance with the conditions indicated by the contract documents, the contract sum and contract completion time should be equitably adjusted by change order.

Time may become a critical factor in making adjustments. Therefore, when the design professional, contractor or owner observes conditions that are substantially different from those anticipated by the contract documents, the observer should, within twenty-four hours, bring this fact to the attention of the others. Once a fact of unanticipated conditions has been brought to the attention of the owner and the contractor, and the design professional has concurred, negotiations should be undertaken between the owner and contractor to arrive at a change in contract price and/or completion time for the work because of a change in the nature or scope of the work due to the unanticipated conditions.

UNDERGROUND UTILITIES

Whenever practical, it is usually prudent and worthwhile to determine the existence or nonexistence of underground utilities or other man-made features by careful, thorough investigation during the design phase. Drawings should clearly show underground facilities, sizes, materials and depths, if known. Test pits dug to determine the accurate location of these facilities should be shown, and all pertinent data developed during these investigations should be indicated on the drawings.

Prior to performing any sub-surface work, the contractor, in accordance with the Code of Virginia, Section 56-265.14, must contact "Miss Utility" to enable the various utility operators to locate and mark their underground facilities. When encountered during construction, variations found in the character, location or size of utilities should be noted by the contractor.

GUIDELINE IV-7

HAZARDOUS SUBSTANCES FOUND AT THE PROJECT SITE

Hazardous materials are being discovered frequently at construction sites, particularly in urban areas. Unanticipated asbestos, PCB's, petroleum products or other hazardous materials are being discovered in building and renovation projects. The existing conditions, including any hazardous material, belong to the owner and so are his responsibility. The owner is advised to deal with any known hazardous substance before beginning a construction project, if possible, and promptly take care of any unanticipated hazardous material that is discovered during construction.

Parties directly engaged in the construction process, and many third parties with possible exposure, are becoming increasingly aware of, and knowledgeable about, the possible latent presence of hazardous substances such as asbestos and PCB at the construction site. To address properly the potentially major impact such substances may have on construction operations and safety, the owner must recognize the possible latent existence of hazardous substances at the project site and be prepared to take action for the elimination, abatement or control of such hazards.

PREDESIGN SITE INVESTIGATION

Prior to the predesign site inspection by the design professional and the preparation of the contract and construction bidding documents, the owner should make provisions to have the project site investigated for hazardous substances by experts technically qualified for such work. Such experts should locate, identify and quantify all hazardous substances at the site and recommend means for their elimination, abatement or control.

INFORMATION FURNISHED

The owner should furnish to all parties to the construction process complete information relating to hazardous substances existing at the project site. If the elimination, abatement or control of the hazardous substances affects the construction process, then the manner and extent of this impact should also be made known.

ELIMINATION, ABATEMENT, CONTROL

The owner should contract directly with firms specializing in and legally qualified for the elimination, abatement or control of hazardous substances. The owner should have such work monitored by a technically and legally qualified firm and certify that all hazardous substances have been eliminated, abated or controlled and that the site is ready for construction.

Other parties to the construction contract should not be involved in any manner with the elimination, abatement or control of hazardous substances including, but not limited to, any assignment of a firm contracted by the owner to perform such work. The owner should hold harmless the design professional(s) and contractor and all other parties to the construction process from liability, directly or indirectly, related to the existence of hazardous substances at the project site.

GUIDELINE IV-8

SHOP DRAWINGS AND PRODUCT DATA SUBMITTALS

Shop drawings and product data submittals are documents produced by general contractors, subcontractors and material suppliers for their use in manufacturing, assembling, coordinating and installing a specific part of the project.

RESPONSIBILITIES

The contractor is responsible for properly implementing the design shown on the contract drawing, properly furnishing the specified materials and workmanship, maintaining the required fabrication and erection tolerances, and for the fit and erection of the various parts of the project. The design professional is responsible for the design shown and specified in the contract documents. He also reviews the shop drawings for general compliance with the information given in the contract documents. These responsibilities become harder to assign if elements of design are delegated to the contractor.

The design of engineered and fabricated items involves setting the design criteria, designing the item, and accepting the responsibility for the design. The responsibility to clear when the design professional performs all three of these steps. In present practice, however, there are many fabricated items used in a project that are designed by a specialty engineer employed by the manufacturer of an item. The item frequently is designed and fabricated by the manufacturer to satisfy the manufacturer's standard design criteria or the specific design criteria set by the design professional for the project. The division of design services will lead to corresponding divisions of responsibilities.

CONTROL OF THE SUBMITTAL PROCESS

The submittal schedule as prepared by the general contractor and logs of the submittals provide controls for the owner, design professional and general contractor to ensure that delays and oversights do not occur in the submittal process.

RECOMMENDED PRIME CONTRACTOR FUNCTIONS

1. Schedule of Submittals:
   Within thirty days after the award of the contract, the prime contractor should prepare a schedule of specific target dates for the submission and return of shop drawings required by contract documents to be reviewed by the design professional. Unless items are otherwise specifically listed, all shop drawings for interrelated items should be submitted at approximately the same time. A progressing item such as reinforcing steel may be listed separately in stages of submission. Generally no fewer than two weeks should be allocated to each submittal for processing by the design professional. A correlated construction schedule and a proposed list of manufacturers and suppliers should be submitted to the design professional, together with the shop drawing schedule, for review.

2. Identification:
   Each submittal should be properly and adequately identified with appropriate specification section number, location on project or other project nomenclature.

3. Channel of Submittals:
   Shop drawings prepared by subcontractors must be submitted to the design professional through the prime contractor, and after review, returned to the subcontractor through the prime contractor.

4. Submittals of Modifications:
   Changes or modifications to the contract documents should not be initiated by the shop drawings or by annotated corrections to them. Where modifications to the contract documents are proposed, the contractor should indicated such intent in writing by specific notice. If the modifications and/or substitutions are approved by the design professional and owner, the contract documents and related shop submittals should then be appropriately modified to incorporate this approved change.

5. Review:
   The prime contractor is responsible for determining that the shop drawings for construction and equipment comply with the requirements of the contract documents and properly fit the work. Drawings that do not comply, are incomplete, or are not correlated, should not be submitted to the design professional to indicate that he has reviewed the submittal and in his judgment it conforms to the contract documents.

RECOMMENDED DESIGN
PROFESSIONAL FUNCTIONS

1. During Design:
   The design professional should ensure that specifications clearly identify the items requiring submission of shop drawings and other product information. The specifications normally state that no portion of the work requiring a shop drawing or product data submittal shall be started until the submission has been reviewed by the design professional.

2. Review:
   When specifications call for such review, the design professional should review shop drawings and product data submittals to determine conformance with the design concept of the project and return them to the prime contractor within the period established in the shop drawing schedule, marked “No Exception Taken”, “Make Corrections Noted”, “Revise and Resubmit”, or “Rejected, Not as Specified.” Where corrections or revisions are requested or shop drawings are rejected, the design professional should provide the reasons for such action.

GUIDELINE IV-8

The design professional should hold up action on contractor submittals only when partial submittals cannot be reviewed until the complete submission has been received or when shop drawings cannot be reviewed until correlated items affected by them have been received. When such shop drawings are held up by the design professional, the prime contractor should be notified in writing that the drawings submitted will not be reviewed until the related items have been received.

CONSTRUCTION CONTRACT CHANGES

Change orders are legal agreements amending the contract documents. All parties should recognize the impact that changes have on both the time and cost of the work. Timely determination of the need for changes can prevent excessive costs, delays and hard feelings on a construction project. To minimize late changes in construction, owners can help by continuing to review the construction documents. The design professional and contractor should also continue to review the contract documents prior to the construction of each phase of the work to reduce conflicts and last minute revisions. The earlier the change is made, often the less the cost involved and the less the loss of time.

TYPES OF CHANGE ORDERS

The Contract Lump Sum Change Order is the most common type. This typed of change order may be initiated by the owner, design professional, or contractor, but to become effective, it must be approved by all three. It is the result of the owner's acceptance of the contractor's proposed price for making a change in the originally specified work.

The request for the contractor's proposal should include all information needed by the contractor to make a fair, reasonable and realistic estimate of the work. The following considerations are typically included:

1. The exact number and type of items to be added or quantity of material to be deleted or substituted, and the location of this material.
2. Supplementary of revised drawings, or authorization for the contractor to prepare such drawings, if needed.
3. The time allowed for making the change and a specific statement as to whether labor overtime is authorized.
4. The amount of supplemental work the contractor is to perform, if the change modified an already completed portion of the work.
5. The degree of detailed cost breakdown required in the contractor's change order price proposal.
6. Since construction can move so rapidly as to make a change estimate invalid almost overnight, a request for a definite period of time during which the quoted price can be considered firm.

In responding to a request for a proposal for a contract lump sum change order, the following considerations will influence the contractor's estimate:

1. Defining the exact scope of change and, if necessary, obtaining clarification from the owner or his representative.
2. Determining and pricing all items of direct cost.
3. Calculating applicable overhead, such as general operating and job facilities overhead.

4. Determining whether delayed completion will extend work into a new season or new labor agreement period resulting in additional labor costs.

5. Applying a reasonable or specific rate of profit to the sum of materials, labor and overhead. The following are recommended for inclusion in the contract documents:

   (a) When only additions are involved, the contractor is entitled to an addition to the contract sum in the amount of direct and indirect job costs, plus general and administrative overhead and profit. If requested, the contractor should provide a detailed breakdown to verify his quotation.

   (b) Where only deductions are involved, the contractor customarily calculates the reduction to the contract sum only in the amount of the reduction in direct and indirect job costs.

   (c) When a change order involves changes in scope , and both additions and deductions are involved, each normally is calculated separately in accordance with (a) and (b) above.

Time and Material Authorized Changes, sometimes in the form of a *Change Order* but preferably in the form of a "*Construction Change Directive*," or *"Construction Change Authorization,"* standard forms of the AIA, are usually used when there is insufficient time or information to prepare and process a formal lump sum request and proposal or when the owner believes that this method is more economical or efficient.

Costs are based on the actual expense to the contractor in making the change and should be submitted to the owner or design professional as the work progresses or shortly after completion. The itemization of costs to be reimbursed given in Article 7 of AIA document A111, *Standard Form of Agreement Between Owner and Contractor* , where the basis of payment is the cost of the work plus a fee, offers guidance for calculating these costs.

The Construction Change Directive is an owner's instruction to proceed with changes in the work on a time and material or other basis, but unlike time and material change orders where the owner pays the contractor for what is billed, the Construction Directive and the Construction Change Authorization require the design professional to make an independent determination that the contractor's charges are reasonable under the particular circumstances. Usually such a directive is used only when the change must be accomplished immediately.

Architect's Supplemental Instructions and Field Orders are issued by design professionals when they desire to issue formal interpretations of the contract documents or to order minor changes in the work without change in contract sum or time. If the contractor considers that a change in contract sum or time is required to comply with the supplemental instruction or field order, he is directed to submit an itemized proposal before proceeding with the change in the work. If the proposal is

found to be satisfactory and proper, the field order is then superseded by a change order.

AUTHORIZATION OF CHANGES

When a change is to be made, the recommended procedure is for a written authorization to proceed with the change, prepared in accordance with provisions in the contract. Soon after award of the contract, it is necessary for the owner to identify individuals who are authorized to make changes on his behalf. The contractor also identifies certain employees, such as the job engineer, project manager, or job superintendent, who are authorized to accept changes. They, in turn, are responsible for informing their foremen or superintendents of the changes. It is important that all parties deal only with authorized representatives.

A major problem concerning change orders is in the time lag between the contractor's submittal of an estimated price and action by the owner. The longer the time lag between submittal and acceptance or rejection, the greater the possibility of an increase in cost. Thus, the contractor finds it essential to stipulate on the face of the estimate a reasonable number of days during which the quoted price may be considered firm.

SUMMARY

Each change order must be evaluated individually; still, certain principles apply to handling all types of change orders:

1. No work beyond the scope of the contract or different form the contract requirements should be done without specific authorization form the owner or the owner's authorized representative.

2. A discussion to establish procedures for handling change orders should be held at the preconstruction coordination conference.

3. All changes in the work should be authorized in writing before they are executed.

4. A change request should contain enough information to enable the contractor to make a realistic estimate.

5. Proposals should be submitted as soon as possible after receipt of a request, and once submitted, they should be approved or rejected as soon as possible.

6. The scope of a change order should be clear.

7. The proposal should be equitable. All parties should acknowledge and honor the contractor's legitimate right to include overhead and profit percentages in contract change order estimates or in time and material change orders billings.

8. All parties should acknowledge and honor the contractor's right to compensation for the cost of time delays, processing deduct change orders, disposing of removed material, and for all other costs incurred in the execution of the change.

GUIDELINE IV-11

RETAINAGE

The contract documents on many construction projects, and particularly public work, require that the owner retain a portion of the contractor's earned funds with each payment; 5 to 10 percent is common. This "retainage" may be held until the final payment, or it may be partially released to the contractor at some point (usually the midpoint) of the work.

Retainage provides the owner with leverage to help assure that the work under contract is completed. It also provides funds to satisfy lien claims by subcontractors or suppliers. Since the amount of retainage may be equivalent to the contractor's profit, the decision to include a retainage clause is usually made carefully, weighing both the costs and the benefits.

Where retainage is withheld, the amount to be retained is noted on the certificate for payment and deducted from the payment amount. All remaining retainage is released in the final payment at the end of the project. If a surety company is involved, the surety's consent to the partial or full release of retainage normally will be required.

PRIME CONTRACTOR PROVISIONS

If the amount being retained to assure faithful performance of the contract is ten percent of the amount earned , it is recommended that after fifty percent completion has been accomplished, no further retainage be withheld; provided however, that the design professional determines that satisfactory progress is being made in the work.

After the work is substantially complete and the design professional has determined that the list of items to be completed and corrected is acceptable, the retainage should be adjusted so that the sum has a direct relation to the value of the work included on the list and the progress being made. Any unsettled claims should be noted and adjustments to the retainage made accordingly.

Thirty days after issuance of the final certificate for payment by the design professional for the contractor's work, the entire unpaid balance of the contract sum should be paid.

OTHER CONSIDERATIONS

It is appropriate for the design professional to furnish to a subcontractor, upon request, the information on the certificates for payment relating to the subcontractor's portion of the work.

See Guideline IV-12, *Applications for Payment*, for recommended method of reporting retained sums and Guideline V-1, *Substantial Completion,* for adjustment of retention with regard to punch list items.

APPLICATIONS FOR PAYMENT

Prime contractors certify and submit their applications for payment to the owner through the design professional who is responsible for certifying the amount of the payment to which the contractor is entitled. This provides the owner and the owner's construction lenders with a professional opinion that the value of work in place and materials and products purchased and stockpiled for the project corresponds to the amount of money the owner is paying.

Typically, these payment procedures are set out in detail in several tightly linked contractual instruments: the owner-contractor agreement, the general and supplementary general conditions, and Division 1 of the specifications. These documents should be coordinated carefully on each project.

FORM OF APPLICATION

If possible, applications should be submitted on standard AIA forms G702 and G703 for traditional practice, and G722 and G723 for the construction management method of project delivery, or equivalent forms of the Engineers Joint contract Documents Committee. These forms have been carefully prepared for this purpose and contain language which is coordinated to the usual general conditions provisions regarding the design professional'' certification.

The standard application forms require the contractor, and the construction manager, in construction manager contracts, and the design professional to certify the amount due.

Where owners or their lenders require the contractor to submit receipts, lien waivers or releases with each application, the details of this requirement should be defined in the supplementary general conditions.

PROCESSING OF APPLICATIONS

When applications are received by the design professional, they should be processed promptly. This is because review of the application is usually only one part of the payment cycle, and payments to subcontractors and suppliers cannot be made until after the general contractor has been paid.

Where an owner's project representative is assigned to the work, the project representative may also review the amount of work completed and verify the quantities of materials stored and report his findings to the design professional. The project representative does not normally have the authority to approve applications for payment. If additional reviews are required, such as for lenders, bonding companies or other interested parties to the work, all such reviews should be defined in the contract documents. The owner is responsible for the timely completion of the review process.

On large projects, a meeting to review a draft of the application among the design professional, the general contractor consultants, and perhaps some subcontractors, may be helpful.

GUIDELINE IV-12

CERTIFICATE FOR PAYMENT

The design professional may decline to certify payments or decide to nullify a previous certificate in whole or part so as to protect the interest of the owner. In such cases, the design professional contacts the contractor and tries to reach an agreement on the revision to the application for payment. If they cannot agree, the design professional prepares a certificate for payment by marking up the contractor's original application or by issuing a new form. The design professional's certificate for payment will be for only the amount for which the design professional is able to represent to the owner that, based on on-site observations and the data comprising the application, to his best knowledge, information and belief, the work has progressed as indicated and the quality of the work is in accordance.

PAYMENT FOR MATERIALS AND EQUIPMENT STORED OFF SITE

The procurement of construction materials and equipment in anticipation of their need is an essential part of the construction process. Availability, pricing, flexibility in scheduling and timely execution of the work may depend on how well the procurement functions are performed.

Contracts usually provide for progress payments to the contractor for materials and equipment that have been delivered to the site and suitably stored prior to being set in place or incorporated into the structure of the project.

EARLY PROCUREMENT

There are circumstances under which it may be advisable for the contracting parties to consider early procurement, with off-site storage of components for the project. The contractor independently has this option; however, if he wishes to be paid by the owner for such stored items, additional agreements and safeguards are necessary. A written agreement as to ownership, responsibility, liability, warranty, etc., for the stored materials, assignment of costs for storage and delivery to the site, and any other charges incidental to the use of the alternative arrangement, should be addressed. The use of and payment for off-site storage must be considered in the overall context of the contract under which is being allowed.

CONSTRUCTION INDUSTRY STANDARDS

The General Conditions of the Contract, Standard AIA document A201-1987, Article 9, Paragraph 9.3.2, appropriately addresses the mater as follows:

"9.3.2 *Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site."*

It is apparent that the use of off-site storage with payment by the owner presents the need for additional care in the safeguarding of the rights of the contracting parties because of the transfer of ownership of materials or equipment to the owner prior to being delivered to the site or incorporated into the project.

GUIDELINE IV-14

GUARANTIES AND WARRANTIES

The customary period for general guaranties and warranties is for one year. A longer period frequently is stipulated for specific items or portions of the work under the contract. The contractor will normally guaranty the equipment, materials and workmanship accordingly. Some equipment and materials are further warranted by the supplier and/or manufacturer either directly or through the contractor for various periods of time.

START OF GUARANTY AND WARRANTY PERIOD

It is advisable for the guaranty and warranty period for all items other than functioning systems (such as heating, piping, electrical, ventilating, refrigeration, plumbing, temperature control, pneumatic systems or elevators) to commence on the date certified by the design professional as the time the prime contracts (s) has been substantially completed in accordance with the construction documents.

The start of the guaranty and warranty period for heating, piping, electrical, ventilating, refrigeration, plumbing, temperature control, pneumatic systems, elevators or any other portions of the work unless a whole or partial system, or any separate piece of equipment or component, is put into use for the benefit of the owner.

In this instance, the guaranty and warranty period should commence when the items are placed in operation. If put into the beneficial use of any party other than the installing contractor without the prior authorization of the owner or his agent, as a condition to formal acceptance by the owner, the beneficial user at his expense must place the time in first class operating condition as if it had been used.

EXTENT OF GUARANTY AND WARRANTY

The extend of a guaranty and warranty should be the requirement to repair or replace, without cost to the owner, all equipment or work which is found to be defective during the guaranty period, and to pay for all physical damage resulting from defects. This provision would not include repairs necessitated by improper maintenance or operation, or to normal wear, tear and usage.

The guaranty requirements of the contract documents should be objective and easy to determine and should not include ambiguous clauses subject to personal interpretation.

WAIVER OF LIEN PROCEDURE

The waiver of liens procedure attempts to protect the private owner against fillings of liens by others for work for which the contractor has been paid and to confirm that the contractor has made the appropriate payments for moneys received from the owner.

Contractors, subcontractors, material suppliers, and others working on a project have right to file a lien on a project if they are not paid for work performed. To be valid, the lien must be filed 90 days of the last day of the month in which labor was performed or materials furnished but in no event later than ninety days of the date the project was terminated or completed. In addition, if the project involves the construction of one- or two-family residential dwelling units, any person working on the project may have to give notice that he seeks payment to the "mechanics lien agent" in order to preserve his lien rights.

LIST OF SUBCONTRACTORS AND SUPPLIERS

It is recommended that the initial request for payment, the general contractor append a list of all known subcontractors and suppliers requesting payment. The second request for payment, and all subsequent requests, should be accompanied by a certification that all payments have been to subcontractors and suppliers shown on the prior payment list and also to any additional subcontractors and suppliers for which the contractors is requesting payment. Request for final payment should be accompanied by a waiver of lien signed by all entities which have provided materials of labor for the work.

CONSTRUCTION INDUSTRY STANDARDS

The standard forms of the AIA, document G706, *Contractor's Affidavit of Payment of Debts and Claims*, and document G707A, *Contractor's Affidavit of Release of Liens*, with referenced attachments, are recommended for use.

GUIDELINE IV-16

OPERATION AND MAINTENANCE OF DYNAMIC SYSTEMS

Any system or item of equipment in which kinetic, electrodynamic or thermodynamic energy is utilized is considered to be a dynamic system.

The owner is advised to insist on the establishment of a suitable operation and maintenance program for all dynamic systems. Competent and knowledgeable personnel should be assigned by the owner to become familiar with the various dynamic systems and equipment as the installation are being made. It is the owner's responsibility to ask for advice and information from the design professional, the manufacturers of equipment and the installing contractor, prior to the initial operation of any dynamic system and to follow the operating instruction provided.

BASIC SERVICES AVAILABLE TO THE OWNER

In addition to answering any questions the owner may ask, the design professional normally specifies that equipment manufacturers furnish operating and maintenance data and manuals and, where necessary, send a trained representative to the job site to assure that the particular piece of equipment adjustments for proper operation. The specifications should, and normally do, require that the installing contractors assemble all of the manufacturers' data concerning the operation and maintenance of the equipment and systems into bound volume(s) for the owner's use and participate in the job site meetings with the owner, design professional, and the equipment manufacturers' representatives to explain the operation and maintenance of the equipment and dynamic systems.

SUPPLEMENTARY PROFESSIONAL SERVICES

The owner may request the design professional to provide services in addition to the scope of normal professional services included in the basic fee. Such additional services may consist of preparing written operation and service procedures, references to manufacturers' manuals or data sheets required by specifications, and explanation of basic engineering schemes demonstrating how each of the equipment components functions in the various systems.

TESTING, INSPECTIONS & CERTIFICATIONS OF MATERIAL, EQUIPMENT & SYSTEMS

Testing, Inspections and Certifications of Material, Equipment and Systems are elements in the quality control program for a building project. Materials, products and equipment used in building projects can be specified in a number of ways. Industry standards published by trade associations, product standards issued by governmental agencies and consensus standards promulgated by professional and institutional organizations are generally accepted as criteria to define the materials and equipment for a project. Tests, inspections and certifications are methods used to verify compliance with the contract documents. The design professionals conduct periodic site visits to become generally familiar with the progress and quality of the completed work; however, the design professionals may not be equipped or trained to conduct the tests and inspections required to verify compliance with the referenced technical standards. Normally, an independent testing agency is employed to conduct the technical tests and inspections, and report the results obtained. The contract documents for the project must stipulate the tests and inspection that are required for the individual components of the project.

MANUFACTURER'S LABELS AND CERTIFICATIONS

The manufacturing industry produces materials, products and equipment used in building construction but not produced for a specific project. The manufacturers may maintain their own quality assurance programs and certify compliance with the industry standards but building codes require testing of the materials, products and equipment by independent testing agencies. The testing agency's label or certificate attached to the item generally is accepted as evidence of product compliance with the specific industry or code standards but does not assure proper application or fitness for the particular project. The cost of these tests and certifications are paid by the manufacturer and become a cost of the item.

SOURCE TESTING AND INSPECTIONS

Industries also produce materials, assemblies, systems, and equipment that are specifically made for a particular project. The testing of these items handled in either of two methods. (1) The manufacturer hires an independent agency to conduct periodic in-plant inspections of scope and frequency that assure the manufacturer's conformance to the agency's quality control program. The cost of this service is paid by the manufacturer and becomes a cost of the item. (2) A testing agency, employed independently of the manufacturer, reviews the manufacturer's procedures and conducts the appropriate tests to determine compliance with the project contract documents. The cost of this testing is separate from the cost of the item.

FIELD TESTING AND INSPECTION

Testing and inspection at the job site of installed and completed work is to verify compliance with project requirements. These tests are different and separate from the tests required for materials and products prior to installation or application. The field testing of completed material, products and equipment after installation is intended to verify proper functioning of the system and compliance with specified performance criteria. Testing of completed work is required by building codes for some building systems, such as plumbing, electrical and fire suppression. These tests and inspections are conducted by

independent testing agencies and represent a cost separate from the cost of installing the work. Testing is also required when the performance of one construction activity depends on the suitability of the prior work. Generally, tests are conducted by the contractor and reviewed by the design professional.

EXTENT OF TESTING

The expense of testing and inspecting adds to the cost of the project and the extent should be commensurate with the requirements of the project. On projects with exacting requirements, extensive testing and inspections are justified, but virtually every building project requires tests and inspections to provide assurance that certain construction elements function as required by the project contract documents. Testing also could be a requirement of the owner's lending institution or insurance carrier. Government agencies and other public authorities, to protect the public health and safety, require tests or inspections to confirm the environmental quality of operating systems and the installation of structural elements ("Special Inspections"). The Virginia Uniform Statewide Building Code requires "Special Inspections" of certain structural components of the building and requires that these "Special Inspections" be the responsibility of the owner. See the discussion of Special Inspections in Guideline III-10.

RESPONSIBILITY FOR TESTING AND INSPECTION

Responsibility is a complex issue even though the owner ultimately pays the cost for the testing and inspection services. The owner may contract directly with agencies providing the testing and inspection services or may assign this responsibility to the contractor. When the contractor hires the testing agency, the loyalty of the testing agency is directed to the contractor, raising a conflict-of-interest issue with the contractor testing his own work. Assigning the responsibility to the contractor sets up a conflict between the demands of time and cost, and the dictates of quality. However, it will provide a significant incentive to provide quality to reduce the potential of testing or inspection failure and the resulting cost of rework. When the owner hires the testing agency, the loyalty of the testing agency is with the owner, splitting responsibility for the testing and the performance of the work. The contractor may question the validity of the owner's testing; and, failure to timely report the results of the testing rests with the owner. Also, there is a possible problem of scheduling of by the contractor and scheduling of the testing by the owner. Some problems may be resolved by assigning the contractor the responsibility to coordinate the services of the testing agency, while the testing agency still contracts with and is paid by the owner.

The responsibility of testing and inspection must be carefully considered by the owner.

RESPONSIBILITY OF CONFORMANCE

The contractor has the responsibility for meeting the specified quality and performance of the materials, equipment and systems. The testing, inspections and certifications are intended to verify compliance with the contract documents and to be an element in a quality control program. The contractor should have the responsibility to coordinate the timing of the tests and to provide access so that tests and inspections can be properly scheduled and performed. Neither owner nor contractor finished tests and inspections relieve the

obligation of the contractor to perform the work according to the drawings and specifications. However, owner furnished testing or inspection services that are flawed may relieve the contractor of his obligation. Where the results of inspections, tests or other quality control service indicate non-compliance with the contract documents, the contractor is responsible for correcting the deficiency and, generally, for the cost of the retesting or reinspection. The retesting, or reinspection, should be in accordance with the intent of the contract documents and should not be used to increase the extent of the testing at the contractor's expense.

The design professional has the authority to reject non-conforming work and to order the uncovering of concealed construction to facilitate testing and inspection. If the work is found not to be in accordance with the requirements of the contract documents, the contractor is responsible for the cost of uncovering, repair and retesting. Generally, if the work is found to be in accordance with the requirements of the contract documents, the cost of uncovering and replacement is the responsibility of the owner.

SUBSTANTIAL COMPLETION

The effect on the construction project of substantial completion may be ambiguous under some circumstances. Although the term as defined in AIA document A201, *General Conditions of the Contract for Construction*, is generally well understood and accepted, that document does not establish in detail the responsibilities of the owner and contractor when substantial completion of the project or a portion of it is reached, nor does it recommend how certain matters should be resolved. Those matters are left to be dealt with as deemed appropriate to each project.

CONSTRUCTION INDUSTRY STANDARDS

The following sections quoted from AIA document A201 outline the usual contractual provisions relative to substantial completion:

> *"**9.8.1** Substantial completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract documents so the Owner can occupy or utilize the Work for its intended use.*
>
> ***"9.8.2** When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. The Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion. When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat utilities, damage to the Work and insurance, and shall fix the time which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and contractor for their written acceptance of responsibilities assigned to them in such Certificate."*

ESTABLISHING RESPONSIBILITIES AT SUBSTANTIAL COMPLETION

Rather than reserving the determination of responsibilities and the terms for acceptance until they are set forth by a certificate of substantial completion near the close of a project, it is recommended that the owner-contractor agreement for the construction work establish the course to be followed once a project has been certified by the design professional as "substantially complete". The construction agreement should establish the responsibilities of both parties with respect

to maintenance, heat, utilities and insurance, as well as terms concerning warranties and guaranties and the formula for determining the amount of retainage to be withheld until final completion. If these decisions are delayed until the certificate of substantial completion is executed, they could be unacceptable to either or both parties. The only matters normally included in the certificate of substantial completion that cannot be incorporated in the owner-contractor agreement are the actual dates of substantial and final completion, the punch list of items remaining to be completed or corrected, and the time and cost to complete the remaining work satisfactorily.

Upon substantial completion, the owner assumes complete responsibility for providing fuel, and for the operation of all services and utilities. The owner also becomes responsible for all maintenance and the cost of repairs or restoration due to damage and/or wear, with the exception of failures of items under guaranty. The owner assumes the responsibility to obtain necessary insurance for protection against any losses not directly attributable to contractor negligence.

EFFECTS OF SUBSTANTIAL COMPLETION

The date of substantial completion shall establish the beginning of the specified period on guaranties, unless an earlier date has been established for acceptance of a portion of the total project or of certain dynamic systems, as defined in Guideline IV-14, Guaranties and Warranties, in which case the earlier dates will be effective for previously accepted work only.

The contractor normally arranges a work schedule so that the items remaining to be completed or corrected are completed in the designated time by working during regular hours. If the design professional determines that the work interferes with the beneficial use of the project, and the owner is unable to adjust his operations to permit the contractor to perform punch list work during regular working house, the design professional shall certify to the owner that this work must be performed on an overtime basis. The owner shall then assume the overtime expense.

As described in Guideline IV-11, *Retainage*, the purpose of retainage is to assure that the owner will have at all times sufficient funds remaining to pay another party to complete the work or correct unsatisfactory items if the contractor refuses or delays doing so for an unreasonable length of time. After the design professional determines that the punch list of items remaining to be completed or corrected is acceptable, the retainage should be adjusted so that the sum has a direct relation to the value of the work included on the punch list. The punch list, as verified and amended by the design professional, and the fully executed certificate of substantial completion, will then be forwarded to the contractor.

As soon as the punch list accompanying the substantial completion certificate is received by the contractor and delivered to the subcontractors, they will immediately correct or complete the items listed. Subsequently, the contractor will report to the design professional when the punch list has been completed, except for those items not completed and delayed beyond the contractor's control. The contractor will then provide a list of the remaining items with corrective actions to be taken and anticipated time of completion of each. At this time, the retainage should be reduced to the value of the remaining items. The contractor will then continue to submit requisitions requesting payment for those items corrected, and the design professional will certify those items for payment.

PUNCH LIST

A punch list may be defined as an official list of items to be completed or corrected. The punch list is required by the terms and conditions of the AIA standard documents to be prepared by the contractor with verification and amendment by the design professional. The Standard Forms of Agreement published by the Engineers Joint Contract Documents Committee require the design professional to prepare the punch list. In common practice, it is usually prepared by the design professional in collaboration with the contractor at or near the time of substantial completion.

CONTRACTOR AND SUBCONTRACTORS
Contractors and subcontractors must assume responsibility for work that must be corrected. Critical and progressive supervision is required of the contractor so that all trades perform their work in accordance with appropriate standards of workmanship.

The following procedures are recommended prior to the inspection which leads to the preparation of the punch list:

1. The contractor should carefully check his own work and that of subcontractors as the work is being performed.

2. From the beginning of the project, the contractor's superintendent should prepare and maintain a written record of deficiencies observed to preclude being overlooked or forgotten.

3. Unsatisfactory work should be corrected immediately and should not be permitted to remain and become a part of the punch list.

4. Corrections should be made before any particular subtrade leaves the project. Unless these corrections are accomplished in a timely manner, the door is left open for subsequent evasion and disavowal of responsibility, protracted delays and possibly extra expense caused by the effect of the defective work on other trades.

5. During the finishing stages of the project, the contractor should make frequent and periodic inspections with subcontractors and the design professional to check for and correct faulty work as the work progresses.

6. When the contractor has decided that the project has been completed satisfactorily and in accordance with the terms of the contract, he should notify the design professional.

DESIGN PROFESSIONAL

1. During the progress of the work, the design professional should point out a deficiency as it is observed rather than waiting and placing it on the punch list.

2. Upon representation by the contractor that in his opinion the project has been completed satisfactorily in accordance with the contract, the design professional should promptly make a thorough investigation and assist the contractor in preparing a punch list detailing any items that are found to be unacceptable.

3. When the punch list has been completed, the design professional should arrange a meeting with the contractor and subcontractors to tour the project to identify all items and explain exactly what is required before the project can be approved as complete.

4. If the contractor gives notice that a major subcontractor has completed his punch list items, the design professional should review that portion of the work; if the items are found to be satisfactorily completed, he should advise the contractor and subcontractor accordingly.

5. When advised by the contractor that all punch list items have been completed, the design professional should review the project with all the specialty contractors involved and if the punch list items are satisfactorily completed, the design professional should then issue the final certificate for payment.

6. If the owner or an installer of the owner's equipment and furnishings, damages finished and previously accepted work, the design professional should advise the owner of his obligations to repair damaged work.

7. The design professional should not include on the punch list items of maintenance or work damaged after the owner has taken occupancy unless such damage was caused by the contractor. Should the owner want the contractor to repair or replace work damaged by the owner, the contractor should be reimbursed for such costs on a change order basis.

8. It is advisable for representatives of all interested parties, including the owner and his project representative if any, the design professional and his relevant engineering consultants, and the contractor and his affected subcontractors, to be present to view the completed project so that misunderstandings concerning unaccepted or any damaged work can be avoided.

If these procedures are adhered to, the initial punch list should be minimal and the corrective work expedited. It is desirable that there be no more than one additional punch list between substantial completion and final acceptance. Issuing a series of punch lists is troublesome to all parties and sometimes confusing. With adherence to this guideline, multiple punch lists should be unnecessary.

Record documents record changes to the original construction documents and memorialize how the building or project was actually constructed. Record drawings are useful to the owner in building operations, maintenance and changes in the future. They are a valuable aid in planning for future alterations and additions. The owner should acquire a complete set of record drawings at the end of the construction project and maintain the set through the life of the facility.

CONSTRUCTION INDUSTRY STANDARDS

Neither the basic services of the design professional described in AIA document B141, nor document A201, General Conditions of the Contract for Construction, require the design professional or the contractor to provide the owner with a set of marked up drawings indicating changes incorporated into the work during construction. It is advised that the design professional recommend to the owner that either the design professional or the contractor provide the owner with a set of record documents noting all approved changes and information including concealed or built-in systems. If this becomes the responsibility of the contractor, the design professional should provide copies of updated drawings which show changes initiated by him or the owner. Regardless of which party provides these drawings, the owner should recognize that there is an associated cost to him for this service.

CONTENT OF RECORD DOCUMENTS

Record documents should include significant changes in the work made during construction. These changes include the effect of design professional's supplemental instructions, field orders, change orders, and construction change directives.

A comprehensive collection of project record documents would include the following items:

1. Documents furnished by the design professional, consisting of drawings, general and special conditions of the contract, and the trade specifications including all contract change orders and revisions.

2. manufacturers' approved drawings and brochures, fabricators' approved shop drawings, installing contractors' approved drawings, operating and maintenance instructions and field coordination drawings.

3. Field record drawings with recorded as-built conditions, significant departures from the installing contractor's drawings, exact locations of underground piping and wiring, and other permanently concealed work.

GUIDELINE V-4

ALTERNATIVE DISPUTE RESOLUTION

Construction is a complex process affected by the project principals, the design, the weather, sub-surface conditions,, the labor market, financial matters, materials availability, and a host of other related and non-related factors. In such a complex process, disputes will arise and must be settled. Traditionally, the settlement of unresolved disputes has been through our court system, but courts frequently do not serve the needs of the industry. In construction, "time is money" and the need to get timely and equitable resolution of disputes has evolved into a system of Alternative Dispute Resolutions (ADR). ADR generally takes two forms: arbitration and mediation. Standard documents in the construction industry today require ADR. The parties to the contract are advised to familiarize themselves with ADR and the processes in use.

ARBITRATION

Arbitration involves the use of experienced, knowledgeable persons to review the positions presented by the disputing parties and make a decision to end the dispute. Arbitration can be speedy and inexpensive. It has evolved into a special form for the construction industry, the American Arbitration Association (AAA) *Construction Industry Arbitration Rules*. Arbitration can be prompt, private, convenient and economical as an alternative to litigation. Each party can present any evidence it wishes. Experienced professionals decide the complex issues. A time consuming and costly discovery process may be avoided (arbitrators will consider motions requiring discovery and other legal issues). The decision of the arbitrator (award) is binding and not subject to court review except where fraud is involved.

Hearing schedules are controlled by the parties. The hearings are private. Issues involving more than two parties may or may not be decided, based on the parties' wishes. There are no limitations on the type of dispute or dollar value to be resolved. The process is generally familiar and acceptable to all persons in the construction industry.

The AIA and Engineers Joint Contract Documents Committee documents include mandatory arbitration as part of their standard construction contract forms.

MEDIATION

Mediation, a more recent form of ADR, may eliminate the need for, or precede, arbitration. It is intended to result in a voluntary agreement by the parties. It has many of the features of arbitration, i.e., speed, economy, limiting of issues, judgment of experienced industry individuals and privacy. But mediation differs from arbitration by being a voluntary process that may be terminated at any time by either party to the dispute. Mediation differs from negotiation only because it involves and impartial, qualified mediator experienced in ADR and construction.