INTERPRETIVE GUIDE

TO THE EVALUATION/DEMONSTRATION

REVIEW CHECKLIST FOR C/SCSC

(APPENDIX E, JOINT IMPLEMENTATION GUIDE)

This Guide represents the effort of numerous people over the years. Its most recent contributors are Professors Richard Antolini and David Christensen. It is intended as a teaching tool in the C/SCSC courses offered at AFIT.

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I. ORGANIZATION

1. DEFINE ALL THE AUTHORIZED WORK AND RELATED RESOURCES TO MEET REQUIREMENTS OF THE CONTRACT, USING THE FRAMEWORK OF THE CWBS.

INTENT: Of foremost importance in organizing any "major" acquisition program is establishing all the work parameters that will be required to accomplish that program. As part of this effort it is also essential to define all the resources that will be required to accomplish that scope of work. C/SCSC requires that this be done and that a Contract Work Breakdown Structure (CWBS) be used as the vehicle for this work and resource definition. When completed, the CWBS will provide a framework for various and extensive management and control purposes. The CWBS will be used in source selection for example, to compare the way each contractor is proposing to accomplish the work outlined in the solicitation specifications. The CWBS will also be used in negotiations to establish the fair and reasonable cost of resources needed to accomplish the contract effort. And the CWBS will be used as the beginning point for all work task planning, the assignment of work to responsible organizations, work authorizing, scheduling, budgeting, cost accumulation, performance analysis, and revisions to planning. Lastly, the CWBS will provide the framework for data/information reporting. Hence the CWBS is, perhaps, the single most important document/exhibit prepared in support of the C/SCSC. Any weakness in the CWBS can have far-reaching and debilitating effects upon performance measurement and contract accomplishment.

CHECKLIST QUESTIONS:

a. Is only one CWBS used for the contract (attach copy of CWBS)?

Only one CWBS can be used for a given contract. That CWBS must be the one that was negotiated and agreed upon as the definition of the work and resources required to meet the requirements of the contract. It would be devastating to performance measurement if one CWBS was used to manage the contract and a different CWBS was used to report data to the government. This would negate any effectiveness inherent in the C/SCSC and would defeat the overall purpose of a common basis for communication. In this regard, program revisions often invite the occurrence of multiple CWBSs. It is unacceptable to utilize more than a single CWBS on any contract.

b. Is all contract work included in the CWBS?

A Work Breakdown Structure (WBS) is a product-oriented, "family-tree" chart which displays and defines the hardware, software, services, and other work tasks needed to produce a given product. In the case of a CWBS, the product(s) are specified in the contract. The CWBS is used to insure that the contractor and the government have a common basis for communication regarding cost, schedule, and technical performance with respect to the contract scope of work. This cannot be possible unless the "single" WBS for the contract includes all the tasks, services, hardware components, and subcontracted items that are required to perform under the contract. To confirm mutual understanding of the complete scope of work contained in the CWBS it is necessary to define each CWBS element clearly. These definitions are set forth in a CWBS Dictionary to insure that both parties understand the composition of each CWBS element and its unique portion of the scope of work. By necessity then, the CWBS must always be all-inclusive. The summation of data from the CWBS elements must always reflect the amount of work authorized on the contract. The total amount of budget allocated for the work accomplishment will flow logically from the definitized WBS.

c. Are the following items included in the CWBS? (annotate copy of CWBS to show elements below)

(1) Contract line items and end items (if in consonance with MIL-STD-881A latest

edition)?

All products and services identified as contract line items and/or end items in the contract scope of work must be contained in the CWBS. Often the names of the CWBS elements directly correlate with the contract line or end items. However, it is feasible that a single CWBS element may contain a number of products and services that were identified as contract line items or end items. It is important in these cases to be able to recognize these products or services (the line items or end items) within the CWBS definitions. Specific cost, schedule, and technical progress will be mandated for these items. If they cannot be specifically and individually identified in the CWBS their progress cannot be effectively measured.

(2) All CWBS elements specified for external reporting?

Within the CWBS, certain higher level elements are selected by the government for which the contractor is required to report on a regular basis cost, schedule and technical specification status. In some cases these elements may correspond with all the elements at a given level of the CWBS. Hence data for all the lower level elements would be summarized correspondingly to these higher level elements where it would then be reported. This situation most often occurs where all the contract line items and end items occur at the specified reporting level or higher. Where contract line items happen to fall at various levels within the CWBS, however, it would not suffice to require data reporting at a particular level of the CWBS. Rather, the individual CWBS for which data will be required must be separately identified. In either case it is important to note which CWBS elements will be specified for external reporting, so there is no doubt as to the lower level elements which be summarized within them. It is only in this way that reported data can be audited for cause and effect relationships and validity reconciliation.

(3) All CWBS elements to be subcontracted, with identification of subcontractors?

All CWBS work tasks or services that are outside of the capability of the contractor to provide himself must be clearly identified on the CWBS. In some cases, a contractor may have the capability to do all the work on a contract himself, but there may be various reasons of economy that may warrant subcontracting certain of the CWBS elements for accomplishment. But for whatever reason, when defining the work and service requirements of a contract, it is important to clearly identify those CWBS elements which will be subcontracted. As soon as the subcontractors are identified, the CWBS should be augmented with their names. Such identification will facilitate the interpretation of data reported by the prime contractor and better allow for total contract progress measurement.

(4) Cost account levels?

The systematic breakdown of the contract products and services within the CWBS framework should continue with an orientation to the deliverable products until the contract scope has been subdivided (within each branch of the structure) to the level where the contractor's management organization is able to assign responsibility for performance to individual managers. These responsibility assignments must relate directly to the functional capability of the manager, and to the CWBS elements product or service. These individual elements are called cost accounts. The cost account is the focal point of control within C/SCSC. The cost account must have a well-defined scope of work which is directly relatable to the definition of the higher level CWBS element of which it is a part. Each cost account must have a time-phased budget and a detailed schedule for the effort within the cost account. The budget and schedule are relatable to, and in support of, the contract's performance measurement baseline and the master program schedule. A cost account must be assigned to a single individual for the control of resources and the direction of effort to be accomplished. For this reason, it is of paramount importance that the CWBS include and identify where the cost accounts occurs within the total work definition.

2. IDENTIFY THE INTERNAL ORGANIZATIONAL ELEMENTS AND THE MAJOR

SUB-CONTRACTORS RESPONSIBLE FOR ACCOMPLISHING THE AUTHORIZED WORK.

INTENT: Once the scope of work has been adequately defined via the CWBS it is important to assign responsibility for getting the work accomplished as defined. This criteria requirement serves to insure that the contractor reviews his manpower availability and the availability of his managerial personnel to ascertain to what extent these personnel have the time and the capability to assume responsibility for additional contract work. The task of composing an organizational chart (or Organization Breakdown Structure - OBS) to identify which managers in the corporate structure will have responsibility for work accomplishment will usually suffice as a review to ensure that full management and technical capability exists. Where management, manpower or technical capacity is not sufficient, the contractor must choose between the options of subcontracting for this additional capability or trying to hire additional personnel as a means of increasing his own capacity. Such a make-or-buy decision is often a hard choice to make because of the far-reaching effects it may have on the growth potential of the company, the company's overhead posture, and the competitive environment in which the company operates. The necessity to identify organizational responsibility can not be minimized. If done improperly or insufficiently at the onset of a contract, it almost always results in lack of management control, lack of scheduled accomplishments, and cost overruns.

CHECKLIST QUESTIONS:

a. Are all authorized tasks assigned to identified organizational elements? (This must occur at the cost account level as a minimum.)

Good management mandates the establishment of clear effort/task responsibility within an organization. Since the definition process of the CWBS establishes a common framework for cost, schedule, and technical performance measurement and for the communication of results of the management process, a clear and definite assignment of organizational responsibility for the defined work establishes a single-point manager who can be held accountable for that work accomplishment. This is especially important at the cost account level. The cost account is the focal point of control within C/SCSC. Therefore, the cost account manager is the single point-of-focus for performance measurement. Here, more than anywhere else in the OBS, clear responsibility must be assigned, authorized, and encouraged. When clear responsibility is not established, unsatisfactory performance is less likely to be corrected; everyone feels that "it is not my responsibility." Decisive, effective management, particularly corrective action, results from clear (and formal) assignment of responsibility.

b. Is subcontracted work defined and identified to the appropriate subcontractor within the proper WBS element?

Subcontracted effort must be clearly recognizable within the CWBS and the OBS. It is necessary to be able to identify each subcontractor's effort, and to be able to separate his performance from that of every other performer. This is often accomplished by creating separate CWBS elements for each of the subcontracted products/services and separate OBS elements for each of the major (or critical) subcontractors. (This is not a requisite of the criteria, however, but simply a method often successfully employed.) When subcontracted effort is not clearly separable it is difficult to determine the underlying cause of deviation from plans. This is true because performance data from the subcontractor would be combined with performance data from other elements (perhaps other subcontractors) so that it is difficult to see who is responsible for what proportion of the data. It would be important to know, for example, if the entire cause of a deviation were attributable to a single subcontractor. Such information must be determinable by the reporting contractor as well as by the Government.

3. PROVIDE FOR THE INTEGRATION OF THE CONTRACTOR'S PLANNING, SCHEDULING, BUDGETING, WORK AUTHORIZATION, AND COST ACCUMULATION SYSTEMS WITH EACH OTHER, THE CWBS AND THE ORGANIZATION STRUCTURE. (Reference format 1.)

INTENT: The basic necessity for the integration of the contractor's management subsystems listed above is an obvious one, but one which cannot be overlooked because of its obvious nature. It is imperative that, at any time, a contractor be able to provide a complete audit trail for any increment of work through the various management subsystems. He must be able to take you from the work task to the CWBS where the work is formally identified and defined. He must be able to trace the work task manager to the OBS where the chain of command is assigned. He must be able to trace the work task to the formal scheduling system so one can identify when, in time, this effort fits into the total contract plan. The contractor must be able to provide and explain the detailed plans for getting the work task accomplished, along with providing a definition of type of effort required. He should be able to break the effort down by element of resource (labor, material, etc.) and substantiate that efforts' budget construction. He should be able to show how the work plan is translated into action in the work authorization system and how actual accumulation of costs are tallied as that work is accomplished. Through this type of audit trail an alpha-numeric work designation system pervades; it is by this system that data is collected and flowed through the various levels of the CWBS and the OBS to the point of summarization and reporting. The existence of a faulty data collection system weakens not only management control of the contractual effort but also provides the opportunity for the management subsystems to be less than fully integrated. Where this occurs, cost, schedule, and technical parameters are most likely to be overrun.

CHECKLIST QUESTIONS:

a. Are the contractor's management control systems listed above integrated with each other, the CWBS, and the organizational structure at the following levels: (Use matrix to illustrate the relations.)

(1) Total contract?

(2) Cost account?

A contractor's existing planning, scheduling, budgeting, work authorization, and cost accumulation systems must be integrated in such a way that data derived from one system is relatable and consistent with the data of each of the other systems. This must be done at least at the total contract level and the cost account level. Specifically, integration at the total contract level ensures that the contract goals are compatible. The Contract Budget Base, as a budgetary goal, must be compatible with the Master Program Schedule; these must be compatible with the capability of the accounting system to accumulate costs exclusively of other contractual efforts; and these must be compatible with the contractor's organizational management capability and the contract's technical specification goals outlined in the Statement of Work and defined by the CWBS. At the cost account level total integration is absolutely essential also. This is the level where actual work task management occurs and where performance measurement is conducted. At this level the scope of work is most specifically defined, planned, and scheduled to meet higher-level goals/milestones, and the cost account budgets are constructed and laid into a time-phased baseline for performance/progress measurement purposes. And at this level work is translated into action via work authorizations, work tasks are managed/supervised to completion, and actual costs are accumulated. Results of cost account management are reflected in data, all of which is initiated by the action of the cost account manager. This data simultaneously flows through each of the management systems, the CWBS, and the OBS to the reporting level and the total contract level, where program management can occur.

4. IDENTIFY THE MANAGERIAL POSITIONS RESPONSIBLE FOR CONTROLLING OVERHEAD (INDIRECT COSTS).

INTENT: Indirect costs must be managed and controlled in much the same way as direct costs. However, where direct cost managers have as their main goal effective cost control for the

objectives of only a single contract, overhead cost managers must establish goals based upon the contractor's total business base (i.e., all the contracts that comprise his business volume). The way in which contractors attempt to control and manage the indirect cost effort may vary tremendously from one contractor to another. One may prefer a segregated control system where different managers provide checks and balances over one another with regard to indirect costs; other contractors may have unified or centralized overhead control systems. The method of overhead control often reflects, more than any other management system, the management philosophy of the contractor's chief executive. Because of the diversity between overhead control philosophies, because of the large portion of total contract costs which are indirectly incurred, and because of the difficulty in measuring overhead performance, it is extremely important to examine the contractor's overhead management system and their control procedures. The first step in this examination is to identify which managerial positions the contractor has identified to control indirect costs. Secondly, it is important to ascertain the extent of responsibility afforded each of these managers.

Regardless of whether overhead control is centralized or segmented, a clear assignment of responsibility is paramount. Where responsibility is vague two syndromes tend to operate. First is the "It's not my responsibility" syndrome where everyone passes the buck in authorizing indirect services and everyone points the finger at someone else when it comes to justifying why an indirect service was authorized. The other syndrome is the "routing" syndrome where every request for indirect authorization and justification is kicked higher up in the chain of command because no one knows who has authority and no one really wants the final authority for fear that they may later be held accountable for the decision. In many cases, one syndrome feeds the other and the two remain in constant fluctuating operation.

CHECKLIST QUESTIONS:

a. Are the following organizational elements and managers clearly identified:

(1) Those responsible for the establishment of budgets and assignment of resources for overhead performance?

Among the controls necessary to manage overhead costs is the establishment of responsibility for control of such costs. This includes a clear definition of who is responsible for establishment of overhead budgets. Normally this is a centrally controlled function because overhead goals establish the overhead rates that will eventually be applied to the direct costs. Overhead budgeting responsibilities must be clearly stated as must the overhead budgeting process and who this responsibility rests with.

In addition to budgeting responsibility, assignment and control of the overhead resources is also a responsibility that must be clearly defined. This responsibility is often assigned to the managers who are most directly responsible for supplying these indirect services. Such authorization responsibility is often placed separately at each overhead pool or category.

Sometimes contractors will centralize these two areas of responsibility. Other contractors make each responsibility an interactive process involving a series of several managers. This criteria does not attempt to imply how overhead budgeting and resource assignment should be managed. It merely insists that to be effective, these managers so assigned should be specifically identified and warranted with specifically defined limits of authority.

(2) Those responsible for overhead performance control of related costs?

Responsibility must also be clearly established for overhead performance (both cost and schedule performance) and control. These responsibilities must be established for each overhead pool or category and must be assigned to individual managers. Normally such managers are those whose organizational assignment is most directly related to the consumption of the resources contained in that overhead category. Again, this criteria does not imply who these managers must be or at

what level in the organization structure these managers must function. But it is paramount that someone be assigned the specific responsibility of measuring overhead performance and exerting control over variances that occur in the indirect cost areas.

b. Are the responsibilities and authorities of each of the above organizational elements or managers clearly defined?

In addition to clearly identifying who has what type of responsibility with regard to indirect cost control, it is necessary to define the tools available to these assigned managers. This includes a clear, formal statement of each overhead manager's authority and the extent of his responsibility within the company's overhead control system. To be effective in the control of overhead resources, for example, a manager must have the authority to either approve or avoid the expenditure of resources and he must have the responsibility for justification when the expenditure of indirect resources is incurred. The limits of each overhead manager's authority should be stated as specifically as possible. Only in this way will these managers feel free to exert the control with which they are endowed.

5. PROVIDE FOR INTEGRATION OF THE CWBS WITH THE CONTRACTOR'S FUNCTIONAL ORGANIZATIONAL STRUCTURE IN A MANNER THAT PERMITS COST AND SCHEDULE PERFORMANCE MEASUREMENT FOR CWBS AND ORGANIZATIONAL ELEMENTS. (Provide matrix showing integration.)

INTENT: The first two organization criteria required the contractor to define/organize the contract scope of work and to identify his managerial staff in a manner that can get contract work accomplished. This criterion requirement juxtaposes these first two criteria; it requires their integration in a manner that enhances performance measurement. The cost account has been previously identified as the lowest-level focal point for management control of all contractual effort. It is the initiation point for performance management and measurement. Hence, this criteria is requiring that the CWBS should be integrated with the OBS at least to the extent the Cost Account Managers be assigned to their respective cost accounts for purposes of performance measurement.

CHECKLIST QUESTIONS:

a. Is each cost account assigned to a single organizational element directly responsible for the work and identifiable to a single element of the CWBS?

Each cost account must be assigned to a single contractor organizational entity that will be primarily responsible for the accomplishment of that work. Making someone singularly responsible for accomplishment of a specific portion of work within a budget and schedule constraint is mandatory to this progress evaluation system we call "performance measurement." In addition, this allows a clear summarization of cost, schedule, and technical performance data up through the OBS without allocation of data from one lower department to two or more high organizational elements. And since each cost account is a logical subdivision of a higher level CWBS element, it must be identifiable to only one CWBS element. This ensures that cost, schedule, and technical performance data can also be summarized directly through the CWBS without subdivision or dual allocation.

Many contractors construct a chart called a Responsibility Assignment Matrix (RAM) with the cost account managers listed on one axis and the CWBS cost accounts listed on the other axis. This RAM becomes a cross check to ensure singular OBS responsibility of each cost account manager for each CWBS cost account element. This one-to-one alignment is absolutely essential to ensure complete work coverage and reliable data reporting.

b. Are the following elements for measuring performance available at the levels selected for control and analysis:

(1) Budgeted Cost of Work Scheduled (BCWS)?

(2) Budgeted Cost of Work Performance (BCWP)?

(3) Actual Cost of Work Performed (ACWP)?

By definition, a cost account is the lowest level of full management responsibility. Therefore, the "level" selected for control and analysis must be the cost account. BCWS, BCWP, and ACWP must be generated for the cost account. Attendant to these data elements, Budget at Completion (BAC), Estimate at Completion (EAC), Cost Variance (CV), and Schedule Variance (SV) can also be derived at the Cost account level. This cost-account-generated data must be capable of being summarized to any higher level of the CWBS and OBS as necessary for timely analysis and control of the total contract. Cost Account selection must be governed by some degree, then, by the ability to develop and collect these data elements. When cost accounts are not properly selected, it is possible that the contractor's management control system will not be capable of providing valid data in a timely manner.

II. PLANNING AND BUDGETING

1. SCHEDULE THE AUTHORIZED WORK IN A MANNER WHICH DESCRIBES THE SEQUENCE OF WORK AND IDENTIFIES THE SIGNIFICANT TASK INTER-DEPENDENCIES REQUIRED TO MEET THE DEVELOPMENT, PRODUCTION, AND DELIVERY REQUIREMENTS OF THE CONTRACT.

INTENT: This criterion is the only one which deals specifically with the need to schedule work. It does not require the contractor to use any specific type of scheduling technique; however, PERT/Critical Path, Line-of Balance, Gantt, and Milestone charting are all effective scheduling techniques. Any one or combination of these (or others) may be employed. Primarily what this criteria requires is that a formal (via written system description and internal operating procedures) scheduling system be established and used consistently to ensure discipline in the sequencing of work throughout the life of the contract. Secondly, this criterion requires that these procedures be followed as a means of documenting, in writing, the complete schedule plan of work. These schedules should consist of summary or master schedules and related subordinate schedules which provide a logical sequence from the summary to the detailed work package levels. In so doing, the schedules can provide for the interdependent sequencing of all work authorized on the contract in a manner compatible with the contract milestones and the technical requirements of the contract. The end goal of such schedules is that they provide a vehicle for evaluating actual progress (in time) against established milestones of achievement.

CHECKLIST QUESTIONS:

a. Does the scheduling system contain: (Prepare exhibit showing traceability from contract task level to work package schedules.)

(1) A master program schedule?

Of prime importance, and basic to all scheduling systems, is the identification of the goals of the contract to a time interval for accomplishment. This entails identification of contract milestones to calendar dates for important contract development and production decisions. Prototype testing, subcontract and/or government-furnished material delivery dates, and end item delivery requirements of the customer are examples of a few. These milestones, or goals, called out on the contractual document itself, must be laid into the Master Schedule first. These will become the primary measurement points for determining contract progress by both the contractor and the government. At the onset, they provide the most basic planning goals for the contractor. It is toward these goals that he will plan all the work tasks, integrate the work force for this contract with the work force requirements of his other contracts, and plan his material procurement need-dates to integrate with his inventory management capability. These scheduling goals will directly impact his cash-flow requirements and to this end many contractors establish additional program milestones in their master schedules to ensure cash/payroll availability. Once finalized, the Master Schedule's milestones become major goals for underlying, subordinate organizations toward which they can plan their work schedules.

(2) Intermediate schedules, as required, which provide a logical sequence from the master schedule to the cost account level?

Intermediate schedules may be of two different orientations. They may be functionally derived (i.e., by the functional departments that comprise the contractor's organization such as Quality Assurance, Engineering, Manufacturing, etc.) or they may be related to WBS elements as a

means of scheduling/identifying the interrelationships that exist between the various hardware components. Intermediate schedules, however, are not required by the Criteria. Some contractors may translate the Master Schedule goals directly to the lower-level Cost Account Schedules. But where contractors do utilize intermediate schedules, regardless of their orientation, these intermediate schedules must perform a "linking-pin" function to tie the detailed schedules at the cost account level into the total contract, master schedule; they thus provide complete schedule traceability for all authorized work.

(3) Detailed schedules which support cost account and work packages start and completion dates/events?

Because cost accounts have a defined and authorized scope of work, translated as they are from the CWBS and the OBS, they have limited life. That is, they have a predetermined start -date and completion-date. Such dates must be derived from, and be within, the boundaries established by higher level controlling schedules (Intermediate and Contract Master Schedules). This provides the means to control the application of resources in accordance with the Master plan/schedule. An important aspect of schedule date flow-down to the cost account level is the clear definition of what constitutes completion of the effort within a cost account (the tangible evidence, in other words); this event must be discretely defined and must be tied to a scheduled date. And although less rigidly enforced in practice, what constitutes the "start-of-work" is considered just as important. Tieing this evidence for start-of-work to a scheduled date, along with that for work completion is what ensures compatibility with other "dependent" schedule events.

b. Are significant decision points, constraints, and interfaces identified as key milestones?

This subquestion to the scheduling criterion is intended to help define what constitutes a "key" milestone. On a Master Schedule, it was previously stated, the "key" milestones should be included, (examples were: the major development and production decisions (such as DSARC-1, DSARC-2, etc.) prototype testing, subcontracted or government-furnished equipment delivery dates, end-item delivery dates.) The use of such "key" milestones ensures that the planning and budgeting activities of the various functional organizations use identical points of reference for task planning and performance measurement schedules. Without this consistency, performance measurement is distorted. For example, "key" milestones established by a Master Schedule should be incorporated into the applicable intermediate schedules and down through the detailed schedules within the cost accounts. Such "key" milestone identification also facilitates interfunctional communication by defining future activities which may be impacted by current activity delays. Of prime importance here then, is that the contractor have an intent-statement in his Scheduling System Description to identify all contract "key" milestones in his Master Schedule. It then becomes incumbent upon any system reviewer to ensure than no contract "key" milestones have been overlooked, ignored, or otherwise omitted.

c. Does the scheduling system provide for the identification of work progress against technical and other milestones, and also provide for forecasts of completion dates of scheduled work?

This subquestion is often confusing to system review personnel because of its apparent overlap with other subquestions which occur later in the planning and budgeting criteria. It does not ask if the contractor is, in fact, measuring work progress against milestones. Rather it asks if the contractor, in his Scheduling System Description and internal operating procedures, requires that his schedules (master, intermediate and detailed) be constructed for this eventual purpose. The system reviewer must ensure that the Scheduling System Description voice this intent and then he must check the constructed schedules to ensure that they have in fact, included in them

technical and other milestones (goals or other concrete evidence of work task completion) which can be used later on to measure how much work has been accomplished at any point in time. Given this capacity for accurate work statusing, the realism for forecasting work completion dates is enhanced. So the Scheduling System Description must also include the intent for the performing organization to forecast completion dates for work which has departed from the original plan. This is to ensure that projected schedule slippages are surfaced for management action in a timely manner.

d. Are work packages formally scheduled in terms of physical accomplishment by month, week, or day as appropriate?

During initial detailed planning of the work, dates for work-start and completion of any intermediate status measurement milestones are formally documented and recorded. This establishes the basic (detailed) work-schedule plan against which performance will ultimately be measured. Various contractor organizations may establish such dates by different frames of reference. However, all work authorized for accomplishment on a contract, regardless of which organization is responsible for accomplishing it, must be scheduled to a specific day for starting, completion, and intermediate milestone assessment.

2. IDENTIFY PHYSICAL PRODUCTS, MILESTONES, TECHNICAL PERFORMANCE GOALS, OR OTHER INDICATORS THAT WILL BE USED TO MEASURE OUTPUT.

INTENT: There is considerable dependence between Planning and Budgeting criteria one and two. Number one requires sequential scheduling that will identify task interdepencies. Number two requires identification of interim goals by which to measure work accomplishment. Once the schedule is established the contractor should devise a methodology for tracking his actual accomplishment of that scheduled work. To avoid subjective guessing of work accomplishment, identification of milestones within the schedule will make it possible to place an objective value on the amount of work required to meet that milestone goal, and in addition, as work can be proven to have been accomplished, the contractor can proceed on to the next task in the scheduled sequence. These two criteria, therefore, from a practical sense, should be accomplished simultaneously and the conscientious planner (and systems reviewer) should ensure that these interim goals have been identified within all work schedules.

CHECKLIST QUESTIONS:

a. Are meaningful indicators identified for use in measuring the status of cost and schedule performance?

A previous Scheduling Criterion subquestion asked if the contractor's Scheduling System Description required that milestones be identified for use in measuring performance. This subquestion goes one step further; it asks if these milestones are meaningful. It's a quality assurance-type question: Has the contractor identified meaningful indicators for work assessment? Some management control systems measure progress on the basis of input-oriented indicators. Time and money expended are two such indicators. These are not considered meaningful indicators, however, because regardless of the amount of time or money expended the effort may still not be accomplished. Despite this, many firms still measure their percent complete as the amount of actual resources they have expended (ACWP), divided by the amount of resources they planned to expend (BCWS). This calculation can only be as accurate as the validity of the originally planned resources or resource estimate at completion. Meaningful indicators are those which address physical or tangible completion. "Actual units installed," "system or subsystem tasks completed," "drawings signed-off" are some examples of tangible

indicators. Even seemingly physically-oriented indicators like "units installed" can be elusive, however, depending on what constitutes completion of an installation. Drawings can be "signed off" with holds, and more or less than the planned quantities may be required to complete an activity. Therefore, care must be exercised in selection, identification, and definition (particularly definition) of such indicators. The contractor must minimize the need for subjective guesses in determining actual accomplishment.

b. Does the contractor's system identify work accomplishment against the schedule plan? (Provide representative samples.)

Under the first Planning and Budgeting Criterion a subquestion asked if the contractor's scheduling system identified work accomplishment against technical and other milestones. This subquestion, however, asks if the contractor's system identifies progress against the schedule plan. Overlap of these two subquestions is obvious since our previous schedule criterion required that the contractor's schedule plan be composed of meaningful milestones. It would appear that progress measurements based on milestone accomplishment would be sufficiently measuring progress against the schedule plan as well. But while this may be true in some cases, it can not be assumed to always be true. At the detailed work level (cost account level) progress measurements must be made based upon milestone accomplishment. A cost account manager may report that he has accomplished 30% more milestones than scheduled in a particular month. On the surface we could assume that he is, therefore, 30% ahead of schedule. Upon closer scrutiny, however, we might find that some of the accomplished milestones were rework milestones based upon work that should have been finished in an earlier period of time. In addition, some of the milestones might have been accomplished out-of-sequence because they were easier to do than the in-sequence ones. And still other of these accomplished milestones may be the result of a work-around procedure not in the schedule plan, but necessary because one of the scheduled milestones could not be achieved. The point is, assurance of progress measurements against specific milestones is important, but one must go one step further and evaluate what these milestone accomplishments mean with reference to the overall schedule plan.

c. Are current work performance indicators and goals relatable to original goals as modified by contractual changes, replanning, and reprogramming actions? (Provide exhibit showing incorporation of changes to original indicators and goals.)

Primarily this subquestion is to ensure traceability of contract performance in the dynamic environment of contract changes so that the performance measurement baseline (PMB) is consistent and changes to it are readily traceable. Ensurance of such traceability is accomplished by comparison of those work performance indicators and goals, key milestones in other words, of the original contract to those of the current contractual document. Where direct comparison is not possible, we expect the contractor to be able to provide a "trace" of how his schedule plan evolved form the original contract goals to the current contract goals. To the extent this is accomplished the PMB is directly reconcilable as the plan to measure performance against.

3. ESTABLISH AND MAINTAIN A TIME-PHASED BUDGET BASELINE AT THE COST ACCOUNT LEVEL AGAINST WHICH CONTRACT PERFORMANCE CAN BE MEASURED. INITIAL BUDGETS ESTABLISHED FOR THIS PURPOSE WILL BE BASED ON THE NEGOTIATED TARGET COST. ANY OTHER AMOUNT USED FOR PERFORMANCE MEASUREMENT PURPOSES MUST BE FORMALLY RECOGNIZED BY BOTH THE CONTRACTOR AND THE GOVERNMENT. (Reference formats 2 and 8.)

INTENT: After all the authorized work required on a contract has been organized and

planned-out, after it has been assigned to functional managers for accomplishment, and after these functional managers have scheduled and budgeted this work, the actual work may finally begin. As soon as work is begun, the contractor must start asking his functional managers how the work is progressing. Their responses, at best, can only be meaningful relative to some basis of measurement. The cost account manager must ask in response to how the work is progressing, "compared to what. If that vehicle for comparison is standardized among cost account managers the responses will not be relevant. This criteria serves as the requirement for cost account managers to establish a standard vehicle for comparison of work accomplishment. That vehicle is the Performance Measurement Baseline. It represents the formal plan of each cost account manager to do all the work assigned to him/her in the amount of time allotted and within the amount of budget authorized to accomplish that work. Given this standardized plan to use as a base line, cost account managers can then respond that their performance is such-and-such with respect to that plan.

CHECKLIST QUESTIONS:

a. Does the performance measurement baseline consist of the following:

(1) Time-phased cost account budgets?

The foundation of a C/SCSC - validated performance measurement system is the cost account. As the lowest level where full management responsibility and control exists for a given CWBS element, the cost account must be the basic ingredient of the performance measurement baseline. Each Cost Account must be planned-out on a task-by-task basis. These tasks must be oriented into the proper sequence for accomplishment, and must be scheduled, or time-phased, across the calendar period allotted for the accomplishment of that cost account. This same scope of work must have a budgetary target established for it as a goal and each of the subordinate tasks planned and scheduled must be allocated a reasonable proportion of the total cost account target budget. Having broken down the Cost Account's scope of work into its subordinate tasks and having budgeted each of these tasks, it is then possible to see what budgetary goal is available to do each month's worth of work. This process is a simplistic model for establishing a time-phased budget plan which can later be used as a baseline against which the cost account's progress/ performance can be measured. The goal of this criterion subquestion is to ensure that each and every cost account have such a pre-determined PMB for performance measurement purposes. Collectively, these cost account PMBs will comprise the major portion of the total contract PMB.

(2) Higher level CWBS element budgets (where not yet broken down into cost account budgets)?

Recognition must be given to the cycle-time associated with the functional budget release and the subsequent approval of cost account budgets. This is especially true when far-term work definition is being accomplished. It is essential to establish a realistic PMB as quickly as possible, however many C/SCSC - complaint management control systems release budgets to major functional organizations at a summary CWBS level. Subsequently these higher level organizations at a summary CWBS level. Subsequently these higher level organizations will breakdown and distribute their budgets to the lower cost account level. (The cycle time required to do this does not relieve the major functional managers from their responsibility to flow-down this summary level budget to the cost account level in a timely manner). Hence, these higher level budgets should be temporary accounts; they should not be used as a management reserve or a contingency fund. At any given point in time, then, the PMB of the total contract may be composed of not only the collective, time-phased, cost account budgets, but also any existing

higher-level budgets as well.

(3) Undistributed budgets, if any?

The criteria collectively require that the contractor, at all times, be able to account for all budgets allocated to a given contract. The contract PMB represents the contractor's plan for doing all the contractual work within the confines of this budget allocation. As has been previously mentioned, the bulk of this budget plan is composed of time-phased cost account budgets. The PMB also contains, as necessary, higher-level budget accounts. In addition to these, one must recognize the occurrence of situations wherein contract changes are received by the contractor too late within the accounting period/month to be distributed down to the cost account or even the summary levels. Where this occurs, the contractor, as a means of accounting for all budget allocated officially to the contract, places this undistributed budget into a holding account. This holding of undistributed budget must be temporary. Within the contractor's system description should be written an intent-statement limiting the period of time in which budget may remain undistributed. (Budget should be distributed down to the cost account level as soon as possible, normally within the next accounting period.) So at any point in time, if a contract change has been received in the recent past the contractor's PMB could be in part composed of Undistributed Budget.

(4) Indirect budgets, if not included in the above?

Indirect budgets (overhead) are budgets for costs which, because of their incurrence for common or joint contractual objectives, are not readily subject to treatment as direct costs. Indirect budgets are authorized to specific functional managers within the contractor's organization who are assigned responsibility for controlling indirect costs. These overhead managers may exist at any level of the contractor's OBS; the criteria makes no specification in this regard. Technically, overhead managers could be at the cost account level or at any of the intermediate or higher summary levels of the contractor's organization. As PMBs are summarized from the cost account levels up through the summary levels to construct the total contract PMB, overhead budgets must be included at the level where the contractor has assigned responsibility for their application / incurrence. Hence, the total contract PMB is composed of not only the direct cost budgets for the contractual work but of the indirect budgets as well.

b. Is the entire contract planned in time-phased cost accounts to the extent practicable?

Advance planning is one of the key tenets of the Planning and Budgeting Criteria and is referred to by several of the subquestions. The ensured adequacy of advance planning both improves the work performance capability and ensures sufficient budget exists to provide reasonable performance objectives throughout the life of the contract. A further objective is to prevent very short-term incremental planning (such as the planning of a subsequent week's work at the end of the previous week). Unless the contractual effort is sufficiently planned in advance, cost account managers will be frustrated (and prevented for the most part) from adequately managing their portion of the CWBS work. They will not be able to identify all the tasks required, they will be unable to sequence the work correctly, they will be unable to schedule the work among other contract requirements and they will be prevented from establishing a reasonable budgetary target or performance measurement baseline. At the start of a contract, however, it is recognized that all of the work cannot be fully defined as to organization or CWBS elements with enough detail to develop all of the future cost accounts. At contract award, the first one or two years of work should be defined to the cost account level as soon as possible. As work proceeds,the remainder of the contract effort should be defined to the cost account level; usually by the end of the first year this can be reasonably accomplished. This is

not to imply that these one and two year standards are (or should be) a norm. The sooner advance-planning occurs, generally the more benefit can be derived, however.

c. In the event that future contract effort cannot be defined in sufficient detail to allow the establishment of cost accounts, is the remaining budget assigned to the lowest practicable CWBS level elements for subsequent distribution to cost accounts?

In line with the previous criterion the objective here is to ensure that work is planned and budgets are allocated as far down into the organizational and CWBS elements as practical. Also desired here is that reasonable budgets be provided for performance measurement purposes throughout the life of the contract. A common failing of contract planners is to provide over-generous budgets for the initial work (because of the fear of unknown (risky) design, set-up, or material lead-time problems) and "lean" budgets later on in the schedule (because of an optimistic value placed on learning curves, and program maturity). Often this results in performance appearing superior in the earlier phases of the contract only to deteriorate rapidly when the lean-budgeted tasks are finally encountered. Instead of this practice, contract planners should be encouraged to break down the future work into the smallest increments which still contain budget, schedule, and scope of work. Only in this way can the reasonableness of these future budgets be ascertained. "Reasonableness" is very difficult to determine with any degree of confidence, if the future work is defined at too high a level. Future work must be continually broken down to the lowest practicable level, and as soon as possible, to the cost account level.

d. Does the contractor require sufficient detailed planning of cost accounts to constrain the application of budget initially allocated for future effort to current effort? (Explain constraints.)

Any system of management and control incorporates checks and balances as a means of ensuring a disciplined and consistent application of the theoretical standards on which that system is based. One such check in the C/SCSC is to restrain the contractor from providing current work with over-generous budgets to the detriment of downstream work. This question implies that sufficient detailed planning of cost accounts will prevent functional managers from applying future budgets to near-term work. In actuality detailed planning of cost accounts will not fully ensure this constraint. But detailed advance planning will help to ensure that sufficient budget is retained for and provided to downstream work. In a fast-track design/build environment, this detailed advance planning is particularly difficult to achieve. This criterion question, in conjunction with the previous one, helps to focus on the potentiality of such a problem and specifically requires administrative and procedural safeguard to minimize it. The Joint Implementation Guide Criteria Checklist requires that the contractor have such a constraint formally written into his management/control system description and it further requires the System Reviewer to explain this constraint in the Validation Report. In this way there may be no confusion on the intent of the C/SCS Criterion. Not only will this requirement prevent a dubious Performance Measurement Baseline, but it will also ensure reasonable performance targets throughout the life of the contract.

e. Are cost accounts opened and closed based on the start and completion of work contained therein?

Cost accounts are, among other things, identified by the C/SCSC as the most valid place for the collection of actual costs. In practice it is often observed that cost accounts, by virtue of their cost collection role, risk erroneous changes, both intentional and unintentional. To prevent excessive charges to cost accounts and to minimize erroneous changes, cost accounts should be open, and allow cost collection, only while work is being accomplished in accordance with their work scope. An accumulation of the work packages and planning packages composing a cost

account should define the expected start and completion of work for that cost account. The actual beginning date of the first work package should mark the real opening date of the cost account; the completion of the last work package should mark the closure of the cost account. Costs should be collected only during the intervening months. If there is an intervening month where no work package has work being accomplished, the cost account should be closed for cost collection purposes. The System Reviewer, therefore, should seek evidence of both procedural safeguards in the system description and evidence of disciplined adherence to these constraints.

4. ESTABLISH BUDGETS FOR ALL AUTHORIZED WORK WITH SEPARATE IDENTIFICATION OF COST ELEMENTS (LABOR, MATERIAL, ETC.) (Reference formats 2, 3, and 4.)

INTENT: An integral part of the planning process and of the construction of a Performance Measurement Baseline is the establishment of budgets for all the work authorized on a contract. In performance measurement parlance a budgetary entity is an expression of a scope of work. A Budget at Completion (BAC) of any cost account or WBS element is just another way of saying how much work has to be done. Earlier in the planning stages, after each of the CWBS elements was broken down into there subordinate cost accounts, the Cost Account Managers were tasked with breaking down their assigned scopes of work into the individual and specific work tasks (work packages and planning packages) that would be required to accomplish that scope of work. Part of that task was a determination on the part of the cost account manager (CAM) as to what amount of skill (in terms of labor) would be needed to do the tasks and how much of this labor would be required. The CAM also had to determine what materials would be needed to do these tasks and he had to plan for any other company services (such as computer use, etc.) that he would need. This particular criterion follows along after this previous planning activity and requires the contractor to apply dollar values to the labor, material, and other direct charge requirements for which he planned. It further requires that the same total of these budgetary values should be constrained to match that CAM's proportionate share of the budget value contractually allocated to the contract. It is within this total budget parameter that all the work has been defined. Hence all work tasks to be accomplished must be budgeted within this parameter. Throughout the WBS then, from the highest level down through the Cost Account, and even at the work package level, there will be a budget entity that has been set aside to do each entity of work. Also, each entity of work (at any level) can be further defined as to amount of labor, material, and other direct charges that will be required to accomplish it.

CHECKLIST QUESTIONS:

a. Does the budgeting system contain-- (Provide exhibit.)

(1) The total budget for the contract (including estimates for authorized but unpriced work)?

The primary and most basic point on which any budget system must work is the budget total. Just as any individual's household budget begins with the amount of expected monthly income as the budget total, so also must a contractor's budget begin with an expected income as the budget total. In the case of a contractor the expected income is the negotiated value of each of the contracts he has been awarded. On a contract-by-contract basis then, the budget total is the negotiated contract cost of the initial contract plus that of any directed changes to the contract. It should be recognized that where unpriced change orders are sent to a contractor the contractor is obligated to begin work without benefit of negotiation as to the fair and reasonable price of that change. Since the previous discussion mandated that every work entity planned by the contractor have an associated budgetary value, the unpriced change order

presented a difficulty. This difficulty is resolved by the first criterion in the Revisions Section which directs the contractor to "estimate the cost of the unpriced change order and distribute this estimated budget to the functional organizations affected by the change. Given this understanding, at any point in time the budget total is the sum of the original contract's Negotiated Contract Cost (NCC), plus the negotiated cost of any contract changes, plus the estimated value of any unpriced change orders. This summation is called the Contract Budget Base (CBB) and represents the total amount of work authorized on the contract; it is this budget total which will be broken-down and distributed to the functional managers to accomplish all the work tasks required by the contract. Any other amount used as a budget total must be mutually agreed to, by both the government and the contractor.

(2) Budgets assigned to major functional organizations? (See checklist Item II, 9ab)

(3) Budgets assigned to cost account?

Once the budget total has been established, the contractor must begin the task of subdividing that value proportionately to the functional organizations in accordance with the scope of work for which each organization has responsibility. Ultimately both the work entities and their proportionate shares of the budget must be broken down to the cost account level. In this way budget continues to remain associated with work. But in-so-far as functional managers are assigned responsibility for work accomplishment, budgets can be viewed in alignment with functional managers as well as with work. The purpose of this criterion question is to ensure that this is done, preferably as soon as possible after contract award. The Organization Criteria require that an alignment be made between the CWBS and the OBS to show "who is responsible for what." The vehicle used is normally a Responsibility Assignment Matrix (RAM). A RAM is a chart-type matrix with WBS elements on one axis and OBS elements on the other axis. Via cross referencing, it can reflect which OBS manager has responsibility for which WBS element of work. The System Reviewer may find it advantageous to extend the RAM into a third dimension by dollarizing it. A Dollarized RAM will reflect the budgetary value assigned to each segment of work on the WBS, the budgetary value assigned to each OBS manager to do the work assigned, and the budgetary value of all the cost accounts. The earlier this Dollarized RAM is done the more value it has and the more it facilitates the previous budgeting requirement for advanced planning. Regardless of whether a Dollarized RAM is used, the contractor must be able to show where in the organization the budgets have been distributed, and what budgetary amount is associated with each cost account.

b. Are the budgets assigned to cost accounts planned and identified in terms of the following cost elements: (Reference formats 3 and 4.)

(1) Direct labor dollars and/or hours?

(2) Material and/or subcontract dollars?

(3) Other direct dollars?

Once a scope of work and an associated amount of budget has been assigned to the Cost Account, the Cost Account Manager has the responsibility to plan for the accomplishment of that work within the confines of the budget that has been assigned to him. If the Cost Account Manager was involved in a previous "grass roots" estimating procedure to substantiate the company's negotiation posture, he probably already has a fairly good plan worked out for getting his scope of work done. However, there may be considerable difference between the amount of budget he received to do that work versus the amount of budget he originally estimated that

work would cost. So at this point the Cost Account Manager may have to reaccomplish his work plan in order to try to do the job for the amount of work distributed to him. He also will inevitably reaccomplish his resource plan as a means of revising his budget to coincide with the amount assigned to him. Accomplishing the cost account resource plan is the crux of this criterion question. It requires that the budgetary resource plan be devised by element of cost; i.e. labor (in terms of dollars or hours), material (dollars), and other direct charges (dollars). This type of budget segmentation adds discipline and integrity to the cost account's resource plan. It ensures that the correlation is made between every budget dollar and the entity that dollar is supposed to buy (be it a labor task, a material, or some other directly chargeable task or service). Ultimately, by summarizing this budgetary breakdown of all cost accounts, it will be possible to construct a performance measurement baseline for each element of expense. These PMBs can be used later to measure the contractor's progress by resource element.

Establishing budgets by element of cost is fundamental to most cost account managers. However, there may be a couple areas where difficulty can arise. First, it is not uncommon for cost account managers to account for labor budgets in terms of hours instead of dollars. This is acceptable and does not violate the criteria. However, these hourly units must be converted to dollars at an appropriate point in time for summarization purposes in accordance with the WBS and OBS performance measurement data accumulation requirements of the "Analysis" Criteria. It is not acceptable to summarize hourly units up to a higher level in the WBS or OBS before converting them to dollars.

A second problem area concerns material budgets. The "Accounting" Criteria prefers the contractor to account for materials on an applied basis (at the point of consumption) but allows for materials to be accounted for at various other points such as upon receipt, payment, or inventory issue/withdrawal. Whichever point has been selected as the contractor's point of material accountability should be reflected in the detailed material budgets. In other words, the contractor's point of material accountability should reflect when the contractor actually plans to account for materials. If material budgets are established to show point of consumption of those materials, but the materials are actually accounted-for and reported in the month when they were paid for, a data distortion will be caused due to the failure of the contractor to coordinate his budget plan with his accounting system. (In this case his monthly reports will likely be reflecting a cost overrun in the materials area even though he is using his materials at a rate and amount just as he had planned).

c. Does the work authorization system contain: (Prepare sample exhibit.)

(1) Authorization to proceed with all authorized work?

The work authorization system is what translates the contractor's plans into practice. Having planned to do a series of tasks in order to accomplish a specific scope of work, and having scheduled these tasks and budgeted for them by element of cost, what is the vehicle for actually telling someone to get on with the work and get it done within those schedule and budget parameters? Answer - the work authorization. It is essential that work be authorized before it is performed, this is what disciplines the performing personnel to work toward the planned targets and goals (budget goals, schedule goals, and technical goals as well). Work authorization policies and procedures must be established which discipline the system so that all work currently being performed is formally recognizable by its proper authorization documents. A formal authorization process helps to ensure that all work is fully staffed and coordinated among the various functional departments.

(2) Appropriate work authorization documents which subdivide the contractual effort and

responsibilities within functional organizations?

The authorization process for all work must establish a clear separation of responsibilities between performing organizations. It must be clearly understood who is responsible for the performance of work. The Responsibility Assignment Matrix referred to earlier as a vehicle for satisfying certain "Organization" Criteria is not sufficient to satisfy this requirement. However, it is certainly a starting place from which the contractor should begin formulating the separation of responsibility documents in his work authorization system. Procedural documentation is extremely important here, to outline how organizations with overlapping capabilities should decide where one organization's work will end and where the next organization's authority will begin.

5. TO THE EXTENT THE AUTHORIZED WORK CAN BE IDENTIFIED IN DISCRETE, SHORT-SPAN WORK PACKAGES, ESTABLISH BUDGETS FOR THIS WORK IN TERMS OF DOLLARS, HOURS, OR OTHER MEASURABLE UNITS. WHERE THE ENTIRE COST ACCOUNT CANNOT BE SUBDIVIDED INTO DETAILED WORK PACKAGES, IDENTIFY THE FAR TERM EFFORT IN LARGER PLANNING PACKAGES FOR BUDGET AND SCHEDULING PURPOSES. (Reference format 6.)

INTENT: Work packages constitute the basic building blocks of the cost account and are used by the contractor in planning, controlling, and measuring performance. "Work Package" is a generic term for the work tasks with definable end-results that collectively comprise, along with planning packages, each cost account's scope of work. The Glossary of the Joint Implementation Guide explains that a Work Package has all of the following characteristics:

(i) It represents units of work at the levels where work is performed;

(ii) It is clearly distinguishable from all other work packages;

(iii) It is assignable to a single organizational element;

(iv) It has scheduled start and completion dates and, as applicable, interim milestones, all of which are representative of physical accomplishment;

(v) It has a budget or assigned value expressed in terms of dollars, man-hours, or other measurable units;

(vi) Its duration is limited to a relatively short span of time or it is subdivided by discrete value milestones to facilitate the objective measurement of work performed;

(vii) It is integrated with detailed engineering, manufacturing, or other schedules.

Of the above characteristics, the one most commonly discussed and argued is the sixth, the requirement for work packages to be of short duration. This requirement, however, is a key feature of the criteria from the standpoint of evaluating accomplishment. It is not intended to force contractors to make "arbitrary" cutoff points simply to have short-term work packages. Work packages should be the natural subdivisions of the planned effort within a cost account; their subdivision of the scope of work should reflect the way in which work will be done. When work packages are of short duration, little or no subjectivity must go into the assessment of work progress; the evaluation of contract status is possible mainly on the basis of work package completions. The longer the work package, however, the more difficult and subjective the

progress assessment becomes. For longer work packages it is strongly urged that they be subdivided by objective indicators of progress, such as discrete, interim milestones with preassigned budget values and scheduled completion dates.

CHECKLIST QUESTIONS:

a. Do work packages reflect the actual way in which the work will be done and are they meaningful products done and are they meaningful products or management-oriented subdivisions of a higher-level element of work?

Two issues are covered by this question but it is necessary to discuss the second issue first. That is, the contractor must have a good workable definition (in his system description and in practice) of what constitutes a work package. This definition must encompass, as a minimum, a delineation of the cost account of which it is a part. Since a cost account's data are traceable up through the CWBS and the OBS, in addition to identifying each work package to the cost account of which it is a subordinate subdivision, each work package must also be identified as to its end-result (i.e, what part it has to play in accomplishing the scope of work of the cost account). Unless every work package can be identified to this degree there can be no assurance that all the work being done on a given contract is, in fact, to the benefit of only that one contract.

The second issue of this criterion question deals with the scope of work of the work packages which comprise a cost account. And there are two parts to this issue. First, the contractor must ensure that each package's scope of work authorized matches with the work package description and work statements, goals, and interim milestones of that work package. Only in this way can one be sure that the work authorized within a cost account reflects the way each work task will actually be done. Secondly, the contractor must ensure that the work packages, taken collectively, reflect the way in which all the work will be done within the cost account to achieve the scope of work assigned to that cost account.

b. Are detailed work packages planned as far in advance as practicable?

Primarily what is needed to satisfy this question is a control mechanism in the system description which will give voice to the intent to prevent work from being planned as it is being performed. Contractors should include a planning requirement that ensures that all work is always planned at least "X" months into the future (i.e., planned to the detailed work package level). Normally contractors use three to six months as their requirement for prior planning. This duration is not so important to the government as is the assurance that all work is being planned in advance of its performance data. Within a cost account, that work which is needed in the near future ("X" months) should be planned in detail and satisfy all the definition requirements of a work package. The remaining work, which will be accomplished in a later period of time may exist as a "planning package;" but it still must have an associated amount of budget and time related to the scope of work of that planning package.

c. Is work progressively subdivided into detailed work packages as requirements are defined?

The progressive subdivision into detailed work packages is called "rolling wave planning." The "rolling wave" can be visualized as far-term effort being broken down into smaller increments of work as the work draws nearer to its scheduled start date. That is, the work filters down through the CWBS to the cost account level and below to planning packages and eventually to work packages. Simultaneously, it is moved in the schedule from the far term into the near term and is planned in detail in terms of schedule, scope of work, measurement milestones, and

budget. This "rolling wave" occurs just prior to the advance planning requirement (discussed under the proceeding question) so that work is planned in detail "X" months before the work start date.

d. Is future work which cannot be planned in detail subdivided to the extent practicable for budgeting and scheduling purposes?

Ideally, when a Cost Account Manager receives his work authorization / assignment he will plan, in detail, the total work requirement to satisfy the scope of work, budget, and schedule parameters established for his cost account. To the extent this is possible discrete work packages are developed, and all of these work packages will meet all the definition requirements of a "work package" as was outlined in the previous discussion of this planning and budgeting criterion. However, from a practical standpoint, there are many instances where this is not possible or desirable. There are many legitimate situations wherein only the near term work can/should be defined into work packages. The question then becomes, what do we do with the rest of the budget given to the cost account manager? What about the rest of the work and the additional schedule time? One solution for this far-term effort would be to have the cost account manager simply account for this effort by the different categories just mentioned. At any point in time he could tell you the total amount of work he has left to accomplish; he could tell you the total amount of budget remaining and the total schedule remaining. However, this is not a good solution because it requires no relationship to be drawn from the work requirement to the budget or schedule. It would not prevent far term budget from being used in the near term, for example. Instead, all work which is not planned to the detailed degree of a work package must at least be subdivided into planning packages. A planning package has most of the characteristics of a work package except that the definition is in "grosser" detail. Most importantly, however, it requires the inter-association of work, budget, and schedule. The far-term effort will, therefore be broken down into large chunks of work which by their nature are logical segmentations of the total cost account's scope of work. Each of these chunks of work will have a gross dollar budget assigned to it (based upon the estimated cost of doing that chunk of work) and a scheduled start and completion date (in terms of week of month, not day) based upon the approximate length of time that chunk of work should take to be accomplished. As the "rolling wave" proceeds to work then, these planning packages will eventually be planned in greater detail and be converted into work packages.

e. Are work packages reasonably short in time duration or do they have adequate objective indicator/milestones to minimize subjectivity of the in-process work evaluation?

Every attempt should be made to identify the authorized work within cost accounts into discrete, short-span, work packages. The completion of such work packages is the best means of measuring accomplishment (i.e., calculating earned value or the budgeted cost of work performed). Long-duration work packages, however, are unavoidable in most contractual efforts (through their propensity varies greatly). In those situations where work packages are greater than two months in length, interim milestones, as physical indicators of progress, are strongly recommended. The longer the duration of the work packages, the more the contractor should place importance on the establishment and measurement of progress by milestone accomplishment. Regardless of their length, however, work packages and their inherent indicators/milestones, must accurately represent the underlying work. Additionally, should replanning of a work package be necessary, it is tremendously easier to do on short work packages than on long ones. The Revisions Section of the criteria establish specific restrictions on replanning and limits its occurrence to future (un-opened) work packages, only. Long work packages that stretch 6 months to a year in to the future, therefore, limit the contractor's flexibility to replan his effort. If that same long work package were able to be identified into

several shorter-span work packages, replanning would be possible of those un-opened ones existing in the future. So short-span work packages benefit the contractor by virtue of the additional flexibility they provide, and they benefit both the government and the contractor by making performance measurement more easily calculable.

f. Do work packages consist of discrete tasks which are adequately described? (Provide representative sample.)

Use of the word "discrete" is recurrent throughout the criteria. Generally it refers to "making something separate and individually distinct." When used in conjunction with work tasks or work packages there are generally three ways in which the effort can be made "separate and individually distinct": In terms of (1) scope of work involved (2) amount of budget assigned and broken down by element of expense (i.e., labor, material, and ODC) and (3) length of time allotted to accomplish the effort with specific identification of start, stop, and milestone accomplishment dates. Given these three vehicles, all work packages can (and must) be discretely described. And further, sub-tasks (milestones, indicators, and interim goals) can, by these same parameters, be discretely described. Poor description of work tasks within a work package and poor descriptions of work packages themselves, result in effort accomplishment, the progress measurement of which cannot be adequately assessed; arbitrary (rather than discrete) evaluation of earned values will be the result.

g. Can the contractor substantiate work package and planning package budgets?

This question, you will note, asks only if the contractor can substantiate his budgets. It does not attempt to define how this substantiation should take place or what types of standards may or should be used to provide budgetary substantiation. The main concern is that reasonable targets be established for getting the work done. The budget provides one such target. And the budget target plays a very important role in the establishment of a sound performance measurement baseline (PMB). So it is important that reasonable resource substantiation be provided to justify the budgeting targets that are proposed for all work packages and planning packages. "Estimating work sheets" or other substantiation is necessary to ensure that adequate resource targets have been established.

h. Are budgets or values assigned to work packages and planning packages in terms of dollars, hours, or other measurable units?

Some of the data elements required to be collected by the criteria and which are also reported on the monthly reports of performance measurement are the (1) Budgeted Cost of Work Scheduled (BCWS), Budgeted Cost of Work Performed (BCWP), and Budget at Completion (BAC). Of paramount importance to all of these data elements is that they be budgetary figures representing specific increments of work (i.e., they are correlations of budget goals to work authorizations). BCWS is the budgetary value of the work scheduled to be done in a given period of time; BCWP is the budgetary value of the work actually done in a given period of time; and BAC is the total budgetary goal distributed for the accomplishment of a given scope of work. (BAC also contains Undistributed Budget, which is a transitory account that is soon to be distributed for a known scope of work. This particular question seems overly simple but it seeks to remind us of a very important point: all work must have an amount of budget associated to it. Only if this is true can an increment of work be totally defined; it ensures that it is then possible to identify the above three data elements for each segment of work. Below the cost account level (at the work package and planning package level) it is sufficient for the work to be identified by labor hours, material units or quantities, computer hours, etc. rather than in budgetary dollars. But at the cost account level these resources should be converted to

budgeted dollars. The important thing is that below the cost account level, work still must be associated with some increment of value, if not dollars, then hours, quantities, or other measurement units.

i. Are work packages assigned to performing organizations?

Work packages must be assigned to the organization that actually performs the work, whereas the cost account resides with the organization responsible for seeing to it that the work gets done. Usually these two organizations are the same. However, situations do occur where work transcends (or crosses) the boundaries of responsibility of various organizational departments. Where this occurs, care must be taken to ensure that the cost account is assigned to the correct organization (the organization responsible for ensuring that the work is done within the authorized budget, schedule, and technical parameters). Of equal importance, however, is to ensure that the work packages that comprise that cost account are identified to the organization who is responsible for actually doing the work. This ensures communication between all parties; everyone thus knows who is to do the work and who is to manage the work. As a rule of thumb, if more than 10 to 20 percent of the work is being performed outside the realm of the managing organization, consideration of making a new cost account might be appropriate.

6. PROVIDE THAT THE SUM OF ALL WORK PACKAGE BUDGETS PLUS PLANNING PACKAGES WITHIN A COST ACCOUNT EQUALS THE COST ACCOUNT BUDGET. (Reference format 2)

INTENT: The intent of this criterion is to ensure a discipline-check over the budgets assigned to the cost accounts. As has been discussed before, at any point in time the contractor must be able to account for all the budget authorized on the contract. Also, with the exception of management reserve, all budget must be specifically associated with a scope of work. In order to ensure adherence to these two principles the contractor must start at the lowest level of work/budget assignment, the cost account. The cost account managers (all of them) must be able to verify the amount of budget that is associated with each work package and planning package of their cost account. And the cost account manager must be able to verify the intended usage of every bit of budget assigned to his/her account. Since no cost account manager wants to risk being accused of fiscal malfeasance, the only way to satisfy the above requirement is to assign all of the authorized budget to the work and planning packages that comprise the cost account. At no time should a cost account manager have an amount of budget that is not assigned to a segment of work. Such an amount would constitute a management reserve and management reserves should never exist at the cost account level. The above practice being true and adhered to by the cost account manager, the CAM should always be able to verify that the sum of the work package budgets plus the sum of the planning package budgets within the cost account equals the cost account budget authorized for that scope of work. If the above can be verified for all cost accounts within the CWBS/OBS, then the budgetary basis for the Performance Measurement Baseline can be considered valid as well.

CHECKLIST QUESTION:

a. Does the sum of all work package budgets plus planning package budgets within cost accounts equal the budgets assigned to those cost accounts?

In order to ensure that the PMB is valid the budgets of all cost accounts which comprise it must be valid. To achieve this all work package budgets plus planning package budgets within the cost account must equal the cost account budget. This criterion may seem to be self evident in that the sum of the elements making up the authorized cost account must equal what is

authorized for that cost account. But undisciplined systems without the proper checks and balances have been found to violate this criterion and have planning that exceeds the authorized budget. The system reviewer should ensure that the contractor's system description gives adequate attention to this requirement and she/he should ensure that the cost accounts do adhere to this summation principle in actual practice.

7. IDENTIFY RELATIONSHIPS OF BUDGETS OR STANDARDS IN UNDERLYING WORK AUTHORIZATION SYSTEMS TO BUDGETS FOR WORK PACKAGES.

INTENT: Earlier it was discussed that in the budgeting process the contractor should be able to reflect in his budget, by virtue of the way he planned to do the work, what part of the budget was for labor, what part was for material, and what part was for other direct charges. This criterion goes one step further. It requires that the contractor be able to substantiate how he arrived at the budgetary amounts assigned to each cost account manager. In other words, if a CAM has a labor budget of $50,000, a material budget of $35,000, and an ODC budget of $15,000, we want to know how he arrived at those figures. For the scope of work the CAM has to do, how does he know how much labor will be needed and what skill level these laborers must be? How does he know what materials will be needed and in what quantity? How does he know what other direct charges he will have? The answer from the contractor is that he is basing his estimates on some type of standards: engineered standards, historical standards, industry-wide standards, geographic standards, independent technical testing standards, etc. But specifically every cost account manager should be able to explain what standards he used to come up with the budget distribution he is reflecting for each work package and planning package within his purview. Lastly, this criterion requires that the work authorizations, which formally tie each scope of work to each amount of budget, also be based upon the same standards as were the cost accounts' work and planning package budget/work relationships. This having been done the contractor (and the system reviewer) can properly evaluate the contractor's (albeit his cost account managers) actual progress as work is done. They can say, "On the other hand, our engineered standard showed we would need "X" hours of "Y" skill level to do this job. On the other hand, in practice we found that instead we needed either X + Z hours of "Y" skill level, or "X" hours of skill level "W" to do the job. It is the underlying standards that force budgets to be constructed properly. And it is the budgets that are used in the Performance Measurement Baseline to measure the contractor's performance against.

CHECKLIST QUESTIONS:

a. Where engineered standards or other internal work measurement systems are used, is there a formal relationship between these values and work package budgets? (Provide samples showing relationships.)

The need for budgets to be based on standards has just been discussed. This question attempts to ensure that the relationship of the budget to a particular standard is legitimate. Where an internal standard is engineered and is unique to a single scope of work, some justification of the applicability of that standard to that work's budget should be established. Budgets should never be pulled out of "thin air." Even where a subjective guess seems all that is available, some standard is used in making the estimate. So regardless of the subjectivity involved, all budgets must have a justification of legitimacy offered by the work manager to represent how the budgetary goal was established.

b. Where "learning" is used in developing underlying budgets is there a direct relationship between anticipated learning and time-phased budgets?

This subquestion was not in the JIG before 1 October, 1987. Paragraph 3.3.d(5)(f) specifically addresses this issue:

> A contractor must utilize anticipated learning when developing time-phased BCWS. Any method used to apply learning is acceptable as long as the BCWS is established to represent as closely as possible the expected ACWP that will be charged to the cost account/work package.

8. IDENTIFY AND CONTROL LEVEL OF EFFORT ACTIVITY BY TIME-PHASED BUDGETS ESTABLISHED FOR THIS PURPOSE. ONLY THAT EFFORT WHICH CANNOT BE IDENTIFIED AS MEASURED EFFORT OR AS APPORTIONED EFFORT WILL BE CLASSED AS LOE. (Reference format 6.)

INTENT: All directly costed effort on a contract falls within one of three categories of effort: discrete work packages, apportioned work packages, or level of effort activities. The prerequisites of a discrete work package have been previously defined, but generally they are the increments of work which have a definable end product when completed, which are specifically budgeted by element of expense in accordance with underlying standards, and which are specifically scheduled, to the day, for opening, interim milestone measurement, and completion. Apportioned effort work packages can be just as discretely defined as discrete work packages. But apportioned effort tasks are unique because they bear a close association of dependence upon another discrete work package. If this degree of association can be identified and quantified then the apportioned work package can be planned and measured for progress as a proportionate factor of its base work package's plan and progress. The last type of effort is called "Level of Effort" (LOE). It also adheres to the same budgeting requirements as discrete effort. Like discrete effort, LOE also has to be scheduled, to the day, for opening and completion. However, LOE activities are characterized by having no interim milestones which could otherwise be used for progress evaluation purposes. LOE activities have no definable end product which can be evaluated for adequacy upon completion. An example of LOE activity might be a cost account managers job. His task is to manage but at the completion of his task he has, himself, turned out no end product - he has just managed others who may have turned out an end product. At any point in time it is difficult to ascertain his progress in the total management effort. One could have counted his phone calls, letters written, meetings attended, and counseling sessions held, but all of these together would not be capable of indicating the amount of the total management effort that had been accomplished. This type of effort, then, is very hard to measure with any precision. All we know about it is how much the CAM is budgeting for his own management effort each month and what day his management effort begins and ends. Consequently, the rule of thumb for LOE activities is to not even try to measure their progress. Their progress measurement is based, simply, on the passage of time; they will always get credit for doing what they planned (BCWP = BCWS). A schedule variance will never be possible, then, in an LOE task. If a CAM has an assistant one month that he had not previously planned for, he will incur a cost variance by virtue of having to claim two salaries against his cost account that month instead of just his own. Because of the assumption of work progress that is given to LOE tasks, it is essential to minimize the categorization of work as LOE to only those tasks which cannot be identified as discrete or apportioned. And because of the immeasurability of LOE as to scheduled work progress it is important to keep track of the performance measurement of LOE activities separate from the discrete and apportioned work packages.

CHECKLIST QUESTIONS:

a. Are time-phased budgets established for planning and control of level of effort activity by

category of resource: for example, type of manpower and/or material? (Explain method of control and analysis).

As was just discussed, LOE progress is measured with the passage of time. In order for this to be possible the budget for an LOE activity must be time-phased. It is this spreading of the LOE resource budget that decides what the performance measurement baseline will be for an LOE task. A common misconception concerning Level of Effort activities it that their budgets must be level-loaded. To be sure, LOE budgets may be level loaded, but they don't have to be. In the case of a Cost Account Manager's task of managing a cost account, assuming that the CAM gets $1,200 per month, if he is working on only this one contract and has no other managerial assistance, his LOE Budgeted Cost of Work Scheduled (BCWS) each month will be $1200 (i.e. the budget for the task will be level loaded). But if the CAM has a management assistant in months 2, 5, and 7, then in those months the BCWS would be $1,200 + the salary of the management assistant. So the key budgeting principle in an LOE task is to time-phase the budget plan but to be sure this budget plan (the monthly BCWS) reflects how the LOE work is actually expected to be done.

Another common misconception with respect to LOE is that LOE tasks are always labor activities. This is simply not true. LOE activities may be in the labor category, they may be material or subcontract, or they may fall in the category of other direct charges. This being true, it is important for LOE activities (just as for discrete and apportioned work packages) to have the budgets broken out by element of expense.

Since LOE has the capacity to drastically distort evaluations of contractor progress when its performance data is combined with that of discrete and apportioned work packages, special attention must be given to the contractor's system description. Ensure that it incorporates a good definition of LOE, and that it has positive statements concerning the time-phasing, by element of expense, of LOE budgets. Rigorous policies for the control and analysis of LOE activities, budgets, and schedules is paramount to this LOE Criterion.

b. Is work properly classified as measured effort, LOE, or apportioned effort and appropriately separated?

Because it is assumed that actual LOE progress is equal to the amount of LOE work planned (i.e. BCWP = BCWS), LOE activities are relatively easy to plan, measure, and generate performance measurement data for. Unfortunately, because of this relative ease of working with LOE, it is often selected as the category of effort for work packages that should actually be measured discretely. A positive and rigorous review of actual work package plans is required to ensure proper classification of the effort involved. ONLY that effort which CANNOT be identified as discrete or apportioned work packages may be classified as LOE. Once classified every attempt should be made by the contractor to ensure that LOE performance measurement data are not summed with that of discrete or apportioned work package within a cost account. Such summarization is only acceptable above the cost account level, never below.

9. ESTABLISH OVERHEAD BUDGETS FOR THE TOTAL COSTS OF EACH SIGNIFICANT ORGANIZATIONAL COMPONENT WHOSE EXPENSES WILL BECOME INDIRECT COSTS. REFLECT IN THE CONTRACT BUDGETS AT THE APPROPRIATE LEVEL, THE AMOUNTS IN OVERHEAD POOLS THAT WILL BE ALLOCATED TO THE CONTRACT AS INDIRECT COSTS. (Reference DCAA Audit Manual and FAR 31.203) (Reference format 7.))

INTENT: Indirect costs account for a major portion of the costs of any program. As such, the budgetary control and management of this category of cost cannot be overlooked or minimized.

Indirect costs exist in essentially three different modes. First are overhead costs for services that benefit more than a single contract. Routine machine maintenance on the manufacturing lines, for example, is a service or type of effort that must be done to keep the machines operational. But while this maintenance activity may be accomplished in a time-frame when only one contract is being worked-on, all of the contracts using those machines benefited from that maintenance service. So this type of indirect cost must be shared by all of the benefiting contracts. A second type of indirect cost is the burden that all contracts must share for such commonly used commodities as electricity and other utilities, employee fringe benefits, taxes, office supplies, and off-the-shelf nuts and bolts. And a third type of indirect cost is classed as "general and administrative" expenses (G&A). G&A is most commonly termed the expenses of the corporate offices (salaries of the chief, corporate executives and their staffs, their office facilities, and their general operating expenses) that all of the contracts must bear a portion of paying. Regardless of the type of indirect cost involved, however, one thing is sure-like any other cost requirement anticipated on a contract, they must be budgeted for. Without this budgeting requirement no baseline can be constructed against which contractor performance/progress may be measured. As a matter of administrative ease, most contractors collect and budget for indirect costs by pools, or burden centers. Such pools are nothing more than the lumping together of similar indirect costs into homogeneous groupings. Once indirect costs are collected in pools, the contractor must identify and substantiate the pro-rata share of each pool that each contract must bear. The criteria questions that follow make no attempt to dictate the structure of these pools nor do they attempt to standardize what costs these pools must collect. They do, however, attempt to force the contractor to clarify how his overhead budgeting procedures work and they require the contractor to ensure that his employees do, in fact, follow these prescribed overhead budgeting procedures.

CHECKLIST QUESTIONS:

a. Are overhead cost budgets (or projections) established on a facility-wide basis at least annually for the life of the contract?

It is imperative that the contractor's overhead budgets be established using a reasonable basis of projected future business activity. The contractor's basis for establishing overhead budgets must take into account the continuation of existing business and the anticipated loss of existing business based on marketing intelligence. The contractor's facility-wide business base is extremely sensitive to market conditions such as a loss of existing contracts, the receipt of unanticipated contracts and the growth or shrinkage of existing markets associated with political, social, economic, or environmental conditions. These changes in the direct business base affect the associated overheads. Consequently, it is imperative that the contractor establish overhead budgets on a facility-wide basis at least annually and these should reflect his best estimate of the future business base. Also, since overhead budgets are applied to future periods and are then reflected as an integral part of contract estimates at completion (EAC), it is necessary for these overhead budgets to be periodically reviewed and revised to reflect changes in the contractor's anticipated business base.

b. Are overhead cost budgets established for each organization which has authority to incur overhead costs?

In order to maintain a feeling of responsibility for the incurrence of indirect costs it is important that all managers in the contractor's functional organization be identified to the indirect services they choose to use. Each functional organization which has the authority to incur indirect costs should be accountable for the establishment, maintenance, and control of its own overhead budget. This overhead budget must be established well in advance of any actual

overhead incurrence and will represent a planned baseline to measure actual overhead expenditure against. As actual overhead usage occurs and the associated indirect costs are traced to the authorizing manager, responsibility for that overhead usage becomes fixed and analysis of actual versus planned overhead expenditure can be evaluated. When responsibility for overhead budgets is not established and identified to specific using organizations, there is little opportunity to influence the expenses that contribute to those overheads. The lack of clear identification of responsibility and control of the functional organization's indirect costs can lead to serious cost-growth problems of contracts.

c. Are all elements of expense identified to overhead cost budgets of projections?

Just as was required in the direct cost budgeting area, so also are indirect cost budgets required to be broken down by element of expense (indirect labor, indirect material, and other indirect charges). This information, taken along with the counterpart direct cost information provides a viable performance measurement baseline, by element of expense, on the total contract. Before this segmentation by element of expense can be done, however, it is important for the contractor to ensure that he has constructed a listing of each overhead expense category item (e.g., material handling, marketing research, etc.) This listing should be compatible with the listings used to establish the functional organization on budgets. Naturally, it is imperative that this listing be a complete one. If all expense items are not included in the overhead budgets, the actual indirect costs incurred on the contract will exceed the budgets and contribute to unfavorable indirect cost variances. Additional consideration should also be given to ensure that these overhead expense category items are clearly identified to eliminate the possibility of double accounting. This would preclude the chance of accounting for an expense item as both a direct charge and an indirect charge. Once the list of expense items is ascertained to be complete, its segmentation by indirect element of cost can be accomplished.

d. Are overhead budgets and costs being handled according to the disclosure statement when applicable, or otherwise properly classified (for example, engineering overhead, IR&D)?

The contractor has the responsibility to propose overhead budgets and to account for these budgets and the distribution of actual overhead costs in accordance with the government approved Cost Accounting Standards (CAS) "disclosure statement." In the absence of a CAS "disclosure statement, "the contractor has the responsibility to handle overhead budgets and costs in accordance with "generally accepted accounting practices." If overhead budgets and costs are not handled consistently, there is a tendency for inequity to exist in the application of costs among the contracts. It is important to ensure that overhead costs are equitably distributed to each customer. This "equitable distribution of costs" is an extremely sensitive area when there is a mix between government and commercial business.

e. Is the anticipated (firm and potential) business base projected in a rational, consistent manner? (Explain.)

Unlike direct cost budgets, which are established on a contract-by-contract basis, overhead budgets must be established on a facility-wide basis for a set increment of time (usually one year). This construction of overhead budgets by the contractor must be periodic then, and this function should be performed in a rational and consistent manner. It should be neither overly optimistic nor overly pessimistic. It should include considerations such as continuation and growth of existing contracts, the projected total market in the business arena, the probability and magnitude of future business, and other factors influencing the business volume. A special concern here, is the natural tendency for contractors to be optimistic in predicting future business. When future sales are overstated, the result is an understatement of the associated

overhead budgets. Then as actual overhead costs are incurred under these circumstances, the result is cost growth.

f. Are overhead cost budgets established on a basis consistent with the anticipated direct business base?

The contractor, in establishing his overhead budgets, should be able to demonstrate a logical relationship between the anticipated direct business and the associated overhead budgets. If the direct business base is projected to increase there is potential for increase in certain expense categories necessary to support this growth. If the direct business base is projected to decline, there is probably justification for reducing certain support services. In either case, the associated overhead budgets will need to increase or decrease to support the projection of business growth or loss; there should be a logical explanation for the relationship of overhead budgets to the direct business base changes. Where careful consideration is not given during the planning phase of the budgeting cycle to factors such as the changes in the anticipated direct business base, there is a high degree of probability that items contributing to the overhead budgets will be understated or overstated.

g. Are the requirements for all items of overhead established by rational, traceable processes?

The contractor must have well-documented instructions and work sheets which portray how the overhead budgets are established. Paramount to this requirement is the assurance that all overhead services being budgeted are, in fact, necessary. This question insists that the contractor be able to trace the budgeted overhead services back to a justifiable requirement for that service. Further, the System Description should specify that this traceability exist and that the justification for overhead requirements be rational. Overhead budgets must be established by responsible functional organizations utilizing the same fundamental ground-rules. Adjustments to the overhead budgets as a result of changes in the direct business base, for example, must be a result of a changing need for overhead services. This changing need must be justified and quantified.

h. Are the overhead pools formally and adequately identified? (Provide a list of the pools.)

Cost Accounting Standards "disclosure statements" submitted to, reviewed, and accepted by the cognizant government audit agency must clearly identify the composition of overhead pools. In the absence of a required CAS disclosure statement, the contractor's internal accounting system description should formally identify each cost collection pool and the composition of expenses collected into each pool. Formal and adequate identification of overhead pools during the budgeting and cost collection process will minimize the probability of double-counting or miscounting indirect expenses.

i. Are the organizations and items of cost assigned to each pool identified?

Just as it is necessary to identify the individual overhead pools for the budgeting and collection of indirect costs, it is also necessary to identify specifically the individual organizations and the individual items of cost (by category and type of manpower, where appropriate) to be charged to each pool. The contractor has the responsibility of identifying each of these contributors to each of the pools so that duplication of costs does not exist. Only in this way can the overhead budgets be projected with an assurance of completeness.

j. Are projected overhead costs in each pool and the associated direct costs used as the basis

for establishing interim rates for allocating overhead to contracts?

The contractor has the responsibility to demonstrate that the projected overhead cost for each overhead pool be used in conjunction with the projected direct cost base in establishing interim rates for allocating indirect costs to contracts. As the overhead services needed to support the direct base changes, and as the direct base itself changes, the contractor will need to change his projected rate of pro-rationing the overhead costs to the contracts composing his business base. If interim rates for allocating overhead to contracts are not based on direct costs and the projected overhead services needed to support them, but rather on some arbitrary method, the validity of the projected "at-completion" costs may be questionable. Further, if the overhead costs in each pool are not related to and based upon the anticipated direct costs, it may be necessary for the contractor to make frequent adjustments to the "cumulative-to-date" costs for billing purposes (not all of which may be justifiable).

k. Are projected overhead rates applied to the contract beyond the current year based on-

(1) Contractor financial periods; for example, annual?

(2) The projected business base for each period?

(3) Contemplated overhead expenditure for each period based on the best information currently available?

Overhead rates projected beyond the current year should be developed by the contractor at the same time that the annual projections are made. Normally, contractors make an annual five-year forecast based on existing and anticipated future market conditions. This five-year forecast serves as the basis for projected capital expenditures, staffing, and inventory planning. It also normally serves as the basis for agreed-to forward pricing rates to be used in bids and proposals. Projected overhead rates should be directly related to the contractor's own five-year forecast. Where corporate five-year forecast are not required, projections of business bases and overhead expenditures beyond the current year should be made at least on an annual basis using the same methodology as for the current year. On a multi-year contract, overhead rates that apply to the contract beyond the current year, may contribute to over one-half of the remaining "Contract Budget Baseline" (CBB). If the same amount of care is not exercised in the application and preparation of the projected overhead rates for future periods, the projected contract "Estimate At Completion" (EAC) could be seriously understated or overstated. Future year projections should periodically be reviewed; adjustments should be made to the overhead expenditure projections for changes in market conditions that will affect the contemplated overhead expenditure or projected business base. Where forward pricing rates are reviewed by the local government audit agency, updates to future projections are required at least on an annual basis.

l. Are overhead projections adjusted in a timely manner to reflect-

(1) Changes in the current direct and projected base?

(2) Changes in the nature of the overhead requirements?

(3) Changes in the overhead pool and/or organization structures?

Contractors normally develop new overhead projections on an annual basis. Generally these projections are reviewed and revised (up or down) on at least a semi-annual basis. Where significant changes occur in the current or projected business base that significantly affects the

overhead projections, an adjustment should be made to the overhead projection. These overhead adjustments should normally be implemented within two accounting periods (which should be specified in the contractor's System Description) or as agreed to by the local governmental audit agency. Changes to overhead pools or organizational structures which significantly affect overhead projections, or changes in the amount of overhead services needed to support the business base, should also be implemented within two accounting periods or as otherwise agreed to by the resident government auditor. The utilization of projected overhead rates based on an anticipated business base and commensurate overhead expenditures is intended to provide the customer with insight as to funding requirements and expected overall project cost. It is imperative that the contractor's system for projecting overhead have the built-in flexibility to be adjusted when changes make future projections of overhead unrealistic.

m. Are the WBS and organizational levels for application of the projected overhead costs identified?

It is not necessary for the contractor to establish overhead budgets and collect overhead costs at the cost account level of the WBS or OBS. It is, however, necessary for the contractor to identity the level at which overhead budgets and actuals are applied and accumulated. The level where overhead actuals are collected must previously have established a budget for those overhead services projected to be used. Regardless of the level of this functional organization (at which overhead budgets and actuals are collected), it is imperative that the responsibility for the management and control of all overhead budgets be clearly identified. There should be no co-mingling of responsibility for the control of overhead. For example, the sharing of responsibility for management and control of a single overhead pool should be avoided wherever possible. There are at least two theses regarding the control of overhead responsibility at the lowest planning level in the organizational structure. Under one philosophy, the cost account manager is provided a total budget, including overhead, and has the responsibility to maintain cost control within that budget regardless of the impact of overhead on his accounts. That is, if higher than budgeted indirect costs are incurred, it is expected that a reduction in the direct labor and materials accounts will be implemented in order to maintain a within-budget condition. Conversely, there are those that maintain that the working level functional manager has little control or influence over overhead budgets and actuals and therefore should only be responsible for direct labor and material. Under this circumstance, overhead budgeting and collection of actuals would occur only at the higher management level of the functional organization and be summarized from there, up to the total contract level. Whichever philosophy prevails, it should be understood that the customer's concern is with the overall cost of the project or program. This overall cost includes the associated overhead. It is, therefore, necessary that the organizational level where this responsibility exists by clearly identified.

10. IDENTIFY MANAGEMENT RESERVES AND UNDISTRIBUTED BUDGET.

INTENT: While this criterion says only to identify Management Reserve (MR) Budget and Undistributed Budget (UB) its intent is to ensure that through diligent identification (identification in terms of amount and location) MR and UB will be separately controlled. The importance of this segregation and control lies in the definitions and uses of MR and UB. Management Reserve Budget is that portion of the total Contract Budget Base (CBB) that is withheld by the contractor (i.e., not distributed) for management control purposes. Contractors normally withhold management reserves for two purposes. First is to incentivise the lower-level managers to do the job as cheaply as possible. Rather than distribute all the budget along with all the work authorized on the contract, a certain amount is withheld as MR. Wishing to keep their jobs secure, the lower-level managers will try to get their jobs done for the amount of budget distributed to them. Hence MR can be used for incentive purposes.

The second use of MR is as a contingency budget, to provide budgeting goals for unanticipated program requirements that will impact the future effort. Looking back historically, most contractors can document for each contract the cost of problems and other program requirements that were unknown at the time of contract award. Using this as a valid experience, after each new contract is negotiated, an amount of the CBB is withheld from distribution. It is called a Management Reserve Budget and represents an amount of budget that the contractor is reasonably sure he will have to allocate before the contract is complete; he doesn't know exactly where or when he will allocate it. Hence, MR may be a contingency budget. In reality, MR serves both purposes at the same time. Once withheld from the CBB, it provides an incentive to do the job for less. At the same time, MR provides management with a contingency budget for future unknown requirements. Since MR is withheld from distribution and maintained at the higher management levels, it is not a part of the time-phased Performance Measurement Baseline. By formula, the value of MR can be determined as follows:

CBB - BAC of PMB = MR

Undistributed Budget (UB) is budget that is applicable to specific contractual effort which has not yet been identified to CWBS elements at or below the lowest level of reporting to the government. UB classically exists as a transient amount. It is part of the negotiated value of a contract or contract change (that is for the accomplishment of a specific scope of work) but which for some reason has not yet been distributed below government reporting level. For the period of time that this scope of work remains undistributed, its associated budget will be classed as Undistributed Budget (UB). Once distributed below the reporting level of the CWBS/OBS it ceases to be UB and instead is incorporated in the budget of the responsible organization for that scope of work. UB is always considered a part of the BAC of the PMB in spite of the fact that it is not time-phased. This is because it represents budget for a specific scope of work and because it will only be for a short time that it is not time-phased. Specific attention must be given by the contractor to adequately define and describe what constitutes MR and UB so they cannot be confused by the managerial staff. Further, every attempt must be made to be able to totally identify all budgetary amounts classed as MR and UB; this identification must include the amount of budget involved, where it is located (which CWBS element or OBS element is responsible for it), and when used, full disclosure of its use must be made.

CHECKLIST QUESTIONS:

a. Is all budget available as management reserve identified and excluded from the performance measurement baseline?

Management Reserve budget plays a very special part in the operation of any performance measurement system. The use of MR must be carefully controlled and monitored in formal records since its use is indicative of management's recognition of previously unknown tasks or problems. MR must be identified and maintained separate from the PMB. Plotting the use of MR over time is often a valuable analysis technique. The identification, maintenance, and use of MR is most commonly documented by the use of a Management Reserve Log.

b. Are records maintained to show how management reserves are used?

Since MR plays a special role in performance measurement, the proper use of MR must be

carefully understood and controlled. Transactions may be made both to and from the Management Reserve. MR should be used by the project's management to budget previously unrecognized tasks that are consistent with the general scope of work of that project. In addition, when a planned and budgeted task becomes unnecessary, the budget may be transferred to MR. (See the Revisions Criteria for the parameters/restriction on MR transactions). Good records must be maintained of all transactions involving the MR budget. These records must be readily available to government representatives reviewing or surveying the contractor's system. These records must identify the reason for the transaction, the amount involved, and the cost accounts affected.

c. Is undistributed budget limited to contract effort which cannot yet be planned to CWBS element at or below the level specified for reporting to the Government?

Only those tasks which cannot be adequately defined below the government reporting level should be placed in UB. The placement of budget into a UB account should place a priority on the further definitization of the subject task. It is inappropriate to hold tasks and budget in UB for long periods of time; a maximum period of time should be established for holding tasks in UB. UB is traditionally considered a holding account for contract changes received too late within the accounting month to be distributed down below the government reporting level. Normally this is for a short time duration 30 to 60 days; but there are exceptions when budgets cannot be planned to this degree in this length of time. At the outset of contract award for example, it is often difficult to plan the entire contract down to this level and larger packages of work remain undistributed at the higher OBS or WBS element level (above the reporting level). But by the end of the first year the entire contract should be planned and budgeted down below the reporting level and in most cases to the cost account level.

d. Are records maintained to show how undistributed budgets are controlled? (Provide exhibit.)

UB records must be maintained to identify all sources and applications of UB while maintaining how much budget is being held at any one time. Remember UB represents an amount of budget negotiated to perform a specific scope of work. Therefore, at no time should UB lose its work identity. When it is finally distributed, UB is authorized along with its associated scope of work. UB records must show which tasks and organizations have been affected by the use of UB during the reporting period. At no time can UB be placed into the MR account to escape the requirement for distribution within the 30 to 60 day time limit. It must always remain associated with specific work.

11. PROVIDE THAT THE CONTRACT TARGET COST PLUS THE ESTIMATED COST OF AUTHORIZED BUT UNPRICED WORK IS RECONCILED WITH THE SUM OF ALL INTERNAL CONTRACT BUDGETS AND MANAGEMENT RESERVES. (Reference formats 3, 4, and 5.)

INTENT: Planning and Budgeting criterion number six required that the sum of all work package plus planning package budgets within each cost account equals that cost account's budget. This criterion builds upon that requirement and goes from the cost account level to the total contract level. Once it can be ascertained that each cost account budget is accurately established as a finite total, it is then necessary to be able to sum all cost account budgets along with any intermediate level budgets and UB to the total that is known as the Budget at Completion of the Performance Measurement Baseline (BAC of the PMB). Having thus validated the sum of the internal budgets, it must be ascertained that this value plus that of the MR equals the value known as the Contract Budget Base (CBB) (the CBB is the negotiated

contract cost (to date) plus the estimated value of any unnegotiated unpriced-change-orders received to date). Hence, the CBB = MR + BAC of PMB, where CBB = NCC + Est. of Unpriced C/Os. There should be no point in time when all budget cannot be accounted for; this truth is exhibited on a monthly basis with the submission of the Cost Performance Report.

CHECKLIST QUESTIONS:

a. Does the contractor's system description or procedures require that the performance measurement baseline plus management reserve equal the contract budget base?

This question requires that an intent statement be included in the contractor's system description saying that the contractor will, at all times, maintain complete budget integrity. The government demands assurance on the part of the contractor that he can account for all budget values authorized for the contractual scope of work. Specifically the contractor should have a set of procedures explaining how his management system will ensure that (1) the sum of all cost account and intermediate level budgets plus UB equals the BAC of the PMB; (2) Negotiated Contract Cost plus the estimated value of unnegotiated, unpriced change-orders equals the Contract Budget Base; and (3) BAC of the PMB plus Management Reserve equals the CBB. The contractor's management control system must provide for controls and records to ensure that all changes in budget due to normal internal management replanning transactions and contractual actions results in the maintenance of the above mentioned formula.

b. Do the sum of the cost account budgets for higher level CWBS elements, undistributed budget, and management reserves reconcile with the contract target cost plus the estimated cost for authorized unpriced work? (Provide exhibit.)

Having ensured that the contractor does indeed, have an intent statement to maintain complete budget integrity, and having ensured that he has a set of procedures that define how this budget integrity can be proven, this last question simply requires that the contractor demonstrate that his procedures are adequate. The contractor must prove, in practice, that all of his cost account budgets are capable of being summed up through each successive level of the CWBS and OBS and be equal to any budget assigned to these levels of the CWBS and OBS. He must prove that the total of all these budgets plus any UB and MR equals the CBB.

1. RECORD DIRECT COSTS ON AN APPLIED OR OTHER ACCEPTABLE BASIS CONSISTENT WITH THE BUDGETS IN A FORMAL SYSTEM THAT IS CONTROLLED BY THE GENERAL BOOKS OF ACCOUNT.

INTENT: It was an original intention of the C/SCSC to maximize the ability to measure performance of government contractors. As part of this intention it was logical and prudent for contractor's accounting systems to be able to account for all resource expenditures on an "applied" basis (i.e. on an "as-used" or "as-consumed" basis). This requirement caused little or no difficulty in the categories of labor (where time cards or other time-measurement devices are used) or other direct charges (where services are rendered on some type of dollarized per-unit basis). However, in the area of material accountability, considerable variation existed between contractors and their respective methods of accounting for material usage. To ease this differential in material accounting methodology the criteria were annotated as follows to give some leeway to the interpretation of what constituted an "applied" basis of material accounting.

Direct material costs shall be those amounts recognized in the time period associated with the consumption of materials without regard to the date of commitment or the date of payment. The amount may be charged to work that is in-process when any of the following takes place:(1) Material are actually consumed; (2) Material resources are withdrawn from inventory for use; (3) Material resources are received that are uniquely identified to the contract and scheduled for use within 60 days; (4) Major components or assemblies are received on a line-flow basis that are specifically and uniquely identified to a single, serially-numbered end-item.

But even with this broader interpretation the fact still remained that many contractor's accounting systems simply were not capable of accounting for materials as they were "used". As a result, most contractors seek to validate the ability of their performance measurement systems to account for materials on an "other than-applied" basis (i.e., at a point other than at consumption). Of the other points at which material can be accounted for (at commitment, at receipt, at payment, at inventory acceptance, or at inventory release) the only point which the government will not accept is the point of "commitment." For those contractors who seek to account for materials on an "other-than-applied" basis, a critical requirement is account for materials in a manner consistent with the way in which materials are budgeted. If materials are going to be account for at the point of receipt, then material budgets should be established based on the point of expected receipt. It is not acceptable to budget for materials at one accounting point and then to actually account for them at another point. To do so would cause distortion in the performance measurement data and reflect incorrect contractor progress status. The seventh accounting criterion will also reference some parameters/restrictions for material accountability.

CHECKLIST QUESTIONS:

a. Does the accounting system provide a basis for auditing records of direct costs chargeable to the contract?

Actual resources expended in accomplishing the work must be recorded on the same basis at which resource budgets were assigned if meaningful comparisons are to be made. The contractor's accounting system provides the basis for substantiating all applicable direct costs chargeable to the work effort expended for the contract. Thus the accounting records must provide an auditable trail to the source of the cost. This must be done in accordance with

generally accepted accounting principles. For example:

i. Direct labor costs must be supported by time cards or other documents generally accepted by auditors as substantiation for salaries and wages.

ii. Material records must account for all receipts, issues, scrap, and residual materials. Receipts should be traceable to purchase requisitions, purchase orders, receiving documents, invoice approval/payment records and material issuance documents. Records should also be maintained to account for scrap and the disposal of residual material.

b. Are elements of direct cost (labor, material, and so forth) accumulated within cost accounts in a manner consistent with budgets using recognized acceptable costing techniques and controlled by the general books of account?

The cost account is the lowest required management control level at which actual costs are to be accumulated and compared to the Budgeted Cost of Work Performed (BCWP). "Consistent with the budgets" means that the effort budgeted has a defined scope/product and that only the actual resources expended to achieve that same scope/product can be accumulated ("charged") against the cost account. Those costs which are allowable as charges fall in one of three classifications:

i. Labor - wages and salaries paid to hourly and salaried employees for work specifically identified to the product or service being rendered.

ii. Material - raw materials, parts, subassemblies, assemblies, and components acquired by purchase orders and subcontract and identified to the product or service being rendered.

iii. Other direct charges - allowable costs specifically identified to the product or service being rendered that are neither labor nor material. Examples include travel, computer time, agency labor, laboratory effort and testing services.

The above categories of costs must be collected within cost accounts using generally accepted accounting techniques and must be traceable to the general books of account.

2. SUMMARIZE DIRECT COSTS FROM THE COST ACCOUNTS INTO THE WBS WITHOUT ALLOCATION OF A SINGLE COST ACCOUNT TO TWO OR MORE WBS ELEMENTS. (Reference format 3.)

INTENT: Cost accounts are formed at the juncture where the lowest level of functional responsibility exists for individual CWBS elements. Allowable costs collected within the cost account by elements of expense must "roll-up" from the cost account level through the CWBS to the top level without being simultaneously applied to two or more higher level elements. If the CWBS was carefully developed and reviewed for adequacy in accordance with MIL-STD-881-A, the CWBS structure itself, should prevent any one single element's data from being rolled-up to two or more higher level elements. The reasons for this prohibition should be obvious. First if a roll-up of data to multiple elements were allowed to occur the values of the data would be multiplied by the number of higher-level elements receiving that data. Secondly, if multiple roll-up occurs, one must question the validity of the CWBS to adequately reflect the way work is actually to be done. Thirdly, multiple roll-up of data makes one question who is really in charge of the lower-level element whose data is being rolled-up. Careful development of the CWBS breakdown and the use of "integration / assembly-type" WBS elements will usually preclude the need for common-item Cost Accounts being subsequently allocated to the "using"

Cost Account.

CHECKLIST QUESTION:

a. Is it possible to summarize direct costs from the cost account level through the CWBS to the total contract level without allocation of a lower level CWBS element to two or more higher level CWBS elements? (This does not preclude the allocation of costs from a cost account containing common items to appropriate using cost accounts.

3. SUMMARIZE DIRECT COSTS FROM THE COST ACCOUNTS INTO THE CONTRACTOR'S FUNCTIONAL ORGANIZATIONAL ELEMENTS WITHOUT ALLOCATION OF A SINGLE COST ACCOUNT TO TWO OR MORE ORGANIZATIONAL ELEMENTS. (Reference format 4.)

INTENT: This criterion and the one before it are identical with the exception that this one deals with OBS data summarization while the previous one dealt with CWBS data summarization. In either case the intent is the same - the data representing the "Actual Cost of Work Performed" (ACWP) collected at the cost account level may not be rolled-up (summarized) to multiple higher-level elements. If the CWBS and OBS are properly constructed and if the responsibility assignment matrix adequately assigns OBS responsibility to all CWBS elements of work, it will be extremely difficult to violate the intent of these two criteria.

CHECKLIST QUESTION:

a. Is it possible to summarize direct costs from the cost account level to the highest functional organizational level without allocation of a lower level organization's cost to two or more higher level organizations? (This does not preclude the allocation of costs from a cost account containing minor non-organizational work to the appropriate functional organizations.

4. RECORD ALL INDIRECT COSTS WHICH WILL BE ALLOCATED TO THE CONTRACT.

INTENT: The intent of this criterion is to ensure that the contractor has a formal (written) system description that not only requires the recording of all allocable indirect costs, but also explains, procedurally, how these indirect costs are to be recorded. Since we are dealing with a category of cost that is expended to benefit more than a single contract, it is not sufficient for the contractor to state simply that he will record all indirect costs. The government wants to know how his overhead accumulation system works; it wants assurance that all of the contracts benefiting from an indirect cost expenditure will bear their fair share of that indirect cost.

CHECKLIST QUESTIONS:

a. Does the cost accumulation system provide for summarization of indirect costs from the point of allocation to the contract total?

The contractor's cost accumulation system must have the capability of summarizing or "rolling up" the indirect costs allocated to the contract from the point of allocation through each successively higher level CWBS element and OBS element to the total contract level. In order for the performance measurement data accumulated on the contract to be useful to the various levels of management, a summarization of that data upwards through the various levels of the CWBS (including all elements of cost, direct and indirect, allowable and allocable) is necessary.

b. Are indirect costs accumulated for comparison with the corresponding budgets?

Contractor budgets are established utilizing allowable labor and material estimates as the foundation for budget projections. Indirect budgets are applied, as a minimum, at the level where indirect budget control responsibility exists in the contractor's management control system. The contractor's accounting subsystem must be established so that those indirect costs allocated to the contract can be accumulated at the same level as where the budgets for these indirect costs are established. If the contractor's system does not accumulate indirect costs at the same level where indirect costs are budgeted, cost comparison analysis and potential corrective action cannot be appropriately made.

c. Do the lines of authority for incurring indirect costs correspond to the lines of responsibility for management control of the same components of cost? (Explain controls for fixed and variable indirect costs.)

This question asks one thing, do the overhead lines of authority correspond to the lines of responsibility? But then, in parentheses, it requires the contractor's controls over fixed and variable indirect costs to be explained. First, the question of authority/alignment of the contractor's management organization should be structured such that the manager charged with the responsibility for management and control of specific indirect cost elements has lines of authority extending down through those elements. In contractor's systems where this authority does not correspond with the responsibility, it is not possible to properly control the indirect costs. For example, if Manufacturing Engineering functionally reports to the Manager of the Engineering Department but charges indirect costs to a Manufacturing "burden" pool, the lines of authority and responsibility are not concurrent. Control of the contribution to the manufacturing pool by manufacturing engineers would be extremely difficult since the Manufacturing Manager has no control or authority over the Manufacturing Engineering personnel.

As for the subject of fixed and variable indirect costs, a definition for each is in order. Fixed indirect costs are those which remain relatively constant on a total basis, as production volume is varied over the shortrun. Examples of such fixed costs are fire insurance, machinery depreciation, rent, and property taxes. These costs will remain relatively fixed over a relevant range of production. Of course, if production requirements change "significantly" from this relevant range, even in the short run, the fixed cost assumption is not valid. Variable indirect costs on the other hand, are those which fluctuate directly on a total basis with changes in production volume over the short run. Examples of such variable costs include indirect manufacturing labor, indirect materials, and sales/marketing functions.

Each of these types of indirect costs pose unique problems for those who would control and authorize their use. Each type has an affinity for crossing standard departmental lines of functional responsibility. Hence, when a contractor seeks to establish procedures for aligning overhead authority with overhead responsibility, he should specifically address the problem of fixed versus variable overhead costs and outline procedures for controlling each type without violating the precepts of direct lines of authority.

d. Are indirect costs charged to the appropriate indirect pools and incurring organizations?

The contractor has the responsibility through his own internal audits to assure that indirect charges are properly applied throughout the accounting structure. The contractor also has the responsibility to assure that such costs are not duplicated (i.e., that they are not charged to more than one pool nor charged to both an indirect pool and at the same time to a direct/allowable cost element). Because of the nature of pooled costs, entry errors are more

difficult to detect than with direct costs. Periodically, reviews should be made to assure that indirect costs are being charged to the appropriate indirect pools and by the appropriate incurring organization.

e. Are the bases and rates for allocating costs from each indirect pool consistently applied?

The allocation of cost to a product, contract, or other cost objective should be the same for all similar objectives. That is, if direct labor dollars is the basis for allocating overhead on one contract, it must be the basis across all contracts. Unless identical bases and rates for allocating costs among contracts are utilized for allocations from indirect cost pools, double accounting or over-allocation and under-allocation of the pool costs is likely to occur.

f. Are the bases and rates for allocating costs from each indirect pool to commercial work consistent with those used to allocate such costs to Government contracts?

Contractors who used pooled costs and allocation of such costs to contracts must allocate such costs to government contracts and commercial contracts on an identical basis. This requirement for consistency is intended to minimize the possibility of selective application of indirect costs to gain an unfair profit. For example, if a contractor had a cost-reimbursable government contract and a firm-fixed price commercial contract an unfair advantage could be gained by the contractor on the commercial work by not charging enough indirect costs (via a lower rate) to the fixed-price commercial work. And by the same inappropriate procedures the Government would be paying more than its fair share of the overhead expenses.

g. Are the rates for allocating costs from each indirect cost pool to contracts updated as necessary to ensure a realistic monthly allocation of indirect costs without significant year-end adjustments?

The contractor has the responsibility to periodically review the allocation formula utilized for indirect costs to assure that they reasonably reflect the actual indirect costs being incurred. If incurred indirect costs vary significantly from those included in the allocation formula, periodic adjustments should be made to prevent the necessity for a significant end-of-year adjustment. Many contractors are currently making such indirect cost adjustments on a monthly basis by utilizing cumulative data information rather than single-month data as the basis for allocation of indirect costs to contracts. Unless these periodic adjustments are made when actual indirect cost rates vary from those budgeted, contractor data being generated by the performance measurement system will be distorted.

h. Are the procedures for identifying indirect costs to incurring organizations, indirect cost pools, and allocating the costs from the pools to the contracts formally documented?

The contractor must have formal (written) procedures for identifying the indirect elements which contribute to each cost pool. They must also identify the method used to allocate costs from the pools to the using contracts. And they must identify how they are identifying indirect costs in the incurring organizations. Normally these descriptions will exist in the contractor's accounting manual or internal accounting instructions. The contractor must perform periodic internal audits of the system to ensure that the procedures describing the handling of indirect costs are being followed.

5. IDENTIFY THE BASES FOR ALLOCATING THE COST OF APPORTIONED EFFORT.

INTENT: Apportioned effort was previously defined under the Planning and Budgeting criteria.

It is effort which is dependent upon or related to (in direct proportion) the performance of other discrete effort. Apportioned effort may be included (and budgeted) as part of the work package to which it relates, or it may be established as a separate work package with its own budget (which is based on a percentage of the related work packages). Apportioned effort may also be included (and budgeted) as part of the cost account to which it relates or it may be established as a separate cost account with its own budget (which is based on a percentage of the related cost account or work packages). It is important that the contractor have and procedures for use of apportioned effort well defined in his system description. From a practical standpoint, however, the intent of this criterion is that the contractor adequately identifies, justifies, and quantifies the relationship between the apportioned effort and the base effort to which it is related. If this relationship is not sufficient, that apportioned account may not be a valid collection point for the accumulation of actual costs. When establishing a time-phased budget and when measuring performance of apportioned effort the percentage factors of the base effort by which the apportioned effort is multiplied is directly dependent upon the quantified relationship between the base and apportioned accounts. For this reason, the factors established for the application of apportioned effort must be documented and applied in a formal, consistent manner. Apportioned effort should be restricted to only that which is genuinely related to discrete effort. The collection of the Actual Cost of Work Performed (ACWP) in an apportioned account, however, is not dependent upon the same factored relationship established for the "time-phase budget" data and "earned value" data ACWP for the apportioned effort will be what ever is actually expended to accomplish the apportioned effort.

CHECKLIST QUESTIONS:

a. Is effort which is planned and controlled in direct relationship to cost accounts or work packages identified as "apportioned effort?"

Apportioned effort is not measured by itself but in proportion to a related task. For example, the work of a quality assurance technician inspecting welded seams is in direct proportion to the work of the welder welding the seams. If the inspector's time is planned and controlled as 25% of the welders time (this factor must be substantiated by historical, engineered, or other acceptable standards) then the inspector's cost account and work packages are to be identified as apportioned effort. The two different efforts, welding and inspection, are directly proportionate to one another and the inspection effort is dependent upon the amount of welding effort. Therefore, the inspection effort should be planned, budgeted, time-phased, measured, and controlled based upon the plan and performance of the welding effort.

b. Are methods used for applying apportioned effort costs to cost accounts applied consistently and documented in an established procedure?

Apportioned effort has a time-phased budget in proportion to the discrete measured effort budget upon which it was based. Earned Value (i.e., the evaluation of work progress, also known as the Budgeted Cost of Work Performed, BCWP) for apportioned effort is taken in that same proportion. Once the proportionate relationships are established, they must be applied consistently. Procedures describing apportioned effort methodologies are to be formally prepared and followed. Of equal importance, however, is that there be procedures for the accumulation of actuals in the apportioned account. It must be clear that the ACWP values are not factored off of the base account like BCWP and BCWS are. Rather the ACWP accounting methodology should be similar to that used for all discrete effort and thus represent the actual resources expended in the accomplishment of the work.

6. IDENTIFY UNIT COSTS, EQUIVALENT UNIT COSTS, OR LOT COSTS AS APPLICABLE.

INTENT: Just as a contractor acquires materials, vended items, and subcontracted components by unit of cost so also is he expected to produce his contracted items in a manner that facilitates derivation of unit cost. Future pricing efforts are intimately concerned with the cost per unit of previous contract acquisitions. Current negotiation postures are established based upon historical unit costing as well. Such data help provide the important justification for what is termed a "fair and reasonable" acquisition cost of items being procured by the Government.

Where production situations exist such that items are being produced an accelerated assembly-line basis, it may not be practical to determine individualized unit costs. In these instances, it is sufficient to accumulate "lot" costs (wherein a "lot" is an aggregate of a specified and consistent number of units).

There are yet other situations wherein units are being produced on a single production line for more than a single customer. In these situations units are taken off the line in more or less random order according to the delivery agreements of the different contracts. It is difficult, therefore, to establish exactly what the cost was of the specific units that went into each customer's order. In such instances, it is sufficient to establish "equivalent unit costs." (i.e. all things being equal, on a "mature" production run, each unit's cost is approximately equivalent to every other unit's cost). Where learning curves are indicated equivalent unit costing must incorporate the value of the learning curve into each equivalent unit.

CHECKLIST QUESTIONS:

a. Does the contractor's system provide unit costs, equivalent unit or lot costs in terms of labor, material, other direct, and indirect costs? (Describe procedure.)

Just as the Planning and Budgeting criteria required the contractor to establish budgets by element of cost, so also is the contractor required, by the Accounting Criteria, to accumulate all actual costs incurred on a contract by element of cost. As contractors determine their unit, lot, or equivalent unit costs of the items they are producing, they must include with these costs their proportionate breakdown by element of cost. If a given unit's cost was determined to be $35,000, it is important to know, for current negotiation postures and future acquisitions, how much of this cost was due to labor, how much was due to materials, how much was for other direct charges, and how much was due to overhead. The contractor's system must be able to identify the cost of products in these terms as a minimum.

b. Does the contractor have procedures which permit identification of recurring or nonrecurring costs as necessary?

Generally, recurring costs are those that would be incurred in continuing production of the product. Nonrecurring costs are those associated with such one-time tasks as design development, systems test and evaluation, initial plant layout, training or preparation of technical data and manuals to name a few. The contractor's accounting system must have procedures to provide for the identification of recurring and nonrecurring costs. If 50% of a unit's cost of $100,000 was identified as nonrecurring costs then future negotiations and project acquisition plans could legitimately expect the unit cost in the future to be around $50,000. So the identification of recurring and nonrecurring costs on a contract, and more specifically on a unit-cost basis, provides valuable data for estimating the cost of future activity for both the government and the contractor.

7. THE CONTRACTOR'S MATERIAL ACCOUNTING SYSTEM WILL PROVIDE FOR: ACCURATE COST ACCUMULATION AND ASSIGNMENT OF COSTS TO COST ACCOUNTS

IN A MANNER CONSISTENT WITH THE BUDGETS USING RECOGNIZED, ACCEPTABLE COSTING TECHNIQUES; DETERMINATION OF PRICE VARIANCES BY COMPARING PLANNED VERSUS ACTUAL COMMITMENTS; COST PERFORMANCE MEASUREMENT AT THE POINT IN TIME MOST SUITABLE FOR THE CATEGORY OF MATERIAL INVOLVED, BUT NO EARLIER THAN THE TIME OF ACTUAL RECEIPT OF MATERIAL; DETERMINATION OF COST VARIANCES ATTRIBUTABLE OF THE EXCESS USAGE OF MATERIAL; DETERMINATION OF UNIT OR LOT COSTS WHEN APPLICABLE; AND FULL ACCOUNTABILITY FOR ALL MATERIAL PURCHASED FOR THE CONTRACT INCLUDING THE RESIDUAL INVENTORY.

INTENT: Recognizing the vast number of differences that can exist between contractors' materials accounting systems (especially the point at which materials are accounted for) this criterion intent is to establish those characteristics that all material accounting systems should be able to follow. Regardless of whether contractors account for materials at the point of consumption (on an "applied" basis) or at some material control point (on an "other-than-applied" basis) these accounting parameters / restrictions must be met.

CHECKLIST QUESTIONS:

a. Does the contractor's system provide for accurate cost accumulation and assignment to cost accounts in a manner consistent with the budgets using recognized acceptable costing techniques?

Material costs must be accurately charged to cost accounts using recognized and accepted methods. These methods may vary based upon the way the material is brought into the cost accounts. For example, material received directly into work that is in-process would normally be costed at its invoice amount directly to the using cost account. Materials issued from an inventory storeroom / warehouse, on the other hand, may be costed to the using account in several different ways: (1) On a LIFO basis (Last In, First Out basis) in which the most recently received units of each type of material are issued first. In inflationary times this process allows the contractor to cost the higher priced materials (just received) to the contracts in-house while retaining the less inflated priced-units in his inventory as surplus or back-up commodities; (2) On a FIFO basis (First In, First Out basis) in which the first units received of each type of material are also the first units issued for usage. This method is most beneficial when there are large quantities of materials being used which have a short, specific shelf-life of guaranteed useability; (3) On an AUC basis (Average Unit Cost Basis) wherein the units being issued for use are taken from the warehouse in a random order with no regard to their time of receipt. An average cost of each unit of each type of material is maintained and updated as each new shipment of materials is received. Then when a unit of material is issued the using cost account will be charged with the average unit cost of that material.
Still other materials may be furnished by the customer, in this case the government (known as GFM-Government Furnished Materials), and would be costed at no charge when placed into work that is in-process. Regardless of the costing method used, however, the same basis must be used for both budgeting and applying actual costs for materials. If material will be supplied as GFM and accounted for at no charge, then the contractor's plan should have reflected this in the material budgets of the affected cost accounts. If a LIFO material accountability system is used for warehoused materials, then the original cost account budgets should be estimated with this "Last In, First Out" concept in mind. The way materials are budgeted for in cost accounts must be dependent upon the contractor's methodology for accounting for those materials.

b. Are material costs reported within the same period in which BCWP is earned for that material?

BCWP, Budget Cost of Work Performed, is the term used for evaluating contractor progress. If a job is estimated to cost $100,000 and halfway through the contractual period of performance the contractor has actually spent $50,000, one only knows that the contractor has spent half of the money he had planned to spend. One does not know exactly how much work was planned to have been done by the halfway point, and one does not know how much work was actually done by this point in time. Let's assume the plan was to be done with 40% of the contractual work by the halfway point. The performance measurement data for this effort is as follows:

i. BAC, Budget at Completion = $100,000.

ii. BCWS, Budgeted Cost of Work Scheduled = 40% of the work = $40,000.

iii. ACWP, Actual cost of Work Performed = $50,000.

iv. BCWP, Budgeted Cost of Work Performed = the "budgeted" cost of the work that has been done so far = ?

We can see from the above data that contractor has overspent his planned budget by $10,000, but we still don't know how much work has been done (the BCWP value). In order for BCWP to have any meaning at all, care must be given to ensure that the contractor does not take credit for work being done (BCWP) before that work is charged to the cost account. If BCWP values are generated in different months than which ACWP is accumulated for cost accounts, the performance measurement will be distorted. In the above example, if BCWP is $25,000 then in comparison to the plan (BCWS) the contractor has only done 25% of the work instead of the 40% he had planned. What is worse, it has cost him 50% of the total budget to do that 25% of work. The determination of "earned value" or BCWP is all-important and the crux of any performance measurement system. For it to have any value at all, BCWP for each increment of effort must be claimed in the same period as which its actual cost are charged to the cost account.

In the case of material usage, the same is true. The easiest method to ensure that both costs (ACWP) and earned value (BCWP) occur in the same accounting period is to use the same document to trigger both data items. For example, for materials measured at the point of receipt, the receiving report triggers both earned value and applied cost. For materials measured at the point of issue from a material holding account, the issue document triggers both BCWP and the transfer of cost (ACWP) from the inventory to the cost account.

c. Does the contractor's system provide for determination of price variances by comparing planned versus actual commitments?

Materials cost variances (that is the difference between the budgeted and actual costs of the work performed (BCWP - ACWP = CV) can be divided into two sources or causes: price variance and usage variance. Usage variance is discussed under a forthcoming checklist question. Price variance is the difference between the budgeted cost for the bill of materials (based upon engineering drawings and technical orders, etc.), including planned quantities for testing and scrap, and the price paid for the bill of materials. By formula:

P.V. = (Budgeted price - Actual price) x (Actual quantity).

The price variance can be determined early in the contract when the materials are ordered and can be used in projections of the estimate cost at completion. The price variance is of prime importance to those responsible for ordering material. Thus the contractor's material accounting system must be able to quantify the material cost variance into its respective causes, price and usage variance; and his system must adequately determine price variance by comparing the planned commitments to the actual commitments.

d. Is cost performance measurement at the point in time most suitable for the category of material involved, but no earlier than the time of actual receipt of material?

Performance measurement for material is measured like any other element of cost. The material budget must be time-phased by dollar amount and to the period in time when the earned value (BCWP) is expected to be claimed and the actual costs (ACWP) recorded in the performance measurement system. Earned value (BCWP) for material may be claimed at the point in time after its receipt which is most suitable to the contractor. The most meaningful points are at the time when the material enters work-in-process, when the material is withdrawn from inventory, or when it is "laid up" in preparation for release. The contractor must have and follow procedures to develop material performance measurement. The optimum performance measurement for material is to lay out a time-phased budget (BCWS) based upon anticipated material usage, claim "earned value" (BCWP) when the material is used, and apply the costs of material (ACWP) at the same time the material "earned value" is claimed.

e. Does the contractor's system provide for the determination of cost variances attributable to the excess usage of material?

As we mentioned earlier, material cost variances can be divided into two sources or causes: price variances and usage variances. Price variances have already been discussed under a previous question of this last accounting criterion. Unlike a price variance which can be determined early in the contract when the materials are ordered, usage variance can occur throughout the period of performance. Normally, usage variances are the resultant cost of materials used over and above the quantity called-for in the bill of materials. Certainly, however, there are instances where less material than anticipated in the bill of materials is used. A usage variance is simply the cost of materials usage that is different than the anticipated (budgeted) material usage. By formula it is represented as follows:

U.V. = (Budgeted Quant. - Actual Quant.) X (Budgeted Price)

While the price variance is of prime importance to those responsible for ordering material, the usage variance is of prime concern to those responsible for controlling the quantity of materials used. Planning for material usage allowances to cover scrap, test rejections, unanticipated test quantities, and the like, is a practical necessity and the contractor should have records of such provisions. The more uncertain the expected usage, the more important it is to have a good plan and to keep track of performance against it (particularly for contract-peculiar materials or materials which require long procurement lead times).

f. Does the contractor's system provide unit or lot costs when applicable?

A previous accounting criterion required the contractor to identify unit costs, equivalent unit costs, or lot costs when applicable by element of cost (labor, material, ODC, indirect). The above criterion question, requires the contractor's material accounting system to provide unit or

lot costs when applicable. The difference between these two standards is subtle. The first one requires that each unit produced should be broken down by element of cost so that each unit's own production cost can be determined. The second standard has to do not with the end product's unit cost, but with the accounting system for materials for each unit. The contractor's accounting system for the accumulation of materials used and charged to each contract, should be able to identify the number of units of each type of material that went into each unit on a given contract. The above criterion standard, in other words, goes a little deeper than the previous one. Instead of just requiring the identification of that part of the unit cost which was due to materials, this standard requires a tabulation identification capability of the contractor's accounting system, to tell which materials were used in each item produced, and how many units of each type of material was used per end item.

g. Are records maintained to show full accountability for all material purchased for the contract, including the residual inventory?

Records must be kept to provide for full and complete accountability of all materials purchased for the contract or furnished as GFM (government furnished materials). These records must reflect the acquisition, issue to cost accounts, return of unused material from cost accounts, scrap quantity and disposition, and residual material inventory. Normally, any unused material should be returned to stores/warehouse for disposition. Actual direct material costs include the materials in the final product, scrap, damaged materials, and so forth, plus any material purchased for the contract but not used, for which an alternate use cannot be found. However, unit cost projections for follow-on procurements should include material consumed plus material requirements for schedule assurance based on waste and spoilage trends determined from an appropriate phase of the contract performance. Without full material accountability requirements unit cost projections would not be dependable.

IV. ANALYSIS CRITERIA

1. IDENTIFY AT THE COST ACCOUNT LEVEL ON A MONTHLY BASIS USING DATA FROM, OR RECONCILABLE WITH, THE ACCOUNTING SYSTEM; BCWS AND BCWP; BCWP AND APPLIED (ACTUAL WHERE APPROPRIATE) DIRECT FOR THE SAME WORK; VARIANCES RESULTING FROM THE ABOVE COMPARISONS CLASSIFIED IN TERMS OF LABOR, MATERIAL, OR OTHER APPROPRIATE ELEMENTS, TOGETHER WITH THE REASONS FOR THE SIGNIFICANT VARIANCES.

INTENT: The intent of this criterion has several facets. First is to establish the fact that analysis, to remain viable, must be accomplished on a regular periodic basis. Since most contractor's accounting and budgeting systems are established on a monthly basis, analysis should be accomplished on this same periodic interval.

Secondly, it is the intent of this criterion to establish the fact that analysis efforts must begin, as a minimum, at the cost account level. Since the cost account is the lowest level where full management and control responsibility exists for specific WBS increments of work, the cost account is the logical point for not only the planning, scheduling, budgeting and accounting efforts but also for the analysis effort as well. A Cost Account Manager would not have full management and control responsibility if his span of authority did not include the requirement to analyze the work performance and associated costs against the Performance Measurement Baseline. Since the cost account represents the lowest level of the CWBS and OBS, by virtue of this requirement for analysis to begin at this level, summarization of analytical data and trends can be accomplished.

Another intent of the criterion is to make it perfectly clear that all data to be analyzed must come directly from, or be reconcilable with, the accounting system. This represents yet one more effort on the part of the criteria to ensure that completely comparable data are analyzed; this minimizes the amount of distortion that would otherwise be rampant if data from a "second set of books" were used for comparison/analysis purposes.

Lastly, this criterion establishes the minimum content of any cost account analysis effort. It implies that the following data elements must be identified, on a monthly basis, at the cost account level: BCWS, which represents the amount of work planned each month; BCWP, which represents the amount of work actually accomplished each month as well as the budgeted value of that work progress; and ACWP, which represents the actual cost of the work accomplished each month. Given these three data elements, this criterion requires that two comparisons be made with them: BCWP versus BCWS, and BCWP versus ACWP. These comparisons result in two variances. BCWP minus BCWS results in the cost account's Schedule Variance expressed in budgetary terms. BCWP minus ACWP results in the cost account's Cost Variance expressed in dollars relative to the budget. Since budgets and actuals are required by previous criteria to be established / accumulated by element of cost, the above data elements, comparisons, and variances can (and should) also be identified by those same elements of cost. Lastly, where <u>significant</u> variances (schedule or cost) exist, the Cost Account Manager is required by this criterion to identify investigate. The significance of a variance is usually established by its relative size in comparison to a threshold.

CHECKLIST QUESTIONS:

a. <u>Does the contractor's system include procedures for measuring performance of the organization responsible for the cost account? (Provide typical example).</u>

Each cost account is the responsibility of a single organizational element of the contractor's management structure. Performance measurement data (BCWS, BCWP, and ACWP) must be collected at the cost account level by the Cost Account Manager for the organization of which that manager is a part. Performance measurement data, by element of cost, is usable to identify trends in the cost, schedule, and technical performance. To be effective this data must be produced with regularity (monthly) as a normal part of the management process. This process, like all other parts of the contractor's management system, should be documented.

b. Does the contractor's system include procedures for measuring the performance of critical subcontractors?

"Critical subcontractors" are so-defined because of their total dollar value and/or their technical risk to the prime contract. It is normally required that the prime contractor flow-down the C/SCSC requirement to critical subcontractors and to develop detailed measurement techniques for statusing their cost, schedule, and technical performance. This flow-down of C/SCSC to critical subcontractors should be a unilateral decision, it should be mutually agreed to by the prime contractor and the government. For those cases when subcontractors are required to comply with C/SCSC requirements, the prime contractor must establish and follow procedures to ensure the applicable subcontractors implement the C/SCSC in a timely and accountable fashion. In those cases where C/SCSC is not flowed-down to a subcontractor, it is necessary to evaluate subcontractor performance. Formal procedures should include the establishment of subcontractor reporting requirements as well as the validation, review, and evaluation of the subcontractor's performance measurement data by the prime contractor.

c. Is cost and schedule performance measurement done in a consistent, systematic manner?

Performance measurement data are most useful when consistent measurements are made in a systematic manner. This provides comparable data from one period to the next for the evaluation of performance trends. For consistency of data it is necessary for the measurement techniques to be documented in formal operating procedures and for the contractor's personnel to be trained in the use of these procedures. Documentation and training help to ensure that the "earned value" methods for evaluating work progress will not change even if personnel assignments are changed during the performance of the contract. Without formal training and procedural documentation of measurement techniques, a performance measurement becomes a subjective decision, or guess, on a month-to-month application. When this is allowed to happen, there exists the possibility of the cost account manager hiding potential problems by overstating the amount of work accomplished. Performance measurement should be based on discrete events and predetermined, objective measurement techniques applied on a consistent basis, rather than on subjective evaluations that change from one period to the next.

d. Are the actual costs used for variance analysis reconcilable with data from the accounting system?

A cost variance is computed by subcontracting ACWP from BCWP. The actual costs come from the accounting system and must reconcile to the accounting records. This must be true at any level of summarization from the cost account level to the total contract level. If the actual costs reflected in the AWCP data and used for cost variance calculation do not reconcile back to the accounting system's accumulation of real charges, the cost variance loses its credibility.

e. Is budgeted cost of work performed calculated in a manner consistent with the way work is planned? (For example, if work is planned on a measured basis, is budgeted cost for work performed calculated on a measured basis using the same rates and values?

The intent of this question is to ensure that the contractor uses the same method for calculating both BCWS and BCWP. Throughout the Planning and Budgeting Criteria much emphasis is put on the planning of resources needed to accomplished each work task. It is often erroneously assumed that the resultant resource plan, spread over time is what constitutes the monthly BCWS values and the Performance Measurement Baseline. Instead, monthly BCWS values should be derived by an objective method commensurate with the way BCWP values are derived so that comparisons between BCWS and BCWP have a minimum amount of distortion. The objective methods used to calculate BCWS and BCWP should be chosen so that when BCWS is calculated it matches the monthly resource plan as closely as possible. The method used should also depend upon the type of effort involved in each work package.

Discrete effort work packages contain effort that has specific measurable tasks and which are planned to be accomplished over short periods of time. Where these work packages must be of longer duration, discretely measurable, intermediate milestones should be used to measure performance/progress. A primary objective of C/SCSC is to maximize the amount of discrete measurement. There are several "earned value" techniques which can be used for measuring the performance of discrete tasks which are in process at the time when BCWS and BCWP must be calculated. Among these are:

i. 50-50 Method
ii. 0-100 Method
iii. Interim Milestone Method
iv. Percent Complete Method
v. Equivalent Units Method
vi. Supervisors Estimate Method

Many variations of these methods also are possible as long as the method the contractor intends to use to calculate BCWP is the same method he uses to generate his BCWS values. Apportioned effort work packages are those which bear an intrinsic relationship to another "base" work package which is discretely measured. The method for calculating BCWP and BCWS for apportioned effort is called the "Factored Method," and the BCWP and BCWS values of the apportioned work are calculated as a factor (or percentage) of the BCWS/BCWP values of the base package.

Level of Effort tasks are those which are neither discretely measurable nor "factorable" to another discrete work package. There is no methodology available for measuring the in-process value or the progress of Level of Effort tasks; they are only measurable with the passage of time (rather than by some type of milestone accomplishment). BCWS values are normally the same values as the resource plan for these tasks and BCWP values are automatically assumed to equal the BCWS values with each incremental passage of time. Hence BCWP equals BCWS and Schedule Variance is always zero for LOE tasks.

Regardless of the type of effort involved or the method chosen by which to measure "earned value," BCWS must be calculated by the same method. It is not allowable, for example, to plan work by a "factoring" method if "earned value" is to be calculated by one of the discrete measurement methods. Nor is it allowable to plan work by the Interim Milestone method if "earned value" is to be calculated by the 50-50 method. Absolute consistency is mandatory between the planning method used and the "earned value" method chosen for measuring performance. They must be the same.

f. Does the contractor have variance analysis procedures and a demonstrated capability for identifying (at the cost account and other appropriate levels) cost and schedule variances resulting from the system (provide examples) which-

(1) Identify and isolate problems causing favorable and unfavorable cost and schedule variances?

The measurement of performance and comparison of performance data with both budgets and actual costs has as its main purpose the identification of individual tasks and areas of responsibility that are deviating significantly from the plan. The contractor's system for analysis of variances should concentrate on those cost accounts and higher level summaries) where significant variances exist. Written procedures must require formal variance analysis for those variances from the "plan" that exceed established cost and schedule variance thresholds at the cost account and other appropriate levels. Thresholds should be established at several levels since it is also possible for small variances that exist at the cost account level to have a significant effect on higher level CWBS/OBS elements, contract milestones, cost goals, or technical parameters. Significant variances at the higher levels must also be isolated and analyzed.

(2) Evaluate the impact of schedule changes, work-around, etc?

The contractor's managerial staff must also be sensitive to the effects of changes in schedules in order to evaluate the cost-impact of these changes. Changes in schedules, work-around plans, and corrective action plans affect the cost plan (time-phased budget) and, most often, the final cost. The relationship between schedule changes and the performance situation must be reflected in the monthly data developed by and for each responsible manager. This data should be reflected in cost account level analysis and "estimates at completion" as well as estimates of when significant schedule variances will return to "zero."

(3) Evaluate the performance of operating organizations?

Cost accounts are identified to higher level OBS elements responsible for their scope of work. Within these responsible organizations, performing units can experience various degrees of efficiency and performance progress. The contractor's management system must be capable of isolating these performance deviations. This data provide some of the most useful information to the cost account manager when tasks within his area of cost account responsibility are performed by more than one performing unit, and when these tasks continue over long periods of time. Isolating variances to performing organizations allows the corrective actions to be specific and to be channeled toward the neutralization and correction of the work methods, tools, and underlying conditions which caused the problems.

(4) Identify potential or actual overruns and underruns?

Another primary purpose of C/SCSC is the identification of the most likely final cost of the project. The measurement of performance and its comparison to the "Contract Budget Base" has as its main purpose the identification of variances that may cause contract overruns or underruns. Performance deviations that create potential "at- completion" variances must be recognized and analyzed by the manager responsible for the WBS/OBS element involved. The use of predictive methods for extending current performance to completion is highly recommended. Additional factors that are not reflected in current performance should also be taken into account by the cost account manager. These include such factors as: the probable

assignment of less-experienced workers in the task due to personnel shortages, occurrences of problems on similar tasks contained in other cost accounts, and schedule delays anticipated for the future. These potential overruns / underruns at the cost account levels are summarized through the CWBS and OBS to determine potential higher level overruns/underruns. Higher level management must review these summarizations of performance and analyze their underlying causes. It is possible that the manager at the cost account level may not be aware of all the project conditions that may affect his cost accounts.

2. IDENTIFY ON A MONTHLY BASIS, IN THE DETAIL NEEDED BY MANAGEMENT FOR EFFECTIVE CONTROL, BUDGETED INDIRECT COSTS, ACTUAL INDIRECT COSTS, AND VARIANCES, ALONG WITH THE REASONS. (Reference format 7).

INTENT: Just as performance measurement is needed for all directly costed effort on a contract, so also it is important to measure the progress of all overhead efforts attributable to the contract. Unfortunately, since overhead effort is not attributable to a single contract it is almost impossible to measure the progress of overhead tasks on a contract-by-contract basis. Any performance measurement of overhead tasks must be done on a total facility basis. But while this is important in the contractor's efforts to control overhead cost growth it does not make for very good monthly identification of overhead progress. As a result, the criteria only require a minimum of monthly overhead analysis: that of comparing overhead budgets to overhead actuals (with the stipulation than any resultant variance be explained as to its cause). It is because of the assumptions on which this minimal analysis effort is based that many have claimed that "Overhead defies performance measurement." To be sure, the criteria standards for overhead analysis are relatively lax in comparison to the direct effort. However, this in no way should be construed to mean that the contractor is relieved of his responsibility to manage overhead costs and control (minimize) the growth of overhead costs on a facility-wide basis. The acknowledged difficulty in analyzing overhead performance only makes it more paramount for contractors to exercise maximum discipline over their overhead procedures.

CHECKLIST QUESTIONS:

a. Are variances between budgeted and actual indirect costs identified and analyzed at the level of assigned responsibility for their control (indirect pool, department, etc.)?

There are two facets to this question. First is that, as a minimum, the contractor's procedures must require that budgeted indirect costs be compared to actual indirect costs. The variances that result from such comparisons must be identified and summarized from their management control point up through the OBS and CWBS to the total contract level. Accompanying these variances must be analyses of their causes and necessary corrective actions.

The second facet of this question is the requirement that the contractor's procedures for overhead control acknowledge that the management level where this analysis must start is the same management personnel which have the responsibility and authority for overhead control (identified in compliance with the Planning and Budgeting Criteria). The criterion does not attempt to standardize the level where overhead must be planned, budgeted, authorized and controlled. But it does require the contractor to at least identify where these activities must be managed and to align the responsibility for this management with the authority to manage, analyze, and control overhead (as is deemed necessary).

b. Does the contractor's cost control system provide for capability to identify the existence and causes of cost variances resulting from--

(1) Incurrence of actual indirect costs in excess of budgets by elements of expense?

(2) Changes in the direct base to which overhead costs are allocated?

In order to have adequate control of indirect expenses, the contractor's overhead control system should be capable of identifying overhead budgets and collecting overhead costs by element of expense for each using department. This system should be able to accommodate summarization of both budgets and actual costs functionally (by department and/or by incurring organization) and by individual collection pool as well. Any incurrence of actual indirect costs in excess of budgets can thus be subdivided by element of expense. If overhead costs cannot be budgeted and collected in a consistent and disciplined manner, and if responsibility does not exist at the point where the costs are actually being incurred, little can be done to analyze indirect cost variances and even less can be done to initiate corrective action.

In addition to overhead services being over-subscribed to and thereby causing costs variances, overhead expenses can also be thrown drastically out of control by a change in the direct base to which the overhead costs are allocated. Company-wide indirect budgets are generally established based on potential business in a forecasted time frame. This business base forecast is typically time-phased to show the anticipated increases and decreases in the business volume. Where there is a drastic change in the business volume the contractor may choose to change the direct base by which his overhead costs are prorated in order to better spread his overhead costs across the contracts that made up the total business base. Such a change in the direct base can itself cause a cost variance to occur. The contractor must have the capability to identify the cause of each overhead cost variance as either due to a usage variance, a change in business volume, or a rate variance due to a change in the direct base.

c. Are management actions taken to reduce indirect costs when there are significant adverse variances?

Since overhead costs, to a degree, do defy performance measurement, this requirement for management action in response to significant overhead variances becomes the crux of overhead control. Many contractor's have no valid procedures for defining when an overhead variance becomes "significant". This being the case, most overhead variances (with the exception of those caused by drastic changes in the business base) never get identified as "significant." Overhead, then, takes on the specter of being uncontrollable. Nothing could be further from the intent of the criteria. Specific variance thresholds should be established for the various overhead categories to define when they are significant (out of tolerance). During the monthly review of the contractor's performance measurement data, variances caused by actual indirect costs exceeding their budgets should be analyzed by the responsible overhead manager. "Significant" variances and unfavorable trends should be thoroughly investigated and corrective action planned as required. "Estimates at completion" should then be reviewed/revised in light of these significant manifestations.

3. SUMMARIZE THE DATA ELEMENTS AND ASSOCIATED VARIANCES LISTED IN ITEMS 1 AND 2 ABOVE THROUGH THE CONTRACTOR ORGANIZATION AND WBS TO THE REPORTING LEVEL SPECIFIED IN THE CONTRACT. (Reference formats 2, 3, 4, and 5.)

INTENT: The intent of this criterion is to ensure that the data being used by the contractor's managerial staff are the same data that are reported to the government. Since the CWBS and OBS exist as a formal and disciplined framework for work and responsibility definition they become the ideal vehicles for summarization of data from the cost account level to the government reporting level. Using the CWBS and OBS for summarization purposes ensures that

data on all work elements and organizational elements is included in the reporting data base. An additional benefit of this requirement for CWBS and OBS Summarization is that it helps to identify the significant problem areas from among all levels of the contractor's organization and the contract scope of work. When significant variances exist in the monthly data report, it is possible to track down through the CWBS and OBS to identify the casual factors involved in that variance. This auditability allows analysis of corrective action procedures and impact evaluation, both of which are important in decision-making at the Program Office level.

CHECKLIST QUESTIONS:

a. Are data elements (BCWS, BCWP, and ACWP) progressively summarized from the detail level to the contract level through the CWBS? (Provide exhibit.)

The CWBS is a product-oriented family-tree division of hardware, software, services, and other work tasks. Each succeedingly lower CWBS level is a subset of the element above it. By ensuring a level-by-level summarization capability, data can be collected for analysis at varying levels of the CWBS which facilitate visibility as to where the problems lie. The cost accounts, as the lowest level juncture between the CWBS and OBS required by the criteria, represent the lower level where actual costs must be collected and performance measured. All the data elements (BCWS, BCWP, and ACWP) plus the ancillary data derivable from them, such as BAC, Schedule Variance (SV), Cost Variance (CV), Estimate at Completion (EAC), and Variance at Completion (VAC), are calculated at the cost account level. These data must summarize from the cost account level up through the CWBS to the total contract level without being divided among two or more higher level CWBS elements. Reconciliation of certain of these summarized data elements to the Contract Budget Base helps to ensure absolute budget integrity. The summarization process itself, ensures an ability to audit the origin of any and all problems. It also provides assurance that both contractor and the government are using the same data-base to manage the contract/program.

b. Are data elements summarized through the functional organizational structure for progressively higher levels of management?

This question is identical to the foregoing one except that it asks if the data summarization is conducted functionally through the OBS instead of through the CWBS. All of the parameters and benefits of the CWBS summarization also accrue to an OBS summarization. Neither summarization is sufficient by itself, however, because each alone could give a distorted picture of what the true performance and problem areas are. Analyzing a CWBS data summarization alone will allow the extrapolation of the performance of the main cost drivers of the contract and will highlight what the problem areas are to date. Analyzing an OBS summarization will add another dimension to the total analysis, however. It may point out, for example, that what was originally thought to be a series of unrelated hardware problems is, in reality, a design problem which is exhibiting cost and schedule variances in the engineering function. Without the dual summarization of data, and the auditability it provides, data analysis can be easily distorted and misread.

c. Are data elements reconcilable between internal summary reports and reports forwarded to the Government?

In "fixed-price type" contracts, where the performance and cost risk is almost entirely on the contractor, the need for performance data reporting is drastically minimized. In "cost type' contracts, the government shares a great deal of the performance and cost risk with the contractor and must make continued program trade-offs between cost and technical parameters.

Both contractor and the government have an important role in the management of programs that are contracted on a "cost-type" basis. The contractor must manage day-to-day development and production problems while the government has to manage the dollarized-acquisition process of the needed weapon system. Primary in this mutual management effort is accurate and adequate communication. The data reports are the prime vehicle for this communication. But to ensure the validity of these reports and hence facilitate the communication process, it is paramount that both the contractor and the government be using the same data. The internal and external report formats need not be identical, but their data base must be one and the same. Any difference in the data on a contractor's internal report versus what he reports externally to the government can have severe repercussion on the contract itself, not to mention the truth-and-understanding relationship between the two parties.

d. Are procedures for variance analysis documented and consistently applied at the cost account level and selected WBS and organizational levels at least monthly as a routine task?

The requirement for variance analysis includes the need for contractor management to acknowledge the problems, identify the causes, evaluate the impact, and develop corrective action and work-around plans. The contractor must have written procedures requiring such monthly variance analysis to occur at the cost account level and at higher levels in both the CWBS and the OBS. This variance analysis must be performed and fully documented whenever schedule, cost, or at-completion variances exceed predetermined thresholds. (Normally the specific dollar or percentage thresholds are not specified directly in the analysis system description/operating procedures because they must vary based upon the type, size, and risk associated with each individual contract. But the requirement for such thresholds should exist in the procedures and the actual thresholds should be attached or referenced as an appendix/addendum to these procedures). The consistent application of variance analysis procedures is paramount to all cost account managers doing their job of management. If it does not occur here (at the cost accounts) as a minimum, any variance analysis occurring at a higher organizational level risks gross misemphasis, misinterpretation, and inadequate corrective action.

4. IDENTIFY ON A MONTHLY BASIS SIGNIFICANT DIFFERENCES BETWEEN PLANNED AND ACTUAL SCHEDULE ACCOMPLISHMENT TOGETHER WITH THE REASONS.

INTENT: Because a comparison of BCWS to BCWP provides a dollarized schedule variance determination, it is often assumed that this is the extent of schedule management and analysis required by the criteria. To be sure, such a schedule variance is extremely important to any performance measurement system, but it cannot stand alone. What can it mean, for example when a contractor has a negative schedule variance of $1.5 million? How far behind schedule has the contractor actually slipped? Is this schedule slippage retrievable? How much time does this $1.5 million represent? And more importantly, as a summary-level schedule variance, what is the schedule status of the work packages of the underlying WBS and OBS elements? The intent of this criterion is to ensure duplicity in schedule management and analysis. Schedules must be managed by the work they represent as well as by the cost by which they are depicted in a BCWS or BCWP data element. Reasons for schedule variances must address work tasks in order for corrective action to be relevant. The dollarization of a schedule variance is simply a means of addressing the impact, in dollars, of a schedule variance. It does not address the time factor of the work discrepancy. This criterion ensures that this time factor is not overlooked.

CHECKLIST QUESTIONS:

a. Does the scheduling system identify in a timely manner the status of work?

Much emphasis is placed by the Planning and Budgeting Criteria on the need for scheduling systems to sequence the authorized work, identify task interdependencies, and identify interim milestones for work statusing. From an analysis standpoint, it is important to have assurance that the scheduling system does in fact, identify work status in a timely manner. From the master schedule down through the intermediate level schedules to the cost account and work package schedules, the scheduling system must portray the planned work by period of time, the actual accomplishment of work, and deviations from the planned schedule. Schedule data must be timely to provide managers with information needed to identify problem areas and take corrective actions.

b. Does the contractor use objective results, design reviews and tests to trace schedule performance? (Provide examples.)

Schedules at all levels must include the planned start and stop dates for tangible events, such as flow diagram and drawing completion, procurements, construction, start-up, and acceptance/performance tests. Throughout work on the program, the progress is measured by the completion of these and other milestones. The contractor should use the results of these assessments to form the basis for measuring actual schedule accomplishment and tracking schedule performance. This standard further serves to emphasize the intent of the criteria to urge contractors to maximize their use of discrete definitions of effort in lieu of level-of-effort definitions which stifle schedule performance measurement.

5. IDENTIFY MANAGERIAL ACTIONS TAKEN AS A RESULT OF CRITERIA ITEMS 1 THROUGH 4 ABOVE.

INTENT: The criteria, as a discipline, place many requirements on contractor personnel (particularly cost account managers) that literally, keeps them busy all the time. Often these managers get so busy going through the motions of performance measurement that they forget why they are going through the motions. The intent of this criterion is to ensure that after the contractor managers have analyzed the performance measurement data (in accordance with the four foregoing criteria) they then take the necessary management action. This management activity should be identified, documented, followed-up for effectiveness, and reported to the government (where significant variances are involved).

CHECKLIST QUESTIONS:

a. Are accurate cost and schedule performance measurement and analysis provided to the contractor's managers in a timely and useable manner?

Data from the contractor's management control system must be provided to managers for their use in tracking process, identifying problem areas, and taking corrective action. The data must be received by the managers within a reasonable time (a length of time that will vary from manager to manager but which is sufficient to allow for effective response). At the same time this data must be accurate (so the managers will have confidence that the data portrays true status), and should be in an easily understood format reflecting the tasks they are managing. When data are not timely, accurate, and/or useable, managers will be frustrated and will shun the data. Conscientious managers will develop their own "desk drawer" data systems as a result and they will drop their support of the contractor's performance/management system which they feel does not help them manage their tasks.

b. Is the information in "a" above being used by the contractor's managers to identify reasons for significant variances and to initiate appropriate corrective actions? (Provide examples.)

Data from the contractor's management control system should be used by managers at all levels to status performance of their respective areas of responsibility. Where performance does not meet the plan, variances will occur. Variances exceeding the predetermined thresholds should be analyzed by management to determine their cause and impact on the program. Corrective action or "get-well" plans should be developed and implemented to bring the program back on track. Unless managers use the performance measurement data to track their performance, identify significant variances from the plan, and take action to correct the problem areas, the data have not served their intended purpose.

c. Are there procedures for monitoring action items and corrective actions to the point of resolution and are these procedures being followed?

After significant variances have been identified and corrective action plans developed and implemented, the corrective actions have to be tracked until the problems are resolved and the program is brought back on track. Managers responsible for implementing the corrective action should periodically report their progress to higher level management until the problem has been satisfactorily resolved. Then the action item can be formally closed. The contractor must have, and follow, procedures for monitoring corrective action plans from their inception until they are closed-out. Corrective action plans reflect the existence of a variance considered significant by management. They must be monitored closely and given additional management visibility and attention until resolved so as to not further jeopardize the success of the program.

6. BASED ON PERFORMANCE TO DATE, ON COMMITMENT VALUES FOR MATERIAL, AND ON ESTIMATES OF FUTURE CONDITIONS, DEVELOP REVISED ESTIMATES OF COST AT COMPLETION FOR WBS ELEMENTS IDENTIFIED IN THE CONTRACT AND COMPARE THESE WITH THE CONTRACT BUDGET BASE AND THE LATEST STATEMENT OF FUNDS REQUIREMENTS REPORT TO THE GOVERNMENT. (Reference formats 2, 3, 4, 5, 10, and 11.)

INTENT: The Estimate at Completion (EAC) or as it is known to others, the Latest Revised Estimate (LRE), is the contractor's vehicle for telling the government where each CWBS element, OBS element, and the total contract is going with respect to cost. At the beginning of a contract the EAC is usually equal in value to the Budget at Completion (BAC) and these values are usually less then the Negotiated Contract Cost (NCC) and Contract Budget Base (CBB). At this point in time optimism normally prevails. As a contract progresses, problems arise which have to be reacted-to and neutralized. As these problems cause "significant" variances, the responsible manager must assess the impact of the problem. The most commonly used way of assessing impact is to develop a revised EAC. If for example a cost account had a BAC and EAC of $500,000 prior to the occurrence of a significant variance, and the EAC was revised to $600,000 as a result of this problem, the cost account manager is telling you that the impact of that problem is $100,000 of additional expenses expected to be incurred to get back on track. With all managers using EACs to forecast impact on their problems the EAC becomes a barometer to the Government Program Manager by which he can make program decisions before the problem blows out of control. The intent of this criterion is to ensure they be constructed properly and that they can be compared to the amount of work authorized and the latest estimates of funds requirements reported to the government.

CHECKLIST QUESTIONS:

a. Are estimates of costs at completion based on-

(1) Performance to date and material commitment?

(2) Actual costs to date?

(3) Knowledgeable projections of future performance?

(4) Estimates of the cost for contract work remaining to be accomplished considering economic escalation?

The intent of this question is to ensure that EACs be properly constructed. As a minimum, EACs must take into consideration the following factors: (1) Performance to date - this refers specifically to the Budgeted Cost of Work Performed (BCWP) calculation which should be a true indicator of work accomplished against the budgeted and scheduled plan for work accomplishment, the BCWS. BCWP should be based on the physical accomplishment of work. In calculating EACs, deviations from the planned progress (BCWP) minus BCWS) must be understood as to the cause of the variance. In addition, it must be known what effect the performance to date has on future performance; (2) Actual costs to date - this refers to the ACWP calculations and includes indirect costs, General and Administrative (G&A) expenses, and all allowable direct costs associated with labor, material and other direct charges; (3) Projections of future performance - EACs must be developed by those individuals knowledgeable of what it takes to complete the job. They need to know if there are additional tasks not originally planned for, if there are schedule delays that will slow down production, if future efficiency will match past efficiency, etc. This intimate knowledge of what the future working environment will be can never be precisely known, but it must be included as a calculated performance factor by which the work remaining must be multiplied; (4) Estimate of the cost of the work remaining - the most commonly used formula for work remaining is BAC-BCWP cum: As a minimum, the EAC must take "work remaining" into consideration. If economic escalation is anticipated this also should be calculated as a factor against which "work remaining" should be multiplied.

b. Are the overhead rates used to develop the contract cost estimate to complete based on-

(1) Historical experience?

(2) Contemplated management improvements?

(3) Projected economic escalation?

(4) The anticipated business volume?

If the most currently available information on historic experience, management improvements, economic escalation, and changes in the business volume are not included in the contractor's Estimate to Complete (ETC) on programs, the completion estimates can be grossly in error. The purpose of developing cost ETCs is to provide the contractor with information necessary to anticipate short-run and long-run funding requirements. Inaccurate projections of these short-run and long-run requirements can cause serious funding problems and the possibility of program terminations.

In developing ETCs the contractor is expected to use and to demonstrate the use of historical experience. For example, if history has shown that the contractor incurs overhead factor rates significantly higher during year-end than during the first part of the year, this historical experience should be used to project the contract ETC. In addition, the contractor should

anticipate the potential growth in the overhead factors toward the completion of a contract as the allowable labor and material base falls off and indirect remains relatively constant. EACs and ETCs should also consider contemplated management improvements if they were not part of the original plan. Such improvements as computer system enhancements and improved management techniques should be analyzed for both short and long-term effects on contracts. In the short-run, there may be an increase in the contract ETC based on investment costs; in the long-run, management improvements may result in a decreased ETC.

As for economic escalation projections, if the contractor prepares an annual "bottom-up" expense forecast as the basis for the annual overhead rate projection, escalation is normally already included in the base number. However, under current inflationary times, additional adjustments to these base numbers may be periodically required as a result of realized and projected economic escalation.

Lastly, it is imperative that the contractor use the latest information concerning realization or non-realization of potential business when calculating ETCs. Changes in the anticipated business base can have significant impact on the overhead rates and as a result, seriously influence contract ETCs.

c. Are estimates of cost at completion generated with sufficient frequency to provide identification of future cost problems in time for possible corrective or preventive actions by both the contractor and the Government program manager?

EACs must be generated often enough to allow management time to take corrective/preventative action. This requires that the Cost Account Managers review, on a monthly basis, their plans for continued validity. When CV and SV threshold are exceeded and written analyses are required, procedures should also require a written analysis of the EAC. In addition to these monthly EAC revisions, a more formal "grass roots" EAC should be calculated on an annual or semi-annual basis. A "grass roots" EAC is accomplished at the lowest level of detail that is practical to indicate what it's going to take to accomplish the remaining work. "Grass roots" EACs take considerable effort and are normally done in conjunction with some types of corporate budget/financial review.

d. Are estimates developed by program personnel coordinated with those responsible for overall plant management to determine whether required resources will be available according to revised planning?

EACs must be the result of a fully-staffed and coordinated effort including top management involvement in order to ensure that needed resources (budget, manpower, special skills, etc.) are available. If resources are not available, replanning or work-around plans can be developed to accomplish the task within the limited resources or at a later time when the resources can be made available.

An EAC in excess of the budget is not an authorization to proceed in excess of budget until top management has reviewed and authorized its necessity.

e. Are estimates of cost at completion generated by knowledgeable personnel for the following levels:

(1) Cost accounts?

(2) Major functional areas of contract effort?

(3) Major subcontracts?

(4) WBS elements contractually specified for reporting status to the government (lowest level only)?

(5) Total Contract (all authorized work)?

The Cost Account Manager (CAM) should be the one responsible for developing the Cost Account's EAC. The CAM may have people working for him that develop the detailed estimates of the work packages and planning packages, but like the CAMs, these people must have an intimate, "hands-on" knowledge of what is to be performed. Sometimes a financial analyst or planner is responsible for calculating EACs. This is acceptable if the EAC has been thoroughly reviewed and approved by the CAM.

Major functional areas of the contract are defined as subsets of the contractor's organization (including outside subcontractors who are to perform on the contract). For Engineering, for example, major functional areas might be Civil/Structural, Mechanical, Electrical, etc., with a manager for each of these functions who normally has one or more CAMs reporting to him. The exceptions are in a strict project organization with everyone reporting to the Project Manager. When variance analysis is required at the functional level, procedures should require that a written analysis of the EAC be performed. Again, as with the cost account, an individual who is both responsible and knowledgeable of the work to be performed should develop the EAC.

A management team comprised of cost, technical, and contract administration skills is usually developed to manage critical/major subcontractors. The EAC for these subcontractors could be the responsibility of any of these people but it should be fully staffed and coordinated with all cognizant parties within the contractor's organization. Often major subcontracts have C/SCSC (and appropriate reporting requirements) levied on them which require them to submit EACs generated at the appropriate levels of the CWBS and OBS.

Each level of the CWBS for which the Government requires performance measurement reporting, also, is required to have an EAC calculated for it. This EAC is usually the mechanical summation of the cost account's EAC at the respective lower levels of the CWBS. At the total contract level, the EAC must be the number that the contractor's program manager and top management personnel agree best indicates the most probable cost outcome. In that the sum of CWBS (and OBS) EACs make up the total contract EAC, the EAC exercise becomes an iterative process with the CAM, Functional Managers, and the Program Manager to arrive at an agreed EAC. This iterative process is especially necessary for "grass-roots" EACs.

f. Are the latest revised estimates of costs at completion compared with the established budgets at appropriate levels and causes of variances identified?

A comparison of EAC to BAC results in a Variance at Completion (VAC). The causes for VACs must be formally documented at the reporting levels of the contract. The analysis should include what underlying elements of work caused the deviation from the BAC, and what corrective actions, if any, are being implemented to minimize the cost overruns.

g. Are estimates of cost at completion generated in a rational, consistent manner? Are procedures established for appropriate aspects of generating estimates of cost at completion?

In order to have confidence in the EAC, there should be well defined procedures that specify the EAC process. Detailed, written EAC guidance should address such EAC issues as:

(i) At what level of the CWBS and OBS an EAC is to be developed?

(ii) Who is to perform, review, and approve each EAC?

(iii) What the ground rules and assumptions are for each EAC cycle? (e.g., an EAC will be generated for all work scheduled to start in the next six months; ten percent inflation is to be used for next year's EAC; etc.)

The internal and external audits of the EAC process determine whether or not the EACs are generated in a consistent manner as described in the written procedure. The EAC process must be well-understood by all parties responsible for their generation. This is the verification test of whether the written procedures are good: if they are well understood and applied consistently.

h. Are estimates of costs at completion utilized in determining contract funding requirements and reporting them to the Government?

The EAC should be compared to the time-phased funding requirements submitted to the Government via the Contract Funds Status Report (CFSR). The totals for the EAC and the funds requirements must reconcile. This appears to state the obvious, but the determination of funding requirements is often performed as a separate exercise from the EAC and by different people within the contractor's organization.

i. Are the contractor's estimates of costs at completion reconcilable with cost data reported to the Government?

A contractor normally develops an EAC for their own internal management purposes and this EAC must be the same as is reported in the C/S reports going to the Government. During review / validation / surveillance of the contractor's performance measurement systems a check on the internal documentation of the EAC must be reconcilable to the latest EAC submitted to the Government.

V. REVISIONS AND ACCESS TO DATA

1. INCORPORATE CONTRACTUAL CHANGES IN A TIMELY MANNER, RECORDING THE EFFECTS OF SUCH CHANGE IN BUDGETS AND SCHEDULES. IN THE DIRECTED EFFORT BEFORE NEGOTIATION OF A CHANGE, BASE SUCH REVISIONS ON THE AMOUNT ESTIMATED AND BUDGETED TO THE FUNCTIONAL ORGANIZATIONS.

INTENT: This criterion mandates two major standards within the contractor's management/control system. First, the contractor must incorporate scope of work, budget, and schedule changes initiated by the government within a timely period of time. This incorporation is intended to extend down to the cost account level of planning. Adherence to this standard helps ensure that budget and work remain co-assigned even when initiated by a contract change. In addition, it minimizes the length of time in which budget may remain classified as Undistributed Budget. It also ensures that the addition of budget and work by a contract change be time-phased as soon as practicable. It is imperative when a contract change is received that the contractor adhere to all the same requirements of planning, budgeting, and scheduling as he did when the original contract was planned, budgeted, and scheduled. This criterion seeks to establish this same requirement of thoroughness for contract changes as the Organization and Planning and Budgeting criteria did for the original contracted effort.

The second standard mandated by this criterion is that when an unpriced change order (here defined by the criterion as "directed effort before negotiation") is issued to the contractor by the government, the contractor should develop his "best estimate" of the cost of that change. This estimated budgetary account should be used in lieu of the budget that is normally associated with a negotiated and definitized change for planning and budgeting purposes. The intent here is to ensure that even in the case of unpriced change orders that a budgetary amount be assigned to each increment of work planned. No work should be held up because of the unnegotiated status of an "unpriced" change order, nor should such authorized but unnegotiated work be distributed for accomplishment without a budgetary target for performance measurement purposes.

CHECKLIST QUESTIONS:

a. Are authorized changes being incorporated in a timely manner?

Three issues are covered by this question. The contractor's system description must address each one of them. First is the issue of what constitutes an authorized change. An authorized change may be the result of either of the following: (1) a contractual change, initiated by the government (including both "proceed" and "unpriced" changes, engineering change proposals, supplemental agreements, and no-cost change directions); (2) formal reprogramming, requiring mutual agreement of both contracting parties and internal replanning by the contractor within the scope of specific budgetary parameters specified by the government.

The second issues deals with the concepts of "incorporation" of these types of authorized changes. Such changes shall be deemed "incorporated" when the planning (and its associated paperwork) is accomplished down to the cost account level. This includes the incorporation of all such changes into the "Performance Measurement Baseline" (or, in the case of reprogramming, the "Over Target Baseline," OTB). This also requires that the necessary changes be made to work authorizations, budget assignments, schedule parameters, and applicable technical (scope of work) documents.

The last issue is what constitutes a "timely" manner of incorporation? It is imperative that the length of time permissible for the full incorporation of all authorized changes be specifically stated in the contractor's system description. System reviewers must ensure that this "timely" incorporation is followed. As a rule-of-thumb, 30 to 60 days tend to be adequate for most contractual efforts. However, one must recognize the relative difficulty involved in change incorporation between R&D programs and Production Programs. While 30 days may be sufficient in a production environment, it may be too stringent in an R&D environment. In either case, the length of time allotted for change incorporation must be identified.

It is also prudent to realize that the Joint Implementation Guide acknowledges a special dispensation in the case of unpriced change orders with respect to the enforcement of "timely" incorporation. In this situation, "the contractor may maintain budgets in an Undistributed Budget account until negotiations have been concluded, allocating budget only to that work which will start in the interim." However, if the contractor intends to invoke this license, his system description must include adequate procedures for doing so.

b. Are all affected work authorizations, budgeting, and scheduling documents amended to properly reflect the effects of authorized changes? (Provide examples.)

All documentation impacted by any authorized change must be updated to reflect the proper and complete incorporation of that change. The contractor must maintain a formal, disciplined control system that facilitates traceability to the Contract Budget Baseline. This same system must also ensure that no work is performed without proper budgetary, schedule, and work authorization. To ensure that the authorized changes are fully staffed, formal communications documents such as internal change notices, revisions to cost account plans, updated drawings, etc., must be utilized as a "review and approval" process to ensure that everyone with a need-to-know has evaluated the impact and made the proper updates to incorporate the change.

c. Are internal budgets for authorized, but not priced changes based on the contractor's resource plan for accomplishing the work?

All cost accounts must contain a budget, schedule, and scope of work and should realistically represent the manner in which work is assigned and budgeted to the organizational units. Further, the cost account budgets should include all direct costs for the total of their assigned work with separate identification of cost elements (labor, material, other direct costs). When it is clearly impractical to plan authorized work in cost accounts, budgets should be identified to effort at higher CWBS levels for further subdivision at the earliest opportunity. For authorized unpriced work, it is acceptable for the contractor to plan and budget near-term effort in cost accounts while the remaining effort and budget should be planned at a higher level. Such situations necessitate that a budget be formulated for distribution purposes in spite of the fact that this budget amount has not been formally negotiated between the contractor and the government. In situations where work is authorized before negotiations, appropriate change order planning will be accomplished and budgets will be established based on the contractor's cost estimate for the change. If necessary, the contractor may allocate estimated budget for the immediate, near-term work requirement while maintaining the remainder of the budget-estimate in an Undistributed Budget Account (even if doing so would violate the normal length of time UB may exist for a negotiated change). The contractor should not be required to use existing Management Reserve to provide funds for authorized, but unpriced, change orders. (The contractor may, if the documented management system permits, use Management Reserve to provide temporary budgets for such "unpriced" effort, but it must remain clear to both parties that the MR budget was derived from the funding previously negotiated for the contractual

effort authorized prior to the change in process). After negotiation, the remaining effort will be planned and budgeted within cost accounts as soon as practicable to ensure disciplined baseline planning. The intention of this criterion is to ensure that the internal budgets are realistic and relate directly to how the contractor plans to accomplish the tasks. This requirement tends to frustrate many contractors who do not like to authorize any budgets internally until they have been "priced out". However, such rationale would not provide performance visibility of an unpriced change until after negotiation of that change occurs. In many cases this could be a significant length of time.

d. If current budgets for authorized changes do not sum to the negotiated cost for the changes, does the contractor compensate for the differences by revising the undistributed budgets, management reserves, budgets established for work not yet started, or by a combination of these?

When an unpriced change order is finally negotiated the contractor must reconcile the negotiated amount of that change with the amount that is currently authorized (as previously estimated budget). Adjustments must be made to liquidate any difference between these two amounts. Such reconciliation is most easily done through the use of Undistributed Budget. As authorized, unpriced work is received, UB is credited by the amount estimated to perform that work. Only that effort to be performed in the near term is budgeted from the UB account to the cost account. When the change is negotiated the differential adjustment can be made to the amount of budget remaining in UB.

The other two alternatives for making these differential adjustments are to use Management Reserve, if it is still available, or to make the change directly to the cost account budgets of work packages which have not yet begun.

2. RECONCILE ORIGINAL BUDGETS FOR THOSE ELEMENTS OF THE WBS IDENTIFIED AS PRICE LINE ITEMS IN THE CONTRACT, AND FOR THOSE ELEMENTS AT THE LOWEST LEVEL OF THE DOD PROJECT SUMMARY WBS, WITH CURRENT PERFORMANCE MEASUREMENT BUDGETS IN TERMS OF CHANGES TO THE AUTHORIZED WORK AND INTERNAL REPLANNING IN THE DETAIL NEEDED BY MANAGEMENT FOR EFFECTIVE CONTROL. (Reference formats 8 and 9.)

INTENT: The contractor's system must allow for complete traceability of all budget changes for those items that are reported to the government. This is normally accomplished by the contractor's establishment of budget control logs that record the receipt and distribution of all budget transactions with reference to the source and application of funds. Each budget and work authorization should reference a transaction number recorded in these budget control logs. Normally, subsidiary records are also maintained for each contract change to help ensure timely and complete distribution of the budget associated with each contract change. Separate records should also be kept for control of Management Reserves and Undistributed Budget.

CHECKLIST QUESTION:

a. Are current budgets resulting from changes to the authorized work and/or internal replanning reconcilable to original budgets for specified reporting items?

3. PROHIBIT RETROACTIVE CHANGES TO RECORDS PERTAINING TO WORK PERFORMED THAT WILL CHANGE PREVIOUSLY REPORTED AMOUNTS FOR DIRECT COSTS, INDIRECT COSTS, OR BUDGETS, EXCEPT FOR CORRECTION OF ERRORS AND ROUTINE ACCOUNTING ADJUSTMENTS.

INTENT: This criterion is fairly self explanatory. The contractor may not permit records of any type of performance measurement data to be changed retroactively. Performance data are essential in reflecting contractor progress in: (1) achieving the budgetary target; (2) staying within schedule parameters; and (3) completing the scope of work to the technical specifications required in the contract. Monthly data reflect such progress; cumulative plotting of such data can be translated into performance trends. Together, this monthly and cumulative data combine to provide a history of contract progress. Any retroactive change to this data will have drastic effects on the progress reports and possibly on the program. A retroactive change to monthly data will not only recall work that was previously thought to have been accomplished but will also impact the cumulative trend that was previously reflected. If ACWP and/or BCWP data are retroactively changed, the progress, payments that were previously paid to the contractor could also have been in error. Historically, the data would become unrepresentative of the actual progress.

CHECKLIST QUESTIONS:

a. Are retroactive changes to direct costs and indirect costs prohibited except for the correction of errors and routine accounting adjustments?

Actual costs must be controlled through the contractor's general books of account and must not be altered unless for routine accounting adjustments or for the correction of errors. Adjustments made to indirect costs to account for the difference in the actual versus the applied overhead rates is an example of a normal accounting adjustment. Likewise in this same category is the adjustment of actual costs impacted by Economic Price Adjustment Clauses (forward pricing rates for labor as an example) where the estimated rate differed from the actual rate. Included as acceptable corrections of errors are the corrections of incorrect time cards, transposition of numbers, accidentally omitted transactions, etc. All adjustments made to previously recorded costs must be well documented, including a written justification of necessity.

b. Are direct or indirect cost adjustments being accomplished according to accounting procedures acceptable to DCAA?

Major contractors that do business with the Department of Defense have government auditors (normally from the Defense Contract Audit Agency) that monitor their accounting practices on a routine basis. For the most part these auditors render opinions on whether the contractor's accounting procedures, practices, and management of indirect costs are in accordance with generally accepted accounting procedures and performed in a manner consistent with their Disclosure Statement. The handling of accounting adjustments must be described in the contractor's accounting policies and procedures. The auditor evaluates these policies. Once they are accepted as sound, the auditors monitors the system to ensure these procedures continue to be followed.

c. Are retroactive changes to BCWS and BCWP prohibited except for correction of errors or for normal accounting adjustments?

Once the BCWS and BCWP have been reported only error-caused or normal accounting adjustments may be made to them. This practice helps to ensure that a reasonably firm Performance Measurement Baseline is maintained. In this way there is continuous and consistently credible visibility into past performance. Contractors have a tendency to want to eliminate the favorable cost variances from past performance in order to allocate the remaining (unused) budget to future effort. This tendency is usually based on the contractor not making

the distinction between financial funding and C/SCSC budgeting standards. The intention of a C/SCSC budget baseline is to maintain visibility of past performance for the purpose of making projections of future performance.

If the BCWP is allowed to change for other than the correction of errors and/or accounting adjustments, then the integrity of the BCWP values become suspect. BCWP is the corner-stone of a performance measurement system and it should be based on the accomplishment of discrete tasks that are representative of true progress. The objective is to minimize any subjectivity in the BCWP calculation. Having ensured this BCWP credibility, it would be extremely counter-productive to allow a retroactive adjustment to the BCWP value.

One type of allowable routine accounting adjustment to BCWS is that required when an unpriced change order is negotiated and a differential exists between the distributed estimated budget of that change and its negotiated budget. Note that BCWP values should not be impacted by this type adjustment, however.

4. PREVENT REVISIONS TO THE CONTRACT BUDGET BASE EXCEPT FOR GOVERNMENT DIRECTED CHANGES TO THE CONTRACTUAL EFFORT.

INTENT: The Contract Budget Base (CBB) represents two things on a contract: (1) the total amount of work authorized on the contract; and (2) the total amount of budget targeted to accomplish this work. The contractor may not arbitrarily change the amount of work authorized on the contract and the contractor may not arbitrarily alter the amount of budget targeted to accomplish this amount of work. Only the government shall have the authority to change the CBB. This shall only be done by specific government direction through contract change notification.

CHECKLIST QUESTIONS:

a. Are procedures established to prevent changes to the contract budget base (see definition) other than those by authorized contractual action?

The CBB is the negotiated contract cost plus the estimated cost of authorized unpriced work. The CBB increases or decreases only as a result of changes authorized by the contracting officer. For definitized changes, the CBB increases/decreases by the amount negotiated for those changes. For authorized work which has not been negotiated, the CBB increases / decreases by the amount of cost estimated by the contractor for that effort. After negotiations, the CBB is adjusted to reflect any change resulting from the negotiations. The CBB, therefore, is a dynamic amount, changing as the authorized work under the contract changes; but it is a controlled amount, since it cannot be changed by the contractor except as a result of contracting officer actions. (Should the contractor wish to formally plan and report to a budgetary figure other than the CBB, he must have prior approval from the Government. The contractor must have contract budget change procedures, then, that require operation to the CBB (unless otherwise specifically approved by the government), because it represents what the government officially recognizes as the authorized scope of work.

b. Is authorization of budgets in excess of the contract budget base controlled formally and done with the full knowledge and recognition of the procuring activity? Are the procedures adequate?

Before the contractor can authorize budgets in excess of the CBB, he must first receive Government approval. The CBB is the amount of budget officially recognized and authorized by

the Government. A budget that is in excess of the CBB is called an Over-Target Baseline (OTB) which requires detailed planning known as "formal reprogramming." Formal reprogramming is required when the current contract planning is substantially unrealistic with respect to the work remaining to be accomplished. Reprogramming is a long and arduous task which the government does not wish to encourage. Another reason for discouraging formal reprogramming is the loss of performance visibility to the original Performance Measurement Baseline (PMB) that it causes. Baseline maintenance is paramount for performance tracking and trend analysis. The contractor must document intent to adhere to this philosophy in his system description and in-house policies and procedures. The procedures whereby the contractor may request reprogramming must be specific on how the OTB will be constructed, maintained, and used. These procedures must address the necessity for credible performance measurement after reprogramming. Also, they must require the full notification and approval of the government procuring activity.

5. DOCUMENT INTERNALLY, CHANGES TO THE PERFORMANCE MEASUREMENT BASELINE AND, ON A TIMELY BASIS, NOTIFY THE PROCURING ACTIVITY THROUGH PRESCRIBED PROCEDURES.

INTENT: Since the PMB is the yardstick by which contractor progress is measured, any change to the PMB must be formally documented. Further, it is paramount that any alterations of the PMB be reported to the government. This ensures that both the government and the contractor are measuring progress by the same "yardstick". The Joint Implementation Guide provides some specific guidelines by which the contractor may internally replan and thereby effect the PMB. The contractor may not: (1) make retroactive changes to budgets, work performance, or costs of completed work; (2) transfer work of budgets independently of one another; (3) replan in-process work packages; (4) replan closed packages. The contractor may: (1) use Management Reserve to change cost account budgets of unopened work packages; (2) replan unopened work packages within the confines of cost account budgets; (3) transfer work and associated budgets between costs accounts.

CHECKLIST QUESTIONS:

a. Are changes to the performance measurement baseline made as a result of contractual redirection, formal reprogramming, internal replanning, application of undistributed budget, or the use of management reserve, properly documented and reflected in the Cost Performance Report?

The PMB is the summation of the time-phased budgets (BCWS) from the cost account level. Any change to the PMB must be formally documented in the contractor's budgeting and work authorization systems by reference to the source and application of each change. At the cost account level, the contractor must be able to maintain traceability to the original budget. Changes to cost accounts must reference the authorizing change number and/or document. In addition, the Cost Performance Reports going to the government must detail all changes to the PMB and the effects of these changes. Specifically, the baseline report (Format 3) must reflect any monthly/periodic BCWS changes of the PMB that have occurred since the last report. The narrative report (Format 5) must explain in detail how and why these changes were made. Formats 1,2, and 4 will reflect the impact of these changes on the budgets of the appropriate WBS and OBS elements and on the manpower forecast (as applicable).

b. Do procedures specify under what circumstances replanning of open work packages may occur, and the methods to be followed? Are these procedures adhered to?

Changes to open (in-process) work packages in order to compensate for poor initial planning or significant underruns is often a temptation to contractors. In neither case shall this be allowed. Changes to open work packages must be limited to government directed changes or formal reprogramming. In other words, the contractor shall never be afforded the option of changing the budgets (or any other type of replanning) of open work packages without prior government approval. Even in an extreme situation, where the future work no longer resembles the original plan and the contractor wishes to stop the current work and issue new plans, the government's prior approval must be received before action may be taken on the in-process work packages. In the case of mature production programs, however, where work packages may be of one or more years duration, the contractor may wish to have the option of replanning the further-term effort within the confines of the open work package. System reviewers may consider this situation for approval on an exception basis providing the contractor's procedures for such are of sufficient detail to prevent the cost account manager from arbitrarily using far-term budget in the near-term work-effort.

c. Are retroactive changes to budgets for completed work specifically prohibited in an established procedure, and is this procedure adhered to?

Favorable cost variances for completed work cannot be eliminated with the "unspent budget" returned to Management Reserve or placed in work packages with unfavorable variances or some other account. Completed work packages with unfavorable variances may not have additional budget added to them. Once work is completed, the budgets cannot be changed. To do so undermines the very intent of performance measurement and destroys the credibility of any performance tracking or trend analysis that should follow. Specific attention should be given by System Reviewers to ensure that not only such "prohibition" procedures exist but that Cost Account Managers are aware of them, and comply with them.

d. Are procedures in existence that control replanning of unopened work packages, and are these procedures adhered to?

It may be necessary to perform replanning actions on future, unopened work packages within the scope of authorized contract for various reasons. Among these reasons are: (1) to compensate for cost, schedule, or technical problems which have caused the original plan to become unrealistic; (2) to effect the reorganization of work or people to increase efficiency of operations; (3) to augment different engineering or manufacturing approaches than originally contemplated. Due to the importance of maintaining a valid PMB, such changes should be accomplished in a systematic and timely manner and must be carefully controlled. Many such changes can be handled within the budget and schedule constraints of the cost accounts. Other changes may require the application of Management Reserves to cost accounts to cover additional costs anticipated as a result of these changes. With regard to these situations, the contractor's written internal procedures should clearly delineate acceptable/unacceptable budget practices to include the following: (a) work responsibility should not be transferred from one cognizant organization to another, or from one cost account to another, without transferring its associated budget; (b) a budget assigned to future specific tasks should not be used to perform another task, regardless of the CWBS level involved; (c) when management reserves are used, records should clearly indicate when and where they are applied.

Replanning of unopened work packages is permissible, then, within the remaining budget and schedule constraints of the parent cost account and if the unopened work package is not scheduled to start within the period of time identified by the contractor as a "freeze period". Replanning of unopened work packages is encouraged to keep the planning realistic to the way the work is to be performed. The "freeze period" which most contractors choose to enforce,

forces cost account and intermediate-level managers to look ahead at future work a little more diligently to determine if the planned start dates and the budgets are realistic.

6. PROVIDE THE CONTRACTING OFFICER AND DULY AUTHORIZED REPRESENTATIVES ACCESS TO ALL OF THE FOREGOING INFORMATION AND SUPPORTING DOCUMENTS.

INTENT: The government contractually requires access to all pertinent Management Control System records in the implementation/demonstration reviews and surveillance of a contractor's performance measurement system. If the contractor does not comply with a review team or surveillance representative's reasonable request to pertinent data, the contractor is in violation of his contract with the Government. Access to data is necessary in order to assess a contractor's compliance to the C/SCSC. However, it must be noted that this criterion is to ensure data access, not necessarily physical transfer of internal records. Especially where data are claimed by the contractor to be of a "proprietary" nature, the contractor is not required to provide copies of such data to the government representatives. He must merely provide access to such data for government review/audit purposes.

CHECKLIST QUESTION:

a. Does the contractor provide access to all pertinent records to the C/SCSC Review Team and surveillance personnel?

This criterion can be exceptionally important and is usually one that is covered insufficiently in the System Description. There are two basic concepts involved. The first concerns information; the second deals with personnel authorized to obtain that information. Both concepts must be incorporated in the System Description, which normally paraphrases the criterion.