

## **PART I: Work Planning**

### **Organization:**

All work under the contract shall be organized by a Work Breakdown Structure [WBS]. The Owner will provide the top levels of the WBS. The Contractor shall complete the WBS down to the Work-Package level and shall include the complete WBS in their Work Plan submittal.

### **Schedule Activity Identification, Scope, and Sequencing:**

Work Activities shall be unique and assigned to only one Work-Package. The Contractor shall identify all Schedule Activities, the scope of work of each Schedule Activity, and the required logical sequence of those Schedule Activities.

### **Logic Diagramming:**

Either Arrow or Limited Precedence Diagramming may be used. Only Finish-Start relationships shall be used. No 'lag' or 'lead' durations shall be used. The Contractor's 'preferential' work area sequencing restraints shall be specifically identified and a written justification of not less than 25 words submitted for each. Each Work Package [sub-net] drawing will be numbered in accordance with the WBS work-package number and shall have a revision block in which all revision dates, explanations, and reference identifiers will be recorded.

Work-Package logic diagrams [sub-nets] shall be drawn with an Auto-Cad type drafting program and a reproducible copy of the diagrams and the database of drawings from the drafting program shall be submitted to the Owner and/or their authorized representative[s].

Composite Activities: where a sequence of activities should or must be scheduled as a continuous effort, they will be combined into one or 2 activity[ies].

E.g.; Concrete Placement Preparation  
   [rebar, form setting & oiling, blockouts & embeds, inspection]  
 and Concrete Placement  
   [placement, curing, stripping, and cleanup].

### **On-site Material and Equipment Deliveries: Owner and Contractor Furnished**

All equipment to be installed and special materials or components shall have an 'on-site' activity of not less than the minimum activity duration inserted into the logical sequence just prior to the 'install' activity, so that required on-site dates will be coordinated with the preceding construction activity.

### **Initial Submittal:**

Complete WBS chart (lower WBS level branches/legs may be shown on separate sheets)  
 Work-Package logic diagrams with Schedule Activity scope and location designation/identifiers  
 Project Plan assumptions document  
 Major sequencing strategy of work flow (i.e. areas, floors, etc.) discussion [aka 'soft-logic']  
 Identification of intended sub-contractors and their qualifications  
   (name, work sub-contracted, qualifications, reference)

All items shall be dated and signed by the Contractor's Project Manager .

## PART II: Schedule Development

### **Completion End-Date:**

Completion of the contract work shall be planned and scheduled to be within 80% or less of the contractually allowable time. The Contractor has the right to finish early and this reserve time belongs solely to the Contractor for their use for 'unanticipated and uncertain events'.

### **Date Constraints:**

All intermediate milestones / completion dates specified in the contract shall be shown in proper logical sequence and be designated as either 'Finish-not-Later-than [NLT]' or 'Start-no-Earlier-than [NET]'.

In addition to the contractual milestones, the number of Contractor's Constraint Dates used shall not be more than 5% of the number of Schedule Activities. Each Constraint Date not specified in the contract shall be explained by a written statement of not less than 50 words.

### **Earnings:**

'Earned Values' shall be assigned to each Schedule Activity and shall be the only basis for progress payments. The total of all 'Earned Values' and the Contractor's Management Reserve shall equal the total contract value. An Earned Value baseline graph/chart shall be submitted which does not include the Contractor's Management Reserve funds in the plotted curve of cumulative periodic values but as a lump sum at the Planned Completion Date. Original activity Earned Values shall not be changed at any time after acceptance of the Contractor's Workplan and Schedule. Management Reserve will only be allocated when a complete replanning and reschedule development is authorized. (see Part III, Schedule Management)

### **Schedule Activity Durations:**

The maximum Schedule Activity duration for the Contractor's work shall not exceed one reporting period and the minimum Schedule Activity durations shall not be less than 25% of the reporting period. Schedule Activities should have an 80% probability of completion within their duration. Schedule Activity duration contingencies can be accommodated through their assigned calendar. Original activity durations shall not be changed at any time after acceptance of the Contractor's Workplan and Schedule.

### **Schedule Activity Resources:**

All resources needed to complete the contracted work shall be estimated for each Schedule Activity. The pacing or 'critical' resources shall be identified and scheduled from the Start-event on a forward allocation and from the End-event in a backward allocation with their maximum desired or expected availability. Histograms for all resources shall be submitted to the Owner or their authorized representative. Schedule Activity resources can be either unit rates or lump sum at the Contractor's discretion. Principal material histograms [i.e. concrete, excavation, steel framing] and man-days of labor effort shall be prepared and submitted for information.

## PART II: Schedule Development

### **Project Management Information System [PMIS]:**

The contractor shall use only a PMIS that is the equivalent or better than either Primavera Project Planner [P3] or Artemis-9000 for PC's.

### **Contractor's Shop Drawing Submittal Plan:**

The Contractor shall prepare a plan and schedule for their shop drawing submittals, equipment manufacturing, and material deliveries which includes material and equipment required 'on-site dates' for the Owner's or their authorized representatives approval in accordance with their construction plan and schedule. The Contractor shall include activities and time for resubmittal and approval of each submittal equal to not less than 50% of the original submittal preparation and approval duration.

### **Acceptance:**

The owner shall only approve the schedule for the Site Access, Permits, Inspections, Interfaces with other contracts, and the Schedule Activities and submittal approvals for which they are responsible. The Contractor's Workplan and Schedule shall be evaluated/audited for correctness and reasonableness of construction sequences, durations, resources, and earnings.

### **Acceptance Submittal:**

Summary Barchart of major WBS components, contractual milestones, and major equipment manufacturing and deliveries.

Work-package barcharts.

Identification of pacing resources.

Resource histograms both forward [early start] and reverse [late finish] w/o leveling.

Resource cumulative curves, both early start and late finish analysis's.

Date constraints used and explanation/justifications.

Preferential logic restraints explanation/justifications.

Proposed Planned 'schedule'.

Resource Histograms after forward and reverse leveling for all limited resources.

Principal material mass curves [i.e. excavation, concrete, etc.] for the Planned Schedule.

Planned Submittals Register

Materials 'on-site' schedule

Owner and Contractor furnished equipment 'on-site' schedule

Narrative explaining of the basis of the Work Plan and Schedule formulation

Compact Disc of Planned Schedule database

All items shall be dated and signed by the Contractor's Project Manager .

## PART III: Schedule Management

### **Field Staff:**

The Contractor shall employ on-site a full-time qualified\* lead construction scheduler with not less than 5-years of field experience whose sole function on the site will be the monitoring and management of the baseline schedule and preparation of Time and Resource Impact Evaluations.

\*(Qualified in accordance with the Association for the Advancement of Cost Engineering International [AACEi] Planning and Scheduling Professional [PSP] certification).

### **Progress Reports:**

Progress performance and status reports shall be submitted by the Contractor to the Owner or their authorized representative monthly. Schedule Activity Actual Finish dates may be when the work is at least 90% complete **AND** the following work can begin. A copy of the Contractor's PMIS database shall be submitted electronically monthly on a compact computer disc. Only hard copies of the Summary Barchart and the Earned Value Management graph shall be submitted. The accepted-planned performance schedule shall not change as progress is recorded.

Estimated completion dates of Schedule Activities started but not complete as of the 'status' date shall be by their re-estimated remaining duration as of the status date and not by percent complete.

The Work-Plan and Schedule status shall be evaluated by the Contractor and reported with the periodic progress payment request. Progress payments for schedule activities in progress as of the status date shall not exceed 50% of their Earned Value. No progress payments will be made for out-of-sequence performance. A report listing all current out-of-sequence work shall be submitted monthly.

### **Time & Resource Impact Evaluations [TRIE]:**

Time & Resource Impact Evaluations must be prepared and submitted within 20 working days of the proposed or actual change or delay. Workplan and Schedule change impacts must be evaluated as well as the Resource impacts. Fifty percent (50%) of the Periodic Progress payments shall be retained until an acceptable TRIE is submitted and accepted for all of the outstanding changes or delay evaluations at the prior periodic status evaluation.

### **Re-planning / Re-Scheduling:**

If progress significantly deviates from the Plan and Schedule the Contractor shall re-schedule the remaining work as of the next regularly scheduled status evaluation. In such an event, if progress is significantly behind schedule without a reasonable potential for regaining the prior accepted schedule, progress payments shall be reduced to 50% until a valid revised Workplan, Schedule, and Performance Baseline are submitted & accepted.

### **Progress, Performance, & Payment Submittals:**

Progress data [i.e. quantities, man-days, etc.] & Actual Start and Actual Finish (90+%) dates.  
Estimated Remaining Durations to complete Scheduled Activities started but not complete  
Earned Value Management charts of the Planned Performance Baseline with performance to date  
45-day look-ahead Schedule versus the Planned Schedule

PMIS data disc

Narrative report which discusses:

- evaluation of progress
- existing problems
- potential near and long term problems
- plan to adjust performance if necessary due to existing and/or potential problems.

**PART III: Schedule Management**

**Progress, Performance, & Payment Submittals: [con't]**

Site pictures of all work in process at each status report.

Progress Payment request

All items shall be dated and signed by the Contractor's Project Manager.