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| **Project Scheduling Development and Control Procedure**  **(sample)** | | |
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# Introduction

The key to Project success is to apply knowledge, experience, and intuition to the Project Plan, and then execute according to the Plan. Scheduling is one of the basic and essential requirements of project management planning and strategic analysis. Its main objective is to establish the time required for the project. This supports the project in arranging funds on required dates, the mobilization of resources in a most cost efficient and cost saving manner, in establishing coordination within the project and with other projects, in the early detection of problems so that required actions can be implemented as necessary to achieve project strategic goals as planned.

This procedure covers schedule planning and control for the execution of **[ Name of your project]**

# Purpose

This procedure neither abrogates nor modifies the CONTRACT documents between the COMPANY and the CONTRACTOR but intends to supplement the CONTRACT documents by providing further guidance and instructions needed to implement the various elements/requirements of the CONTRACT documents.

In the event of any conflict between this procedure and the CONTRACT, the CONTRACT requirements shall prevail. The main purposes of this procedure are:

* To describe the methods and the tools for project schedule development and controlling
* To plan and schedule the activities related to **[ Name of your project].**
* To track the time and physical progress throughout the Project duration, and
* To report project control information to the Project Management and Company.

## 2.1. Target Audience

The target audiences for this guideline are Project Engineers, Project Team Leads, Project Support EPC and Project Planners within Project Teams Organization and contractors.

# Definitions

The following words and expressions shall have the meanings herein assigned to them:

* **Project**: Brief Description of the Project and your project's objectives.
* **Key Project Stakeholders:** Company, Contractor, MC,Consortium members and leader of consortium.
* **Effective Date:** means the date on which the CONTRACT comes into force.
* **Exhibits:** means the documents attached and referred to therein, all as attached to the AGREEMENT
* **Approval:** means COMPANY's prior written assent. APPROVAL shall in no way be construed as relieving CONTRACTOR of any of his obligations, responsibilities or liabilities under the CONTRACT or at law. APPROVE or APPROVED shall be construed accordingly.
* **Deliverable:** Any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project. This includes documents and drawings (in Engineering) procured material and equipment (in Procurement) and constructed elements (in Construction).
* **Work Package:** The lowest level of the work breakdown structure, work packages are further decomposed into activities**.**
* **Baseline Schedule:** A snapshot of a project plan. This "snapshot" provides a target against which project's cost, schedule, and performance can be tracked.
* **Activity ID:** A unique identification number (Code), which enables to uniquely identify and describe the activity.
  + **EPS:** Enterprise Project Structure.
  + **Node**: One EPS instance is referred to as a node.
  + **WBS**: Work Breakdown Structure.
  + **CBS:** Cost Breakdown Structure.
  + **OBS:** Organizational Breakdown Structure

# References

* + Project Progress Measurement System (PMS)
  + Project Control Procedure
  + Project Coordination Procedure
  + Project Reporting Procedure
  + Project Master Time Schedule
  + Project Organization Chart
  + Exhibit I: Scope Of Work (SOW)
  + Exhibit II: Schedule Of Prices
  + Exhibit III: Work Time Schedule

# Scope

This procedure describes the basic approach and methods to be employed in the management of planning and scheduling for the **[ Name of your project].**

All main Sub-contractors, Suppliers, Vendors and etc. concerned with planning and scheduling activities related to the **[ Name of your project]** shall implement this procedure.

This procedure defines the schedule control method for each phase of the PROJECT implementation including:

* + Detailed Design and Engineering (E)
  + Procurement (P)
  + Construction (C)
  + Pre-commissioning and Commissioning
  + Operation

# Responsibilities

The prime duties of the Project Schedule Control Manager of CONTRACTOR will, as appropriate, be:

* + Analyze project requirements and prepare a project schedule that integrates constraints and strategies for Engineering, Procurement and Construction.
  + Prepare logic diagrams in accordance with Work Breakdown Structure, which form the basis for detailed level schedule reporting and analysis.
  + Issue detailed activity schedules and expedite the return of schedule updating data.
  + Monitor progress against baseline schedule, analyze deviation and recommend remedial actions.
  + Prepare agenda items for schedule review meetings.
  + Prepare and maintain progress curves for Engineering, Procurement and Construction.
  + Issuing maintaining schedule control procedures.
  + Identifying project activities and integrating Engineering, Procurement and Construction activities into one comprehensive project execution plan.
  + Developing and issuing various types of project schedules.
  + Identifying the critical paths.
  + Resource Planning and optimal resource mobilization.
  + Analyzing schedule trends and identifying schedules problematic areas.
  + Monitoring the schedules, incorporating any change occurring during project execution.

# Procedure

## 6.1. General

The primary objective of the planning and schedule control function is to provide project management by timely and accurate information as needed for further planning, executing and decision-making.

The planning system shall be based on logic networking (precedence) using computerized critical path analysis method of which the lowest level rolls up into higher levels.

Agreed WBS shall be used for trouble-free identification of the individual activities within the detailed time schedule.

Any assumptions, constraints and external relationships required by the CONTRACT shall be considered in project time schedule.

Schedules shall be established in accordance with the hierarchy of schedules (attachment # 1), be prepared, checked, approved, and numbered, revised, distributed, maintained and up-dated in accordance with the schedule numbering.

Each activity must have a WBS code set up in accordance with Work Packages/ Work Units/ Sub-Work Units as described in Exhibit I Scope of Work (SOW) in AGREEMENT. Each activity must be coded so that a summary code covering several activities can be used for upper planning levels. Coding shall allow grouping as per the following:

* + Part (offshore, onshore…)
  + Responsible party
  + Work package (Engineering, Procurement, Supply, Pre-fabrication, Construction…)
  + Work unit and Sub-work unit
  + Area and Unit
  + Discipline
  + Interface

**6.2. Scheduling Infrastructures**

## 6.2.1. Project and Activity Codes

Project and activity codes of **[ Name of your project]** are defining base on difference controlling, reporting and filtering concerns and shall be applied into the detailed schedule by the CONTRACTOR.

The primary values of these codes are indicated within attachment # 2 of this Scheduling Development and Control Procedure.

**6.2.2. Schedule Calendars**

Following calendars for project shall be defined and introduced in scheduling tool;

* + 5 working days calendar: will be assigned to schedule activities planned to be performed in offices during Engineering and .
  + 7 working days calendar: will be assigned to the foreign and local manufacturing and supply activities (Procurement) and any construction activities. All the site activities shall be treated using 7 working days time calendars.
    1. **Cut-off Date (Schedule Updating)**

The scheduling cut-off date will be considered as follows:

* + Monthly cutoff date: is set to 15th of each Georgian month. In this case the data date shall be placed at the 16th day of the talked about date.
    1. **Schedule Hierarchy**

Schedule hierarchy guideline is prepared to facilitate introducing of schedule activities to keep Consistency and uniformity amongst project time schedules of [ Name of your project].

The primary schedule hierarchy for this project is presented within the attachment # 1 of this scheduling procedure.

* + 1. **Activity ID Structure**

To set up a primary key which correlate the data among the project different sources and software an activity ID structure has been proposed within the attachment # 2 of this procedure.

* 1. **Schedule Development Process**
     1. **Schedule Development Process Overview**

The Schedule Development process includes selecting a scheduling method, scheduling tool, incorporating project specific data within that scheduling tool to develop a project specific schedule model, and generating project schedule(s). This process results in a model for project execution which reacts predictably to progress and changes. Once developed, the schedule model is regularly updated to reflect progress and changes, in areas such as scope or logic.

During project planning, a process to develop a schedule model that meets the needs of the project and its stakeholders begins. Activities must be described uniquely. The resources required to complete each activity should be considered to determine the duration of each activity. Constraints must not be used in the schedule model to replace schedule logic. When the schedule model is complete, a baseline which is subject to the OWNER APPROVAL must be established to permit comparison of progress against the original plan.

* + 1. **Schedule Interface**

The Interfaces between different Stakeholders will be referred to as Interface Booklet. In this regard, all relationships of Task/Milestones shall be considered by those who are responsible for the successor of Task/Milestones in the project’s time schedule.

* + 1. **Scheduling Method**

Scheduling methods provide the framework within which schedule models are developed. One of the most common is the critical path method (CPM) which is considered as [ Name of your project] scheduling method. The Critical Path Method (CPM) is a schedule network analysis technique used to determine the minimum total project duration and the earliest possible finish date of the project as well as the amount of scheduling flexibility (the amount of float) in the schedule network. Early start and finish dates are calculated by means of a forward pass, using a specified Start date (CONTRACT effective date). Late start and finish dates are determined by means of a backward pass, Starting from a specified completion date (work time schedule).

* + 1. **Scheduling Tool**

Master schedule and detail schedules shall be established using Oracle Primavera P6 (Last version), which is the computerized planning system for project Stakeholders. All users of the computerized planning system shall comply with everyone concerned with planning and scheduling activities shall follow the detailed instructions issued by the planning team governing the use of this system. (Detail Instruction for Common Settings in Primavera is indicated in Attachment # 3.)

* + 1. **Scheduling Progressive Elaboration**

The schedule planning content of level 0, 1, 2 and 3 schedules shall be as follows (Refer to Contract):

* **Level 0 – Summary Schedule**

The summary schedule shall be in the form of a Gant chart, consisting of key milestones based on Contract and key milestones as per Attachment # 5. Issue of schedule to the COMPANY will be done one month after effective date.

* **Level 1 – Project Master Schedule**

Project Master Schedule will be a summarized high level bar chart indicating start and finish of each project phase (Engineering & Procurement Services, Construction and Commissioning) and major project's milestones and will be decomposed further in Detailed Schedule. This time schedule is framed to meet contractual target dates as stipulated in the contract. It will be issued in month 1st of project.

* **Level 2**

The level 2 Schedules shall be in the form of a Gantt chart, it shall:

* + Cover the whole duration of sub-work unit and sub-sub work unit based on Contract and PMS
  + Highlight critical path (critical path are those activities that total float is equal or less than 10 days)
  + Finish/start relationship will be maximized within the network to ensure meaningful float calculation in time analyses
  + Start/start and finish/finish relationship shall be omitted or keep to absolute minimum
  + Utilize early start and early finish dates to identify floats
  + Be marked-up monthly with Actual/Expected start and finish Dates and be issued as time schedule level 2 Progress Mark-up Schedules.

The level 2 Schedule shall be consistent with the tasks, Milestones dates contained in the level 1 Master Schedule.

* + **Level 3**

The level 3 Schedules can be in the form of a Gant chart, it shall:

* + Cover the whole duration of unit based on PMS
  + Cover list of dates such as issue of documents, issue of PO’s of material or planning of particular operation
  + Highlight critical path (critical path are those activities that total float is equal or less than 10 days)
  + Finish/start relationship will be maximized within the network to ensure meaningful float calculation in time analysis
  + Start/start and finish/finish relationship shall be omitted or keep to absolute minimum
  + Be marked-up monthly with Actual/Expected start and finish Dates and be issued as time schedule level 3 Progress Mark-up Schedules

This schedule will be prepared based on estimated man hour in Engineering phase, sequence of work item and forecast material / equipment deliveries in Procurement phase and work volume in Construction phase. It will be considered as project's Baseline and basis for project's time management after receiving Owner's Comments.

* 1. **Project Baseline**

Schedule Baseline is an “approved” version of the project schedule that we can compare to the current project to evaluate progress. We Create a baseline plan before updating a schedule for the first time. Schedule Baselines provide a target against which you can track a project's cost, schedule, and resource performance. At the beginning of project execution, the Project Schedule is the same as the Schedule Baseline. The Schedule Baseline is a part of the Project Management Plan. In order to establish baseline, it is necessary to estimate the relative work content of any aspect of the project. This is done in terms of the Work Breakdown Structure (WBS) and the defined work packages.

* 1. **S-curve**

There are 2 planned curves generated for the project; Early and Late Planned curves. Early curve is illustrating the earliest date of performing project's activities whilst late curve is showing the latest date when the activities shall be done to prevent any delay in the project's completion date.

Progress curves will be generated and issued to Owner together with project's detailed time schedule: Planned progress from the lowest level (Deliverables and non-deliverable activities) will be rolled up to the WBS higher levels and calculated for overall project. When actual curves lay between the late and early curves, it means the volume of work performed is good but it is not enough and the delay report shall be calculated in time schedule base for Critical items.

* 1. **Schedule Revision**

Project schedule and subsequent progress curves may be revised and re-base lined as per Contractor's request and Owner's approval. Typically request for time schedule revision is due to the following reasons:

* + Actual status is far below than planned late curve when time schedule is not worth controlling
  + Change orders discussed and approved by Owner which have time influence shall be incorporated into the time schedule

Contractor is responsible to re-plan the project and generate the revised curves within 1 month after Owner's confirmation.

* + **Early Production Activities**

All the activities pertaining to carry out the Project Early Production shall be precisely indicated within the detailed scheduling using the predefined activity code (EP). Further information among the activity codes are made clear within attachment # 2 of this scheduling development and control procedure.

* 1. **Updating & Scheduling**

The Updating & Scheduling Detail Instruction is indicated in Attachment # 4.

* 1. **Performance Monitoring and Reporting**

The main objective of measuring progress shall be able:

* + To evaluate the performance of the project through its life cycle, i.e. what has been realized compared to the man-hour and other items
  + To control the overall advancement of the project, i.e. the actual state of completeness compared to the planned one.

The performance measurement shall be appropriate to phase of the project: work packages (EPCC) refer to PMS.

The performance monitoring system shall be consistent with the network level it refers to the project performance monitoring system shall be consistent with the level 2. The work package performance monitoring systems shall be consistent with the level 3 detailed schedules.

**6.8.1. Management**

The monthly progress of management, project control and administration activities shall be based upon corresponded based on contract.

**6.8.2. Engineering**

The progress shall be calculated or estimated on document production. This can be monitored in different ways; however, most methods are based on the same basic principle of allocating progress values to predefined milestones (IFI, IFC, IFA, AFC), in the document development process.

Each document (technical specifications, calculation notes…), or group of documents (drawings, data sheets…) shall be weighed; these physical weights shall reflect the overall man-hours required to produce theses document (issues, reviews…). Predefined milestones shall follow the production life cycles of each nature of document.

The assessment of planned progresses between milestones shall be obtained by assuming linear progress-development between milestones.

At a cut-off date, the consolidation rule shall be the following:

**% complete = (∑ % complete \* weight) / (∑ weight)**

This actual percentage complete is then to the planned one.

* + 1. **Contractor Items (Procurement)**

The progress shall be calculated based on milestones, which is defined as Exhibit. Each contractor item shall be weighed; this physical weight factor shall be calculated according to supplier contract price. The assessment of planned progresses between milestones shall be obtained based on contract.

**% Complete = (Σ % complete \* Weight) / (Σ Weight)**

* + 1. **Fabrication (Construction)**

The progress shall be calculated based on PMS.

* + 1. **Commissioning and Start Up**

The progress shall be calculated based on PMS.

* + 1. **General Services**

The progress shall be calculated based on PMS.

# Project Progress Reporting

In order to measure and control the performance of different activities of the project, the work has been divided into different work packages. These work packages have been further broken down to work units and sub-work units according to tables of itemized breakdown of contract lump sum price and schedule of payment (Exhibit II).

Project progress report content and issuing will be considered as per reporting procedure.

# Work instructions and corrective actions to the disciplines

Along the project work progress, updating, reports and analysis will monitor delays and problems, Meetings will be held to advise the disciplines (Engineering, procurement and Construction) of the priorities for the work to be carried out. In the meetings will discuss, decide and agree upon the instructions and corrective actions. Each planning engineer at the discipline will be responsible for tracking, following and reporting for the status of decisions and targets that will be agreed in meetings. Reports will be integrated and reported to the project manager to ensure the confirmation plan and actual status of the Project work progress and agreements.

# Change Control in Scheduling

The owner will have the right to order changes. The contractor will be required to make changes in return for an equitable adjustment in the contract price and time. The overall change process must be managed efficiently during all stages: Planning and Design, Bid/ Award, and Construction.”

Schedule change control is an important element of the Project change control. Schedule change control is an important element of the Project change control program. When the schedule is accurately maintained and changes are documented, it is a vital element for successful project management.

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# Attachments

* 1. **Attachment # 1 - Schedule Hierarchy**
  2. **Attachment # 2 - Activity ID Numbering and Project/Activity Code Dictionary Definition**
  3. **Attachment # 3 – Detail Instruction for Primavera Settings**
  4. **Attachment # 4 - Detail Instruction for Updating & Scheduling**
  5. **Attachment # 5 – Key Milestones**