# SCHEDULE H
# GENERAL PROJECT REQUIREMENTS

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# 1. PROJECT ORGANIZATION

## 1.1 General

It is important that a close cooperation is established at the beginning of the project between the Employer, the Engineer (the Consultant) and the Contractor's project teams.

The proposed organization aims at providing clear areas of responsibility while enabling flexibility and dialogue between all the concerned specialists.

For the whole project duration, it is understood that the Engineer and the Employer will jointly work on the project as a common team sharing the same interest in the project, it is clear that the Engineer responsibility is to advise and assist the Employer in all technical or contractual matters.

Moreover, the Engineer and the Contractor shall take interactive actions to make the implementation activities – such as data and information collection, field activities, related facilities visits, etc. – as efficient as possible, thus avoiding unnecessary delays.

## 1.2 Document Circulation

All correspondence from the Contractor will be addressed to NEPCO, copies to the Engineer Site office and Engineer main office.

All correspondence from the Consultant will be addressed to the overall project manager of the Contractor, copies to NEPCO.

Documents shall be submitted generally following the procedure, and language as laid down under the Contract.

The correspondence must be in line as mentioned in the Particular Conditions of the Contract (PCC).

The documents shall be submitted by the Contractor in the number and form as given in the sub-clause “document distribution”.

The distribution of correspondence and potential attachments shall be clearly indicated on each correspondence.

## 1.3 Meetings

### 1.3.1 Coordination/progress meetings

After the start of the Contract, coordination and progress meetings between all involved parties (Employer, Engineer and Contractor Authorized Project Manager) will take place at site, in Amman or more generally in Jordan at the discretion of the Employer. If found advantageous, the meetings may also be held at other places. If not otherwise decided by the Employer, Progress meetings shall take place on a monthly basis.

The main aims of these meetings will be:

- review of progress of works
- coordination of various activities between the parties involved during the duration of the project
- review of project and design schedules
- other similar matters which Employer/Engineer deem necessary to be discussed for a timely and technically adequate implementation of the project.

All meetings will be called for by the Employer/Engineer. Should one of the parties deem a meeting to be necessary, he shall request the Employer/Engineer to call for it, following the procedure as laid down below.

The announcement shall be done in writing by the agreed correspondence procedure within time frame, as specified hereinafter for each type of meeting.

The invitation or the request to hold a meeting shall always be accompanied by an agenda. The agenda shall propose the items to be discussed/clarified during the meeting and shall indicate the place where the meeting should preferably be held.

At the end of each meeting day, a Minutes of Meeting (Notes of Conference/Meeting Report) will be prepared by the Engineer. At the end of each agenda item, the minutes shall be read out and mutually agreed upon by all parties participating in the meeting.

Minutes of Meetings shall be finalized and signed subsequent to the meeting. In exceptional cases, if accepted by the Employer, Minutes of meeting might be sent to all parties by e-mail. Remarks, if any, shall be sent to the Employer/Engineer within one week from the date of sending, if no remark is received after this date, minutes are deemed to be accepted.

### 1.3.2 Site Progress Meetings (SPM)

During all the project design and construction phase, it is of prime importance that the Employer and Engineer team continuously review the project implementation, detect any problem which might arise and closely monitor the Contractor's works. At the same time, the Contractor shall be informed by Employer/Engineer remarks and shall also report any difficulty encountered in the works execution. The project progress and the task coordination shall also be regularly reviewed between all involved parties.

Site Progress Meetings (usually held weekly) will be implemented to properly address these issues. The meetings will take place in Amman or at site at the discretion of the Employer.

Minutes of meetings will be prepared by the Employer/Engineer. According to the meeting agenda, the Employer, the Engineer and the Contractor shall assign the relevant specialists and decision makers bearing in mind that these meetings shall remain working meetings with technical issues (therefore it is advisable to limit the number of participants).

The main items discussed will be:

- reporting/follow up of last week's activities
- status of the project implementation, overall and per the main following categories:
  - design including review and approval
  - procurement including manufacturing, testing, shipment and local transport
  - construction works overall and per activities
  - planning for next week
  - QA/QC and HSE issues
  - administration, procedures & any technical matters.

In particular a quick review of each activity progress shall be conducted, with an emphasis on the difficulties, if any, and technical issues which need to be solved. Technical issues will be dealt with during these meetings. No approval will be given during these meetings, but documents approval status and technical pending points will be reviewed with a special emphasis on urgently needed decisions.

If not otherwise decided by the Employer, Site Project Engineers from Employer/Engineer and Site Project/Construction Manager and Engineers from Contractor and other responsible personnel of main Sub-Contractor concerned shall be present at that meeting.

### 1.3.3 Other meetings

The Employer/Engineer may call for a meeting at any time as per the project needs. According to the importance and the subject to be dealt with in these meetings, the Employer/Engineer will decide if the meeting minutes will be recorded or not. It shall be prepared during each meeting, agreed and signed as part of the meeting. Otherwise meetings shall be concluded with a list of actions. These actions shall be appended to the monthly progress report. Urgently needed decisions and actions shall be raised to the monthly meetings.

This procedure aims at ensuring flexibility in the works and shall take place whenever needed. It is, however, mandatory that minutes of any meeting with any contractual impact are recorded.

Should the Contractor desire to call the Employer/Engineer for a meeting, he shall inform the Employer/Engineer in writing **five working days prior to the meeting** except in case of emergency. The information shall include the agenda of the meeting and any supporting document. The Employer will approve the meeting based on an assessment on the meeting criticality advised by the Engineer.

During SAT, inspection and commissioning phases, the procedures recommended by the Engineer include:

- A kick-off meeting for each test session, with related specialists of each concerned parties, will check the tests pre-requisites, precise the tests environment, will recall the procedures to be used and the records to be performed.
- A conclusion meeting for each test session, to be minuted by the Engineer, which will give a status for the tests according to the tests procedures. The participants at the end of each meeting will sign the minutes of such meetings. Specific and simple formats of such records shall be prepared by the Contractor to be approved by the Employer/Engineer before the starting of the test session.

In case of testing sessions of long duration, weekly meetings aimed at providing a review of the test progress and problems will be called and recorded by the Engineer. Minutes will be submitted within a week's time to the participants for comments.

## 1.4 Reporting

### 1.4.1 General

The reporting activity is of utmost importance for a good project management. A regular and correct report is a basic tool for:

- estimating the project progress
- detecting and anticipating delays, if any
- evaluating the difficulties if any, and find appropriate remedies
- tracking important decisions and in particular any changes in the scope
- following up the payment schedules.

Contractor shall report to Employer/Engineer on the Progress of his work during the entire duration of the Contract. Reports shall contain facts only and shall not be construed as agreement.
Presentation of the reports shall be of the highest quality. Contractor shall submit within Execution Programme a draft Weekly & Monthly Progress Report formats for Employer/Engineer approval. Once approved by Employer/Engineer the format shall not be altered in any way, except in agreement with Employer/Engineer. Reports shall be issued observing the following timing:

- Weekly Progress Report
- Monthly Progress Report
- Breakdown Report
- Close Out Report

### 1.4.2 Weekly Progress Report

Contractor shall submit during the entire duration of the Contract, one day before weekly meeting by 15:00, by e-mail, a Weekly Progress Report that include (as minimum) the following:

a. Overall Contract Status (Narrative)
   - Planning & Scheduling-overview of performance
   - Engineering Design - brief description of works executed
   - Design related tasks
   - Procurement
   - Construction / Erection
   - Pre-Commissioning & Commissioning
   - Areas of Concern
   - Employer/Engineer constraints
   - Permits Approvals
   - Forecast for next week
   - Recovery plans and actions (when required)

b. Permits Approvals

c. Site Status (substations)

d. Procurement Status

e. Health, Safety and Environmental

f. List of Pending correspondence

g. FAT Schedule

h. DOC / DWG required for Const. / Inst. – submission forecast

i. Accomplishment Keyplan

j. Layout Status

### 1.4.3 Monthly Progress Report

Contractor shall submit during the entire duration of the Contract, within 5 working days from the monthly Cut Off date, a Monthly Progress Report under a cover of transmittal sheet. A Monthly Progress Report Cut Off date is set for 28th day of each month. Submission of Monthly Progress Report (complete report, hard copy + soft copy) is set for 5th working day of the month following the reporting period. Monthly Progress Report shall include (as minimum) the following:

1) Executive Summary

2) Project Status Report

2a) Accomplishment Key plan (for cable packages)

3) Areas of concerns

4) Major Activities in the Month

5) Program Status

   i) Contractor Updated Schedule – level 1

   ii) Contractor updated Schedule – level 2

   iii) Contractor Updated Schedule – level 3

   iv) Critical Path Analysis

   v) Delayed Activities layout

   vi) 45 days look ahead schedule

6) To Date Impact and Analysis Report

7) Status Curves

   i) Overall Project S-curve (cost)

   ii) Section of Work S-curves (cost)

   iii) Overall Project S-curve (Weightage factor)

   iv) Section of Work S-curves (Weightage factor)

8) Resource Histogram and S-curves

9) Invoicing and Cash Flow Report

10) Logs Report

i) Permits approval log

ii) Drawing Submittal Status log

iii) Documents Submission Status log

iv) Materials submittal and approval log

v) Procurement log

vi) FAT Schedule

vii) Variation status log

viii) RFI Logs

ix) Work Instructions Status log

x) Monthly Correspondence log

11) HSE Report

12) Progress Photographs

At the 28th day of each month, Contractor should provide the advanced Monthly Progress Report (sent through e-mail, PDF and source files) of the following Monthly Report chapters:

- Executive Summary (descriptive)
- Updated progress tables
- Updated s-curves
- Safety
- QA/QC
- Invoicing and Cash Flow tables and diagrams

NOTE: To date impact analysis report shall include list of all activities on the Critical Path (include Activity ID's and Activity Descriptions) where work is currently being delayed, and for each such activity provide detailed information including:

- The events that caused delay.
- The party(s) responsible for the delay event(s).
- The number of days the activity has been delayed (negative float).
- The activities in the construction schedule affected by the events.
- The reasonable steps needed to minimize the impact of the delay, and which party needs to take the action(s).

Contractor shall attach diagrammatic representation of the delay impact of each event on the overall project schedule.

### 1.4.4 Breakdown reports

From start of commissioning until the end of the guarantee period the Contractor is to prepare a special report as instructed by the Engineer/Employer for any failure of equipment or extraordinary case of disturbance indicating in detail the failure occurred, the reason for its occurrence and the operational consequences. The Contractor shall furthermore describe the special activities carried out and his preventive measures to allow an undisturbed future operation.

Additional investigations shall be carried out by the Contractor as instructed by the Employer/Engineer, if necessary, to define the reason for damage or reconcile contradictions.

This report shall be subject to the Engineer/Employer's approval.

### 1.4.5 Close out report (Final Report)

The Contractor shall prepare a Final Report on the Project, which shall be submitted to the Employer/Engineer not later than one month after the Taking Over Certificate for the entire installations has been issued. Format and content of the Close Out Report shall be communicated to the Contractor latest three months before taking over but shall, as a minimum, cover the following:

- project definition
- Contractor's scope of works
- original and final overall contract value with major reasons for deviation, if any
- original and final time/implementation schedule with major reasons for deviations
- problems occurred during project execution and detailed description of the performed actions, impact on costs and time, if any
- Contractor's organization charts
- commissioning report
- performance test calculations and results
- test certificates
- inspection certificates
- acceptance certificates
- all final Engineer calculations bound in separate volumes
- environmental and health and safety documents.

This report shall be updated after issuing of Performance Certificate.

## 2. PROJECT DOCUMENTS

### 2.1 General

All information, documentation, calculations, drawings, schedules etc. have to be submitted within such periods or at such dates which are required to guarantee a smooth handling of the project without any delays. The Contractor is responsible for submitting all documentation, in accordance with a program to be prepared by him, allowing all participants sufficient time to check, assess, comment and approve the documents. Time for approval of 28 days must be considered by the Contractor. The quality of the submitted documents must be in accordance with acceptable international practice to allow a speedy checking procedure. Documents not fulfilling these requirements will be returned to the Contractor without comments for improvement and resubmission.

Two types of documents are generally to be considered for the Project:

- correspondence, i.e. letters, faxes and e-mails
- contract related documents, i.e. technical requirements, drawings, procedures, design (manufacturing, preliminary, main, detailed, as-built), reports, minutes of meetings, instructions for operation and maintenance, testing program, testing protocols, certificates, technical data etc.).

It is of the utmost importance that all documents are exchanged between Contractor, Employer and the Engineer in an organized manner in strict accordance with the Project Manual and the Contract Documents.

All documentation in electronic format shall use standardized software compatible with Microsoft Office or in the software version as communicated by the Employer. All documents shall be handed over to the Employer/Engineer in electronic form (in the electronic format in which the document has been prepared and/or pdf, as requested by the Employer).

## 2.2 Tendering Stage

The drawings issued by the Employer/Engineer forming part of the Tender documents are intended to be descriptive and used in conjunction with the requirements of the specification and shall in no way limit the responsibility of the Contractor to supply all plant equipment, materials and services as a complete functional assembly.

Any omission from both drawings and the specification or express reference to any detail or work necessary and obviously intended shall not relieve the Contractor of his responsibility to include such detail or work in his supply. All information shown on a drawing but not stated in the specification shall be deemed to be included in the specification as well and vice versa.

The final sizes of equipment etc. shown on the drawings have not been fixed by the Employer/Engineer since these are dependent on the size and shape of the Tenderer's equipment and materials forming the works and the space required for installation, maintenance, lay down, storage, access etc. They are, however, to be considered as minimum requirements.

When measurements are affected by conditions already established, the Contractor shall take and be responsible for field measurements notwithstanding any information set forth on the drawings included in the Tender Document.

The drawings portray the basic layout of the scope of works and the Tenderer shall incorporate these requirements in his Tender drawings.

The Tenderer has to ensure that the information provided within the Tender Document is sufficient to state his final contract price.

The Tenderer has the liberty to comment on any document and drawing issued with the Tendering Document within the time specified in the Instructions to Tenderers (ITT). After the Tender has been submitted the Tenderer is deemed to have checked all these documents and drawings and they are without any restriction accepted by him. No claim resulting out of omissions or discrepancies in this respect will be accepted by the Employer and the Engineer.

## 2.3 Language of Documents

All meetings and discussions with the Employer/Engineer shall be in the language stated in the Particular Conditions of Contract, and the Contractor shall engage appropriate supervisors speaking this language.

The following additional requirements shall be considered:

### 2.3.1 Permits

All documents required by the Employer to obtain the necessary approvals and permits form the authorities shall be provided in national language as well.

### 2.3.2 Spare parts

Each item is labeled in English and in the national language of the Employer's country.

### 2.3.3 Labels

The Contractor shall supply all labels, nameplates, instruction and warning plates necessary for the identification and safe operation of the plant, and all inscriptions in the national language of the Employer' country.

### 2.3.4 Operating instructions

The operating instructions shall be prepared in English language and additionally in the language of the country.

## 2.4 Correspondence

For all project documents, relevant clauses of Tender documents are applicable.

For any correspondence, letters shall normally be used.
All correspondence shall bear the date of issuance, in the format dd/mm/yyyy. This format allows avoiding any misunderstanding.

Letters and documents shall be of such quality that allows easy photocopying and issued in A4 format.

For the purpose of classifications, correspondence of any type dealing with a mixture of various subjects is not allowed.

Separate documents shall be prepared for each major technical and commercial topic in order to expedite the distribution to the discipline Engineer.

All correspondence shall be prepared, codified and numbered in accordance with the following procedure (details will be given during kick-off meeting):

Project / Sender / Recipient / Consecutive number

All correspondence of the Contractor to the Employer shall be routed in parallel with copies to the Engineer local and head offices.

The addressee shall acknowledge receipt by signing and dating a prepared copy of the front page of each document, when received. Unnecessary delays shall be avoided if all counterparts reply within two weeks after receipt of any document requiring a response.

Through a monthly review of the correspondence logs, it shall be ensured that all correspondence was received and is followed-up properly.

All documents and correspondence shall be submitted in parallel by email (letter/fax to be signed and scanned), however, documents/correspondence submitted by email shall be considered only as valid document after submission of the original letter/document or by confirmation with a specific return message. The size of the email shall not exceed 10 MB. Additional information shall be avoided in the message. The correspondence/document shall in general be provided as pdf file, however, if requested by the Employer/Engineer, the correspondence/documents shall be provided in the format of the software as issued (Word, Excel, AutoCad, etc).

The hardcopies of the letters from the Employer/Engineer in Amman shall be picked-up by the Contractor. A project office has to be opened in Amman immediately after commencement date.

The Employer/Engineer may introduce other means of electronic document exchange, e.g. sharepoint or other software, which has to be used by the Contractor and, if applicable, his subcontractors. The Contractor is/are obliged to have sufficient number of licenses available.

## 2.5 Documents

The Contractor shall prepare all necessary documents (term document refers also to other documentation, calculations, designs, drawings etc.) giving full and complete information to enable the Employer/Engineer to properly consider the design of the work.

Documents originated by any Subcontractor shall fulfill all specified requirements and standards. Prior to the submittal of those documents, the Contractor has to verify with regard to measurements, size of members, material and details to make sure that they conform with the requirements and to the intent of the Technical Requirements, and the Contractor shall place thereon his approval stamp and date. Documents found to be inaccurate or otherwise in error shall be returned to the Subcontractor for correction, before submittal to the Employer/Engineer.

Documents shall be submitted to the Employer/Engineer in such a sequence that the information required by the Employer/Engineer for examination purposes corresponds with the progress of the works. The Contractor shall ensure that all documents for approval are forwarded to the Employer/Engineer in such a way as to allow sufficient time for examination by the Employer/Engineer. The Contractor shall also ensure that documents are submitted early enough to permit amendments to be made and re-submission for approval without delaying the program of deliveries or the guaranteed completion dates of the Works.

The Contractor shall submit for approval a master documents list, indicating:

- each kind of document per job site, and
- estimated submission date.

This schedule shall be updated whenever necessary until completion of the work, at least every quarter of a year.

All documents prepared or furnished by the Contractor shall be marked with the title of the work, certified by the Contractor and Subcontractor respectively, and shall be transmitted to the Employer/Engineer. Each transmittal of documents shall be accompanied by a Document Transmittal Sheet (DTS) giving the titles and numbers thereof.

At monthly intervals, or as agreed upon otherwise, (and if required with any document and design document sent for approval) the Contractor shall submit copies of his complete document lists, having incorporated the updated schedule as mentioned above, and the latest transmittal sheets. These lists shall clearly indicate the actual status and history of every document and design document, i.e. for information only, for approval, resubmitted for approval, approved or as-built, date of submission, and date of each reply from the Employer/Engineer.

Modified documents shall bear a revision field and a revision date. The nature of the modification shall be clearly stated, no matter if it was already approved, approved on condition, revised or not approved.

All documents shall bear the approved contract references and title block as agreed with the Employer/Engineer.

At least the following information shall be included in the title block:

- the Contractor's name
- the Subcontractor's name, where applicable
- the Employer's name
- the Project name
- the name of the Engineer, when so advised
- brief description of the contents of drawings
- drawing and revision number
- first date and revision dates
- scale and scale bar (where applicable)
- location for the Employer's drawing number.

All drawings shall be plotted in and shall show the scales of the metric system, and all descriptive wording shall be in English language.

All drawings and other documents submitted by the Contractor shall be of one of the following sizes that conform to the International standards specifications ISO 216:

| Size | Dimension in mm:<br>of trimmed drawing (finished sheet) |
|---|---|
| A 0 | 1,189 x 841 maximum |
| A 1 | 841 x 594 |
| A 2 | 594 x 420 |
| A 3 | 420 x 297 |
| A 4 | 297 x 210 |

All the above formats shall be folded to size A 4 with margin for binding.

The following scales shall be used:

| | |
|---|---|
| For reductions: | 1 : 2.5; 1 : 5; 1 : 10; 1 : 20; 1 : 50; 1 : 100;<br>1 : 200; 1 : 500; 1 : 1,000; 1 : 2,000; 1 : 2,500 |
| For enlargements: | 2 : 1; 5 : 1; 10 : 1 |

In addition to the sizes mentioned above, horizontally extended sizes are permissible, for example for circuit diagrams, wiring diagrams and route plans; these shall have the following dimensions:

Height: 297 mm
Length: a multiple of 210 mm

The quality of original drawings, master prints, blue-prints and of all other copies, irrespective of the method by which they have been produced, must be such that no damage whatsoever, such as partial or complete illegibility, can occur as a result of extreme climatic conditions.

For drawings a paper grade weighing no more than 80 $g/m^2$ shall be used throughout.

Logical and graphical symbols as well as abbreviations used in the drawings shall be identified in a legend. Abbreviations shall be described in their full text.

Documents approved shall not be changed except as provided in Tender documents.

The Contractor shall be responsible for any discrepancies, errors or omissions in the documents and other particulars supplied by him, whether such documents and particulars have been approved by the Employer/Engineer or not. Where such errors or omissions are discovered later, they shall be made good by the Contractor out of his expenses irrespective of any approval of the Employer/Engineer.

If during the contract period, the Contractor is required to increase the size of any foundations etc. from that shown on his Tender drawings to accommodate the finally approved arrangement of the works provided under the Contract (with due allowance for access, lay-down, maintenance etc.), then such increases shall be deemed to be included in the Scope of the Contract.

The Engineer and the Employer shall have the right at all reasonable times to inspect at the factory of the Contractor all documents of any portion of the Works. If requested the Contractor shall submit design calculations and shop drawings.

The Contractor shall, within the times named in the Tender Documents, provide drawings showing the manner in which the plant is to be assembled with all information relating, unless otherwise agreed, only to the works, required for preparing suitable foundations, for providing suitable access for the plant and any necessary equipment to the point on site where the plant is to be erected and for making all necessary connections to the plant (whether such connections are to be made by the Contractor under the Contract or not).

Any expenses resulting from an error or omission or from delay in delivery of the necessary documents and information shall be borne by the Contractor.

For the documents, which shall be submitted to the Authorities of the Jordann Government, the Employer shall seek approval from such Authorities based on information and documents prepared by the Contractor.

### 2.5.1 Document submission

The following documents and information shall be provided for the Engineer / Employer within the specified time indicated in days and / or weeks:

| Documentation after Letter of Acceptance or Contract signature | Preliminary | Final |
|---|---|---|
| | | |
| • Detailed Execution Programme (as instructed in Section 6 of this document) | 6 weeks | updated every month |
| • Completed technical schedules | - | before Contract clarifications |
| • List of all drawings intended to be subject for approval | 4 weeks | 8 weeks |
| • List of all standards to be used | 4 weeks | 8 weeks |
| • Drawing register | 4 weeks | updated every month |
| • HSE policy & HSE plan | | 4 weeks |

| Documentation after initializing of Contract Agreement | Preliminary | Final |
|---|---|---|
| | | |
| • Contract Documents | | 21 days |
| | | |

| Documentation after Commencement Day | Preliminary | Final |
|---|---|---|
| | | |
| • Monthly Progress Reports | | every month |
| • Two sets of all standards | | 4 weeks |
| • Detailed factory and site test program | 8 weeks | 1 month before each test |
| • Documentation for manufacturing | | 1 month before manufacturing |
| • HSE Reporting | | 1 month before start of civil works |
| • Quality Manual and Test Plan | | 4 weeks before each test |
| • Commissioning time schedule, commissioning instructions, incl. detailed description of each test and sample sheet | 8 weeks before start of erection or commissioning | 4 weeks before start of erection or commissioning |
| • Training schedule | 8 weeks | 12 weeks |
| • Operation and maintenance manuals, operating instructions | 8 weeks before start of commissioning | before Taking Over |
| • As built documents | | before Taking Over |

| Documentation after Commencement Day | Preliminary | Final |
|---|---|---|
| • Close out Report | 1 month after Taking Over | during issuing of Performance Certificate |
| | | |

### 2.5.2 Document distribution

In addition to the number, type and distribution of documents called for under various clauses of this Tendering Document, the following document distribution shall be followed by the Contractor (details including delivery address will be discussed during the kick-off meeting):

| | For the Employer | | For the Engineer | | Total |
|---|---|---|---|---|---|
| | H.O. | Site | Main O. | Site | |
| Contract Documents | 3 | - | 1 | 2 | 6 |
| Correspondence | 2 | 1 | 1 | 2 | 6 |
| Contract related documents | | | | | |
| • for approval (and re-submission) | 2 | - | 1 | 2 | 5 |
| • approved drawings | 2* | 2 | 1 | 2 | 7 |
| • as built documents | 2** | 2** | 1* | 1* | 6 |
| Progress reports | 4 | - | 1 | 2 | 7 |
| Breakdown reports | 3 | - | 1 | 2 | 6 |
| O & M Manuals and operating instructions | | | | | |
| • draft | 2 | 1 | 1 | 1 | 5 |
| • final | 2** | 2** | 1* | 1* | 6 |
| Close out report | 3 | 2 | 1 | 1 | 7 |

* including one soft copy on CD-ROM
** including two soft copies on CD-ROM
All correspondence, documents and reports shall be submitted additionally by email.

The original documents shall be included in the submission to the Employer.

The Contractor shall supply and submit -free of costs- any further copies, if and when reasonably required by the Employer/Engineer.

The Contractor shall take diligent care that generally copies of his correspondence

- with the Employer and the Engineer
- with third parties such as municipalities, authorities, and other Contractor, etc.

are forwarded as stipulated in the Tender Documents.

# 3. APPROVAL PROCEDURES

## 3.1 General

All information, documents, including also calculations, drawings, schedules etc. have to be submitted within such periods or at such dates which are required to guarantee a smooth handling of the project without any delays. The sequence of submission shall be such that information is available for timely approval/review of each document when it is received The Contractor is responsible for submitting all documents allowing all participants sufficient time to check, assess, comment and approve the documents. The quality of the submitted documents must be in accordance with acceptable international practice to allow an expeditious checking procedure. Documents not fulfilling these requirements will be returned to the Contractor without comments for improvement and resubmission.

Approval will be given by the Employer/Engineer latest within 28 days after receipt of such documents. Any manufacturing work carried out prior to such approval will be at the Contractor's own risk and expense. If the Employer/Engineer fails to approve or comment on the documents submitted by the Contractor within the above period, the Contractor may proceed with the fabrication. The 28-day period starts on the date of the Employer/Engineer’s acknowledgement/signing of DTS.

The Contractor shall be responsible for any discrepancies, errors, mistakes, omissions or deficiencies in the documents or the material and equipment as supplied by him subsequently, whether such documents have been approved or not.

Each document for which no approval is required shall be clearly marked "For information only" on the Documents Transmittal Sheet. The Employer/Engineer may, however, decide to treat such document as sent for approval.

Each document sent for approval shall be clearly marked "For approval" on the Documents Transmittal Sheet. The Employer/Engineer may, however, decide to mark such document "not subject to approval" if deemed necessary.

The Contractor must in no case distribute any document without either one of the above mentioned marks or the mark "Approved". Documents distributed in spite of it may be regarded as non-existent.

## 3.2 Documents for Approval

### 3.2.1 Documents

The term document shall include all documents, drawings, design documents etc. submitted by Contractor to Employer for review and approval.

The Contractor shall distribute within the time called for in the Tender Document, documents for approval to the Employer in the number as laid down in the Contract or as the Employer or Engineer may reasonably require.

The documents required for design, construction, installation, operation and maintenance of the entire plant shall be submitted by the Contractor in good time so as to permit the plant as a whole to be erected in compliance with the specified time table. The Contractor has to submit drawings, documents and all such information which are necessary to verify that the goods he intends to manufacture comply in every respect with the requirements of the Contract.

After Contract signing the Contractor shall prepare technical documents for manufacturing of equipment and submit it to the Employer for approval. Any manufacturing work carried out prior to such approval will be at the Contractor's own risk and expense. On the basis of these documents and testing programs, Factory Acceptance Tests shall be performed.

After Contract signing the Contractor shall prepare technical documents on the basis of which the installation and civil Engineering works will be executed and submit to the Employer for approval. Only after having received the approval start of installation and civil works are permitted.

On the basis of these documents and testing programs, Site Acceptance Test, Technical Inspection and Trial Operation, Preliminary Taking Over will be performed.

Only the most important documents for approval are listed below. These documents shall be submitted sufficiently in advance, so that corrections and amendments desired by the Employer as well as resubmission of the documents will not result in any delays with respect to the guaranteed time table. The Employer reserves the right to request from the Contractor additional documents as may be required for proper understanding and definition of the design and Engineering of the plant.

As a minimum the following documents are to be submitted for approval:

#### 3.2.1.1 General

- reports/documents as stated in chapter above
- list of new sub-contractor/sub-suppliers as replacement, if any
- outline drawings drawings of the equipment indicating overall dimensions with min. required distances to neighboring equipment, weights, anchoring and connection details, and erection working space
- layout drawings
  General assembly drawings showing details to demonstrate fully that all parts will conform to the provisions and intent of the Contract Documents and to the requirements of their installation, operation, and maintenance. These drawings shall show in a true scale all necessary components the equipment is made from, and components shall be identified by means of a legend.
- wiring and connection diagrams (for information only)
  Complete full-line wiring diagrams and connection diagrams covering all equipment furnished (instruments, relays, control switches and other devices as e. g. existing interface equipment). The equipment drawings shall also show the internal functioning by means e. g. block diagram.
  The diagrams shall show all interface information such as identifications, terminal numbers, and wire numbers.
- cabling (for information only)
  Cabling from terminals of equipment A to equipment B shall be documented with cable lists, indicating at least cable no., description of function, starting and ending point (of each wire), cable type, cable length, numbers., section of wires, and available spare wires.
- calculations/design criteria
  In addition to the drawings or whenever the contractual documents may require, the Contractor shall submit appropriate calculations for determining the main design criteria, clearly indicating the principles on which calculations are based. Conceptual design studies shall accompany Contractor’s solution whenever deemed to facilitate the understanding thereof.

- detailed design system documents for installation/erection of OPGW and underground optical cable
- proposed inspection and testing programs
- testing documents/report of results of all tests of the equipment not foreseen to be tested
- training program
- operating and maintenance manual with description of all equipment and facilities, detailed operating and maintenance instructions
- as-built-documents (as-built design) including drawings of all equipment
- spare part lists.

### 3.2.1.2 Time scheduling

- detailed time schedule for design, manufacture, supply, assembly and commissioning broken down for the principal plant components and all construction works, stating dates for completion of any preparatory work from others which may be necessary
- detailed erection, design, installation and commissioning schedule with all information necessary to permit a satisfactory erection, assembly, and commissioning of the equipment by others. Detailed instructions for the erection of the equipment shall be submitted together with reduced size copies of applicable drawings showing the erection sequence. The instructions and drawings shall include information on handling and slinging the major pieces of equipment, erection tolerances, and special precautions to be taken in installation and during testing and commissioning tests.
- detailed program for commissioning
- complete list of documents with proposed submission deadlines.

**Electrical and structural Engineering, where applicable**
The documentation must be an integral part of the designs, instructions, programs, testing reports etc.

- electrical single-line diagrams
- list of consumers
- lists of equipment and devices
- earthing plans with calculations
- line profile drawings of the OHL route
- insulator strings, conductor and OPGW fittings
- OHL tower outline drawing including clearances
- calculation of conductor and earth wire tension and sags
- statical calculations of all gantries
- drawings of gantries for switchyard.

**Civil Engineering, where applicable**
The documentation must be an integral part of the designs, instructions, programs, testing reports etc.

- general site plan of each entire site showing all buildings and installations, traffic routes and landscaping etc.
- architectural arrangement drawings, design layouts and itemized drawings (plans and sections) to scale 1:100 of all buildings and plants

- arrangement drawings of the external plants of the site as a whole (existing, planned) with all supply and disposal facilities, roads and parking, vehicle access and maneuvering areas, sewers, channels and culverts etc.
- raised floors and suspended ceiling systems
- underground services and ducts with equipment appertaining to the services
- sewage and storm water systems
- layouts for external works showing plants and fencing etc.
- diagrams for heating, ventilation and air conditioning systems
- civil drawings of roads
- statical calculations of foundations including foundation outline drawing
- drawings of all foundations for switchyard.

All other documents and information the Employer and the Engineer deem necessary are to be submitted by the Contractor in a reasonable time.

### 3.2.2 Operation and maintenance manuals, operating instructions

The Contractor shall provide to the Employer complete operation and maintenance manuals and separate Operating Instructions.

The operation and maintenance manuals to be provided by the Contractor shall contain a detailed description of the equipment and components written in such a way as to enable the Employer to operate, maintain, dismantle, reassemble and adjust all parts.

The operation and maintenance manuals shall be accurate and easy to understand and shall be presented in such a manner that the contents can be used for instructing the Employer's personnel in the operation, service, maintenance and repair of the installations and their individual component. Tables, lists, graphic presentations and explanatory diagrams should be used as far as possible for easy understanding.

Further, the operation and maintenance manuals shall contain the following information:

a) Detailed description of the equipment, its subassemblies, components and accessories: A detailed list of clearances, tolerances, temperatures, settings, system data, etc., is required.
b) Principles of operation: A brief summary is required of the technical basis for operation of the system or equipment.
c) Testing and adjustment: The complete procedure of testing, recalibration and adjusting the system or any parts during operation, after overhaul, or during recommended periodic checks must be covered. For all important items of equipment, test schedules in tabular form shall be included.
d) Drawings: All layout drawings, assemblies and sections, schematic drawings, detailed control and wiring diagrams, program documentation, flow sheet, piping diagrams, etc. necessary for understanding the operation and necessary for maintenance work. As many drawings as necessary of the "as built" type shall be included in the manuals.
e) Manufacturers' descriptive technical literature (brochures)
f) Maintenance instruction: A maintenance schedule shall mention the inspection and maintenance intervals laid down separately for each individual equipment or part, the exact description of the operations to be carried out as well as the necessary spare parts and materials.

This section will be divided into two subsections:

1. Preventative maintenance, which will indicate the periodic inspections required, the inspection procedure, the routine cleaning and lubricating procedures, the routine safety checks, calibration checks and the like.
2. "Trouble shooting guide". For repair and adjustment, it will describe the inspection, removal, and replacement of parts; electrical, fluid or mechanical circuit tracing; repair, adjustment, calibration and commissioning procedures.

The Contractor shall set out in these instructions the intervals of exchange of equipment to be replaced in the course of operation (expressed in no. of operation cycles, or years of service). The necessary dismantling/erection instructions shall be given in detail.

g) Spare parts: The Contractor shall mention how and where additional spare parts can be ordered specifying for each part the ordering number, the name, address, telephone and fax number as well as the e-mail address of the manufacturer or supplier.

The Operating Instructions to be provided by the Contractor shall contain a detailed description of each individual plant written in such a way as to enable the Employer to operate all installations of the respective plant. The instructions must be accurate and easy to understand and shall be presented in such a manner that the contents can be used for instructing also untrained personnel in the operation of each individual plant. The instruction shall contain the detailed description of the operating principles for each system of the plant and how to operate them. For clarity of presentation, careful consideration shall be given to the use of charts, tables, and operating data in this section.

The Employer/Engineer reserves the right to specify a uniform cover (loose- leaf folder) for all operation and maintenance manuals. The Contractor shall not be entitled to claim extra payment because of this requirement.

The Contractor shall submit to the Engineer and to the Employer a draft version of the operation and maintenance manuals and operating instructions for checking and approval. After having received the approval and all the necessary corrections and additions have been made, the Contractor shall send copies of the operation and maintenance manuals and operating instructions to the Employer and Engineer as stated in the “Document Distribution List”.

If it shall emerge during the erection, commissioning trial run or warranty period of the equipment that the operation and maintenance manuals and operating instructions are inadequate or faulty and after obtaining such data only available after commissioning and proper setting the Contractor shall carry out and supply the necessary corrections and supplements. The Contractor shall make all amendments to documents free of charge.

### 3.2.3 As-built documents

Documents of the work as completed, the so-called "as built" documents, shall be prepared by the Contractor and forwarded to the Employer/Engineer's Site office for approval. After approval they shall be returned to the Contractor for distribution in the required amount to the Employer/Engineer. These documents shall be in sufficient detail to enable the Employer to maintain, dismantle, reassemble, and adjust all parts of the work.

The Contractor shall accept and incorporate an Employer’s drawing number in the „as built“ documents, if requested.
All "as built" documents include as a minimum:

- line profile drawings

- insulator strings, conductors and earthwire fittings
- calculation of conductor and earthwire sag
- structural calculations of all steel structures and foundation
- drawings of all foundations
- test reports
- operation and maintenance instructions
- any other relevant drawing as requested by the Employer/Engineer.

The documents are all updated with the modifications made at site until acceptance of the works.

For extensions and/or modifications in substations as-built documents shall include also the originally existing electrical equipment and originally existing building parts which were subject to extension and/or modification by the Contractor.

In addition to hard copies, the Contractor shall submit each as-built documentation as an AutoCAD or AutoCAD-compatible file, recorded on CD-ROM. The PLS_CADD line backup files shall also be submitted.

The „as built„ documents (drawings, test reports, operation and maintenance instructions) shall be set-up in an orderly way (in files, with table of contents on the back and inside, and register) and subject to the Employer's approval.

### 3.3 Sub-Contractor and Sub-orders

As soon as practicable after entering into the Contract the Contractor shall, having obtained the Employer/Engineer's consent in accordance with the conditions of Contract, enter into the Sub-Contracts he considers necessary for the satisfactory completion of the works (based on the approved list of subcontractors).

### 3.4 Submission for Approval - Documents Transmittal Sheet (DTS)

All documents submitted for approval shall be accompanied by a Documents Transmittal Sheet (DTS).

The DTS number and submission date is to be indicated (stamped) on each copy of document sent for approval.

The status (i.e.: "Approved", "Not Approved", "Approved on Condition", see below) will be stamped by the Employer/Engineer on the documents covering page.

The DTS shall include the following:

- document destination :
  - Employer offices
  - Engineer local office
  - Engineer head office
  - numbers of original and copies
- date of issuance
- date of receipt (to be filled up by the addressee)

- emitter internal references
- signatures and stamp of the Emitter
- title of the documents
- numbering of the documents according to the procedure herein above described, with a specific version number well identified
- purpose of the document: for information (***FI***), for approval (***FA***) from Employer/Engineer, for returned document after approval from Employer/Engineer (***RET***)
- status of approval (variable part is to be updated by the Employer/Engineer) as described in **Categories for Approval**
- date of Employer/Engineer decision related to the status
- signatures and stamps of authorized Employer and Engineer representatives
- comments and remarks.

The Employer/Engineer will keep the original of signed DTS. Copies of signed DTS will be sent to the Contractor according to the Approval and document handling procedure.

It shall be noted that the signed DTS will be used as contractual receipt acknowledgement.

### 3.5 Categories for Approval

As far as documents submitted for approval are concerned, the Engineer will notify the Contractor by returning one copy marked with one of the following categories:

- "Approved" - ***AP***
- "Approved on Condition" - ***AC***
- "Not approved" – ***NA***

The notification "Approved" authorizes the Contractor to commence or to proceed with the fabrication in compliance with his contractual obligations.

The notification "Approved on Condition" authorizes the Contractor to commence or to proceed with the fabrication in compliance with his contractual obligations, subject to all corrections noted on the document, and after he has made sure once again that the work at this stage is in full compliance with the Employer/Engineer requirements. After correction, the document shall be resubmitted for approval **within 28 days** from the date of the precedent "Approved on Condition" - remark, indicating clearly reasons and details of the revision.

The notifications "Approved", "Approved on Condition" or "Not Approved" shall, however, be understood as result of sample checks only, i.e. it will not prevent the Employer/Engineer from any further claim during the development of the entire project until Final Acceptance Certificate.

The notification "Not approved" indicates that the document must be revised and resubmitted for approval before proceeding with the manufacture.

When the Contractor receives the notification that a document is "Approved" by the Employer/Engineer he shall immediately enter the mark "For Construction" in the original (transparency), e.g. on top of the title block, and distribute copies to the Employer/Engineer as within two weeks.

If such document is modified for any reason afterwards, it is understood that the previous notification of the Employer/Engineer is automatically null and void. The Contractor is hence obliged to immediately

notify the Employer/Engineer of the existence of such further modification, to delete the pertinent remark "Approved by the Employer/Engineer on..." from the original (transparency), and such document shall undergo the above mentioned procedure once again.

During the preliminary stage of his design work, the Contractor may submit once to the Employer/Engineer documents for information and general review, being basis for eventual design meetings.

At the latest when quality, completeness and conformity with the contractual documents have reached a satisfactory level, the Contractor shall submit these documents for approval. Each of such documents will be reviewed and checked by the Employer/Engineer up to two times so as to reach the status "Approved", see above.

In cases the approval of documents is urgently requested so as to allow the Contractor to meet his time schedule, the Contractor's letter should clearly state such request to have documents approved at his Office in the interest of expediency. If possible, the Employer/Engineer may agree to such procedure under the conditions as defined in Contract Documents.

Prior to starting any work, the Contractor shall have in hand copies of the pertinent documents being approved, and shall supply the required number of copies to the Employer/Engineer at site minimum **48 hours prior to the start of the relevant work**.

The Employer/Engineer may order the interruption of the execution of any work for which the Contractor cannot present approved documents at site. Such an interruption shall not relieve the Contractor from executing his contractual obligations as stipulated in the Contract and shall be no reason whatsoever for claiming a delay.

As mentioned above, all basic documents are to be approved by the Employer/Engineer. For all work, the following shall be submitted to the Employer/Engineer approval as well:

- substation layouts showing dispositions of all OHL connected to the substation
- updated single line diagrams of the substations, if applicable
- tower general layout with related clearance diagram
- foundations layout

Moreover, minor variations during erection works at site as well as the civil finishing, route and profile drawings plus related documents and the User Guides may be approved at site in the first instance, entailing the above mentioned imperative approval procedure for formal reasons.

## 4. QUALITY ASSURANCE

### 4.1 General

The Contractor testifies that the services and supplies are in compliance with the quality requirements of this Contract and apart from that, that services and supplies meet the principles of good workmanship.

The Quality Assurance shall be in conformity with ISO 9001.

The quality plan drafted by the Contractor shall be a project-related plan, developed specifically for this project. This will not be the quality handbook used by the Contractor, but will relate to it. In this project - related quality plant, the Contractor should describe how he himself intends to check the activities for the works. In this plan the following should be included (but not limited to) as a minimum (ref. ISO- 9001): The

project organization of the Contractor, qualifications and expertise, checking documents, testing procedure in the factory and on site, trial operation, elimination of defects and corrective measures, documentation of quality, internal quality audits etc. Further details are mentioned in the following chapters.

## 4.2 Quality System

The quality system shall give a description of the quality system for the works and shall include following details:

- the structure of the Contractor's organization
- the duties and responsibilities of staff assigned to ensure quality of the work
- the system for purchasing, deliveries and verification of materials
- the system for ensuring quality of workmanship
- the system for control of documentation
- the system for recording of rejected works
- the arrangements for the Contractor's auditing
- A list of the administrative and work procedures required achieving and verifying the contract quality requirements. These procedures shall be made readily available to the Employer for inspection on request.
- Information on any audits performed previously within the scope of ISO certifications.

The quality manual of the system shall be submitted to the Employer for approval prior to the commencement of the works, unless the Contractor's quality system has been previously audited and approved by the Employer.

## 4.3 Contractor's Quality Plan

The Contractor shall prepare quality plans in accordance with ISO 9001 The Employer shall submit quality plans for approval within one (1) month after Contract award. Each quality plan shall set out the activities in a logical sequence and shall take into account the following:

- a detailed time schedule from commencement of the preparations up to take-over, with a work breakdown structure containing the several tasks and covering the scope of work
- specification of supply deliveries
- specification of different activities and tasks
- procedures concerning the internal project organization
- procedures concerning the interfacing with the Employer
- the inspections of supplies and services
- reference to the Contractor's quality specific procedures of each type of activity.

The Contractor's quality plan shall be submitted to the Employer for approval prior to the commencement of the Works. The quality plan shall include Quality Inspection Plans (QIP) for supplies and services. The QIPs shall contain:

- Type tests: These are intended to prove the capabilities of the design to meet the requirements.
- Routine tests are intended to check the quality of the manufacturing/installation.
- Factory Acceptance Tests/final tests are intended to check the manufactured supplies/completed services.

## 4.4 Quality Monitoring

The Employer and his representatives are entitled to perform Quality Inspections on the various parts within the scope of the Contract. The Contractor shall provide any assistance that is necessary concerning visa, traveling and lodging reservations. The Contractor shall also arrange a health insurance to cover all medical costs that may be required for the inspection periods.

The Quality Inspections on the various actions in the Quality Assurance Plan can be performed when:

- ordering supplies, calculations, drawings, specifications, procedures and time schedules
- manufacturing of the concerned supplies
- installation services.

The Contractor shall provide all facilities including access to his suppliers or Sub-Contractor and Suppliers, which may be required by the Employer for monitoring activities.

### 4.4.1 Quality inspection plan

The prime responsibility for inspection and testing rests with the Contractor. Inspection reports shall include as a minimum the contract identity, the name of inspector/tester, date of inspection/test, operation/inspection, technique used, acceptance standard and acceptability.

The Contractor shall inform the Employer at the latest 14 days prior to an inspection about planning and scope of the inspection. The Employer then informs the Contractor about the information that will be required.

The Contractor shall take care of the availability of any information and equipment required in respect with the acceptance of the supplies and services.

The Contractor shall take care of the accessibility of any facilities that have to be inspected in respect with the scope of supplies and services.

The costs for inspections and testing and equipment required for sample testing on request of the Employer shall be borne by the Contractor. Costs resulting from any damage caused by testing and inspections shall be borne by the Contractor.

In case of rejection, all concerned supplies and services shall be replaced with new ones in conformity with the Technical Specifications.

## 4.5 Certificate of Conformity

Prior to the issue of the ‘Release Certificate’ or agreement to shipping, the Contractor shall submit to the Employer copies of the completed Certificate of Conformity. Copies of the appropriate material test certificates, inspection records, and type and sample test reports shall support the certificate.

## 4.6 Suppliers and Sub-Contractor

The Contractor shall ensure that any Suppliers or Sub-Contractor appointed by him under the Contract shall conform to the requirements of this Specification. Prior to the appointment of any Supplier/Sub-

Contractor the Contractor shall ensure that their Quality Assurance arrangements comply with the requirements of ISO 9000 series standards and this Specification.

The Contractor's auditing of his Supplier's/Sub-Contractor's Quality Assurance arrangements shall be documented to demonstrate to the Employer their extent and effectiveness.

### 4.7 Quality Assurance during Workshop and Site Testing

The Contractor shall perform all workshop tests, site tests and inspections necessary to ensure that the material and workmanship conform to the requirements of the Contract and the approved design documents. Such tests shall be adequate to demonstrate that the equipment will comply with the requirements of the documents and meet the guarantees specified.

Tests in the factory and on site will be performed. The following tests will take place in factory:

- during equipment manufacturing
- during Factory Acceptance Test.

The following tests will take place on site:

- during equipment installation and execution of civil Engineering works
- during test run
- during technical inspection and trial operation
- during Preliminary Taking - Over
- during Final Taking Over.

All tests and inspections shall be conducted strictly in accordance with the approved standards and in accordance to the requirements of the documents.

Mechanical and electrical equipment and materials shall be inspected and tests witnessed during manufacture by an "Independent Inspection Authority", which is in normal case the Engineer. The Employer may appoint any other independent inspector, which will be communicated to the Contractor. The Employer/Engineer reserves the right to witness any of the tests. The Contractor shall permit free access at all times to his manufacturing facilities, for the Employer, the "Independent Inspection Authority" and the Engineer for purposes of inspection and expediting. If part(s) of the work is being manufactured at other premises, the Contractor shall obtain for the Employer/Engineer permission to inspect, examine, and test as if the said work were being manufactured at the Contractor's premises. Such inspection, examination or testing shall not relieve the Contractor from any obligation or responsibility under the Contract.

All material-, mechanical-, electrical- and other tests carried out during manufacture shall be in accordance with the applicable test procedures submitted by the Contractor to the Employer/Engineer and approved by the Employer/Engineer.

The Contractor must describe in detail the degree to which each equipment, auxiliary, or any part thereof will be assembled in the factory and the tests to be carried out on the parts assembled.

The Contractor shall submit detailed factory and site test schedule (s) to the Employer/Engineer. This schedule shall be updated whenever required, however, at least monthly until the last shipment (to be included to the progress report). Inspection visits shall be arranged, as far as possible, to coincide with the performance of key activities indicated in the inspection program.

With the respect for approval of the testing program(s) and testing schedule(s), the Contractor may offer test results for identical equipment in lieu of the tests specified, in which case the specified tests may be waived by the Employer/Engineer. If type test results for identical equipment are offered in lieu of the specified tests, the Contractor shall also provide evidence of the similarity of the equipment tested and the equipment to be provided under the Contract.

The Contractor shall give the Employer/Engineer a twenty (20) working days advance notice before the various factory tests and site tests are made on equipment specified. When the Contractor gives the Employer/Engineer notice of factory tests, he shall also submit in detail the type and extent of test to be made so that a decision can be made by the Employer as to whether witness the same or not. With the notification the Contractor shall propose and submit for approval test schedule(s) (detailed time schedule) applicable for the test program and procedure, in order to allow the Employer/Engineer to arrange for their representatives to be present during such tests, if they so desire.

The Contractor shall bear the cost for the visits of the Employer delegated to the Contractor's works at various times during the workshop test period to monitor the progress of works and ascertain the quality of manufacture. The full cost to be borne by the Contractor shall include travel fares, travel insurance, food allowances, lodging, boarding and incidentals and all locally required transportation at the place of inspection for two (2) persons of the Employer (if not otherwise defined elsewhere). The number of tests is defined in the price sheets.

The duration of each visit by the Employer/Engineer shall be according to the actual test and inspection program and related requirements.

The Contractor shall ensure and submit evidence to the Employer/Engineer that the instruments used for testing have been calibrated at an approved testing laboratory (e.g. the Quality Control Department) within a period of up to six (6) months for a portable instrument and twelve (12) months for a fix installed instrument.

Upon satisfactory completion of tests, the Contractor shall provide the Employer/Engineer with signed copies of all test reports, data and results including calibration curves and any necessary information to correct data. All reports and enclosures with test results shall be in English language and shall be of such a quality and size that photocopying for filing purpose is possible.

Upon approval of the test results, the Contractor shall submit prepared Acceptance Certificates (the form will be proposed for approval by the Contractor in due time) for signature to the Employer/Engineer.

Copies of certified inspection and test certificates should be supplied within thirty (30) days following the making of all standard and non-standard tests, however, prior to packing for shipment of the relevant consignment.

Upon approval of the test results and return of the signed Acceptance Certificates by the Employer/Engineer to the Contractor, the equipment may be shipped.

# 5. HSE MANAGEMENT

## 5.1 HSE Targets and Objectives

The Healthy, Safety and Environmental (HSE) targets of the Project are:

- zero accidents
- no hazardous situations to the environment and public
- no harmful spills to the environment

- the promotion of welfare and health issues
- the development of a sound working environment and
- the integration of the local community.

Considering the defined HSE targets, the HSE objectives for the Project are:

- to develop, implement and operate an HSE management system that provides a maximum contribution to meet the HSE targets and the success of the project
- to maintain an OHS (Occupational Health and Safety) management system in line with good international practice such as ILO OHS 2001 Guideline or OHSAS 18001
- to maintain ESMS (Environmental and Social Management System) in line with the requirements of IS 14001:1996
- to design overhead lines and substation that is intrinsically safe, a healthy place to work in and has an as low as reasonable practicable impact on the environment
- to execute the erection, construction and commissioning to initiate the start-up of the overhead lines and substation without health or environment related incidents and to form the basis for a health and safety operation and maintenance
- to comply with the applicable laws and regulations.

## 5.2 HSE Organization

The Contractor shall additionally to his HSE policy and goals prepare a project specific HSE policy, outlining the HSE targets, and HSE plan which, after approval by Employer, shall undergo continuous updating and improving during the project phases. The HSE targets shall be reached by implementing the HSE plan and by considering the following organizational subjects.

The Contractor's project HSE organization and responsibilities shall include:

- **Management representative:** The Contractor shall nominate a representative of the management who will be responsible to follow-up the HSE commitment of the Contractor on a general level.

- **Project Manager:** The Project manager shall be responsible for the overall project execution and shall be accountable for HSE issues on the project. The Project manager shall provide the drive and resources necessary to ensure that HSE targets and objectives are achieved. He should provide all necessary support to the HSE manager. The Project manager shall report directly to the Management representative.

- **HSE Manager**: The HSE Manager shall be responsible for the suitable and reasonable implementation of all necessary efforts to fulfill the HSE targets and objectives.
  - The HSE manager shall be responsible for the development of the project and site specific HSE plan and shall be responsible for the implementation.
  - The HSE manager shall be responsible for implementing legislative, company HSE and technical requirements in project deliverables and during the project execution in all project phase applicable under this FIDIC contract. This shall include but not be limited for the application and follow-up of HSE requirements for start of construction, during construction, the involvement of subcontractors and suppliers.
  - The HSE manager shall ensure that all HSE requirements stipulated in the HSE plan, together with the relevant local laws and regulations, are adhered to by the project team personnel and shall ensure compliance with the same by subcontractors and suppliers.

- The HSE manager shall be responsible for the implementation of day- to-day HSE matters on site. Through the site supervisors, he shall support and advise the workers. He shall report on any site HSE issues.
- The HSE manager shall be available for the project with start of the mobilization phase.

- **Site supervisors:** Supervisory personal shall be responsible and account- able for their commitment to HSE and their participation in the management of subcontractor and supplier HSE performance.

The main focus of HSE during the design phase is to meet the targets and objectives defined in section above. This shall be implemented by considering the following project execution key tasks:

- HSE team building with all project team members as part of coordination meeting (s)
- HSE training presenting all relevant governing documents and applicable legislative requirements related to HSE
- implement measures to meet all risk acceptance criteria and HSE objectives defined for the overhead lines and substation project
- prepare HSE design requirements at the beginning of the design phase to be followed
- implement HSE requirements in all requisitions/subcontractor
- implement HSE requirements in all supply contracts
- set-up and maintain HSE evaluation and decision making system
- definition and implementation of all HSE permit requirements
- implementation of an office safety and clean desk policy
- preparation of an emergency preparedness and response plan.

The main focus of HSE during construction is the preparation and consideration of a site-specific HSE plan to be prepared by the Contractor and to be submitted to the Employer for approval prior to mobilization. This HSE plan shall:

- consider the HSE targets and objectives defined in section above
- cater for the full scope of Contractor's work, inclusive of what is done by his subcontractor(s)
- provide all procedures required for performing HSE tasks that are inherently harmful and/or hazardous, e.g. performing excavations and trenching and working in them, confined space entry, work at elevations,
- lifting/hoisting operations, working with hazardous, dangerous or flammable material or goods etc.

Any deviation to the HSE requirements must be reported in writing to the Employer for approval.

The Contractor shall be responsible for promoting HSE awareness among his employees, those of his subcontractor(s), suppliers, visitors, and persons delivering materials and equipment:

- The HSE policy shall be prominently displayed in conspicuous places that are frequented by the project personnel.
- The Contractor shall erect a board at a visible location at the entry to the site, showing the HSE performance and achievements. The board shall show both reactive and proactive performance indicators, e.g. days without LTI (Lost Time Injuries), number of toolbox talks held, etc.
- At appropriate, conspicuous places the Contractor shall display posters to promote awareness and importance of safety, health and the environment among the work force. These posters must

be changed out on a regular basis and must, in as far as is possible, be relevant to the type of work being done at the time. Poster stations shall be located in both office/temporary facilities as well as in the project work site.

- The HSE plan shall be placed at a suitable location open for HSE staff and workers access.

To ensure good dialogue and bi-directional HSE communication, the following meetings shall be held:

- Monthly meetings during the design phase and weekly meetings during site activities shall be held to discuss past performance and determine ways of further enhancing the project HSE performance. HSE targets, objectives, improvements and failures shall be a separate point at the respective agendas.
- HSE steering committee meetings shall be held every two months to evaluate the HSE performance and devise new strategies to consolidate good performance and enhance the program where required. The steering committee meetings shall be attended at least by the Project manager, the HSE manager and the management representative (if requested by the Employer) to demonstrate the binding commitment with respect to the defined HSE targets, HSE objectives and HSE requirements.

Regular HSE audits (monthly basis) including HSE inspections (weekly basis) performed by the HSE manager and site supervisory personnel shall be carried out. The results of the audits and the inspections shall be summarized by written reports to be submitted to the Employer for information and action, if needed. The structure of the report shall be mutually agreed between Employer and Contractor sufficiently prior to the first audits or inspections whatever will take place earlier.

### 5.3 Specific HSE Requirements during Construction (Work and Public Safety)

The following requirements are the minimum requirements with respect to HSE at the construction site. The employer shall have the right to extend the HSE requirements in case of the needed actions to fulfill the HSE targets and objectives:

- The Contractor’s approved HSE plan will be the only applicable and valid HSE plan at site outlining and specifying details regarding HSE. Separate Sub-Contractor or supplier’s HSE company policies, HSE management systems or HSE plans are not acceptable at site.
- No personnel or employees are allowed to perform works, tasks or operations which they are not specifically trained and certified to per- form. All works will be subject to work permits. No works are allowed to perform without an applicable and valid permit to work.
- The Contractor shall at arrival of any personnel on site secure that those have or will get the required training / certification before any works, tasks or operations are assigned to arriving personnel.
- The Contractor shall ensure that his own, his subcontractor(s)’ and suppliers’ personnel at all times follow all site specific HSE rules and requirements whenever they are present on site.
- The Contractor shall ensure that first aid kits including "eye washers" are available at all work locations and that first aid kits at all times are complete. The Contractor shall ensure that at least one heart starter will be available on site.
- If applicable the Contractor shall inform itself about the potential presence of poisonous animals and take all required precautions to avoid accidents.
- The Contractor shall ensure that his personnel have passed an elementary first aid training

including cardiac arrest treatment.

- The Contractor shall ensure that safety goggles are handed out and worn by all employees or personnel at all times at working places. Hard hat, safety footwear, working gloves and protective outer clothing suitable for the local climate conditions shall be worn at all working locations.
- Hearing protection shall be worn in all areas with noise levels at or above 80 dB (A).
- All electrical hand tools, extension cables, transportable generators, other non permanent electrical equipment etc. shall undergo short circuit checks by certified and registered electrician minimum per every three
- (3) months, prevailing national or international rules.
- Use of drugs and alcohol are strictly prohibited when working or being present on site. Personnel reporting for work that are under the influence of alcohol and/or drugs shall be denied access to site. In such cases, Employer expects the Contractor to intervene with appropriate measures according to Contractor' terms of employment in order to prevent recurrence. However, Employer reserves the right to deny continued access to site to such person(s) without further notice if the site safety and security in any way otherwise is felt threatened.
- The site location is subject of occurrence of poisonous snakes. The Contractor has to consider subject specific advices and procedures for every site personnel to avoid hazardous and harmful situations. A detailed outline of the needed advices and procedures has to be addressed in the HSE plan.

Implementing the commissioned works the following shall be respected in particular:

### 5.4 Water and soil quality

Any wastewater discharge to the environment is strictly prohibited. All chemical storage, including fuel and hazardous liquid waste shall be placed in sealed areas with proper containments. Sanitary wastewater from staff facilities, workers camps and mobile sanitary units shall be stored in sealed septic tanks.

All wastewater shall be transported and disposed periodically to the wastewater treatment facility of the local municipality.

Waste oils and hazardous liquids shall be transported and disposed by licensed forwarding companies acc. to national regulations.

### 5.5 Waste

Disposal of any type of waste and debris in the environment is strictly prohibited.

All solid wastes shall be characterized acc. to composition, source, type and acc. to local regulatory requirements. Feasible solid waste prevention, reduction, reuse, recovery and recycling measures shall be taken, waste material shall be treated, separated, temporarily stored and disposed for eventual recycling measures. Adequate containers for waste collection shall be placed at the staff facilities and workers camps.

All hazardous waste shall be collected in leak-proof containers, adequately stored and removed by licensed forwarding companies acc. to national regulations. “Hazardous waste” labels indicating type

and amount of waste shall be placed on the containers. Hazardous waste containers shall be checked regularly against damages.

### 5.6 Biological resources and habitat alterations

Any harm to the existing fauna and flora shall be reduced to its possible minimum within the scope of commissioned works. Habitat alterations necessary for the performance of works have to be reported to the Employer immediately.

The area used as storage for any type of material and for tools and machinery shall be restored to the original state as come across before works commencement. All temporary structures and shelters constructed within the scope of commissioned activities shall be removed completely.

Used ground shall be restored to the original (previous) condition and left in the same condition upon the works completion.

Best control technology shall be adapted to reduce emissions, as noise, exhaust gases and oils of any type, from combustion engines and other equipment. All equipment, incl. vehicles shall be maintained accordingly.

Off road driving is strictly prohibited.
Hunting at and around the project site is strictly prohibited.

### 5.7 Traffic

Existing roads shall be used for transport of materials and equipment as far as possible. In case new access roads become necessary, this has to be closely coordinated with the Employer.

Safety and traffic signs shall be placed clearly near and around the project area to approach the sites.

### 5.8 Land usage

Additional land for the site facilities will not be provided by the Client, but by the Contractor, as well as the complete infrastructure.

### 5.9 Waste management, pollution prevention, reinstatement and transport plans

The Employer will supply waste management, pollution prevention, reinstatement and transport management plans control documents in order to facilitate the respect of the commitments arising from the ESIA (Environmental and Social Impact Assessment) and the contractual documents into Contractor action.
This control documents include for instance the procedures and method statements, etc. They will ensure the compliance with project commitments.

#### 5.9.1 HSE reporting

The Contractor is responsible to prepare the following HSE documents and reports. All reports and documents have to be prepared for the particular purpose of the Project:

- HSE policy
- HSE plan

- HSE audit reports
- HSE minutes of meeting of the HSE communication meetings described in section above
- permits to work
- HSE incident reports.

All reports have to be submitted to the Employer for approval or information within 2 workings days. The HSE policy as well as the HSE plan shall be available sufficiently prior to the start of mobilization to ensure a review by the Employer and finalization by the Contractor.

The needed content of the HSE plan, reports and permit to work shall be submitted with the technical proposal to ensure the correct understanding of the HSE requirements by the Contractor.

### 5.9.2 Environmental application documents and permits

All available permit application documents and permits like

- environmental impact assessment
- environmental and social impact assessment
- environmental approval (conditions)

shall be considered as an example if issued for the Project.

The requirements stipulated in the permit application documents and the corresponding permits shall be taken into account for the preparation of the technical and financial proposal.

Especially the HSE requirements included in the permit documents are legally binding requirements to be considered during the construction of the Project. The Contractor has to guarantee that these requirements will be fulfilled. Any deviation from the permits has to be announced to the Employer with the following minimum information and not later than 2 working days after identification of the need for the deviation:

- the reason for the deviation
- the time implication
- the cost implication
- the authority to be contacted for approval of the deviation
- an outline of the possibility for a positive authority reply.

If not otherwise stipulated, the Contractor will be responsible for all environmental management measures (mitigation and monitoring measures) as included in the EIA and/or permits documents.

## 6. PROGRAM, PROGRESS OF WORK AND REPORTING

### 6.1 General Requirements

Contractor shall develop detailed implementation plans and Contract Control Procedures based upon the Contract execution programme as provided in General and Particular Conditions of Contract and appendix 4. Contractor shall clearly identify all activities pertaining to the work, enabling but not limited to the following functions to be undertaken:

The analysis and Identification of Contractor's, Sub-contractor's, Manufacturer's and Supplier's basic activities, including significant Section of Works and interface activities through an agreed Work Breakdown Structure (WBS).

The progress monitoring of these activities through the use of critical path networks, bar charts, progress curves, histograms and follow-up tables with detailed back up data.

Continuous comparison of current, target forecast and actual data.

The prompt identification of delay, and where necessary, actions required to implement corrective measures to recover any slippage.

Contractor's planning services for the implementation of planning, monitoring, reporting and control system of the work corresponding to the Contract Execution Programme shall be submitted.

Contractor shall within 6 weeks from the Commencement Date, prepare and submit for review and approval a Comprehensive Planning Package, which shall be based on the Contract Execution Programme prepared in Primavera P6. This package shall include full details of the arrangements and methods, which Contractor proposes to adopt for the execution of the work including planning, control of costs, manpower and construction equipment levels and scheduling. This document shall then be the Execution Programme where it complies with the requirements of the Contract and when approved by Employer/Engineer.

During the entire duration of the Contract, the Contract Execution Programme shall not be revised in any way without prior approval from Employer/Engineer. Any changes requested by Contractor shall be made formally in writing with suitable justifications and approved by Employer/Engineer prior to the acceptance of the new programme. Any changes in the Scope of Work agreed between Contractor and Employer/Engineer shall be clearly indicated on the bar chart and the overall program rescheduled to include the change(s).

At any given time during execution of Contract, there shall be only one Execution Programme.

Contractor shall appoint number of Planning Engineers as required to perform job acceptable to Employer/Engineer to operate this service and to satisfy monitoring and reporting requirements.
Contractor shall grant Employer/Engineer access to all relevant planning and control documents, during both development and implementation period.

All Progress Curves and Histograms shall include a data table below graphics providing planned and actual data for both reporting and cumulative period. When necessary Employer/Engineer may request that forecast data be included on some or all of these documents.

## 6.2 Execution Programme

Contractor shall develop and detail the Execution Programme in accordance with Contract requirements considering following guidelines:

Detailed program (level 3 or 4 as applicable) in primavera P6, comprising overall scope of the contract shall be submitted. Program shall consist of detailed activities for Engineering, Procurement, Execution and Commissioning stages of the project.

All planning documents shall cover the entire Contract period in accordance with the LOA/Contract including all pre-commissioning, commissioning and as-built documentation activities.

Overall project execution strategy along with logic diagram shall be submitted with the execution program.

All planning documents shall clearly describe the type and category of resources (manpower and construction equipment), man-hours, equipment days, and status used.

Program shall be resource loaded.

Program shall be Cost loaded as per the approved Contract Price Schedule and Price Breakdown.

Program shall be loaded with weight factors to determine weighted progress.

For projects which have multiple Section of Works, program for each Section of Work shall be developed independently to assess progress performance of individual Section of Works.

All Engineering activities shall be defined in detail with minimum 2 revisions of submissions.

Cash flow curves based on cost loaded in the program shall be submitted with following values (monthly and cumulative);

a) Planned 100%

b) Planned 70% VOWD (Value of Works Done)

c) Planned Payment.

For all NEPCO related activities such as documents approval, testing, commissioning etc. contractor shall consider 5 day work week calendar and all holidays as per Jordan national calendar.

According to contractual requirements and as per NEPCO general practice, appropriate duration for all authority approvals and commissioning activities shall be considered in the program.

As a minimum, the Contractor shall address the following in the Execution Programme Schedule:

**i)** **Defining Project details and defaults** – Within the Dates tab, the “Planned Start” shall be either the Letting Date or the contract effective Date, the “Data Date” shall be the Commencement Date, the “Must Finish By” date shall be the contract Completion Date. Within the Settings tab, define the Critical Activities as the “Longest Path”.

**ii)** **Sufficient activities** shall be included to assure that there is adequate planning for the entire project. The appropriate number of activities will be largely dependent upon the nature, size, and complexity of the project. In addition to all site construction activities, network activities shall include: activities necessary to depict the procurement/submittal process including shop drawings and sample submittals, and the fabrication and delivery of key and long-lead procurement elements; testing of materials, plants, and equipment; settlement or surcharge periods activities; sampling and testing period activities; cure periods; activities related to temporary structures or systems; activities assigned to subcontractors, fabricators, or suppliers; activities assigned to the NEPCO, consultant and other involved authorities, including final inspection; activities to perform punch list work; and activities assigned to other entities such as utilities, municipalities, County government/agencies, and other adjacent contractors. The

schedule shall indicate intended submittal dates, and depict the review and approval periods as defined in the Contract Documents for Employer/Engineer review.

**iii)** **Work Breakdown Structure (WBS)** - A multi level hierarchal WBS shall be incorporated. The levels (nodes) shall include, but not be limited to:

Level 1 is the project level / Section of Work level;

Level 2 shall have five nodes; General, Major Sections, Engineering, Procurement, Execution/Installation, Testing and Commissioning.

Level 3 Engineering activities shall have two sub nodes; Materials and Shop Drawings

Procurement activities shall have sub node for each major item

Execution and Installation shall have two sub nodes as Civil Works and Electrical Works

Testing and Commissioning shall have sub nodes for Tests After Installation, Commissioning and Handing Over;

Level 4 the Areas of work shall have sub nodes for the various Stages of works.

**iv)** **Activity ID** - Include a unique identification number for each activity. Activity ID numbers shall not be changed, or reassigned.

**v)** **Activity Name** - Clearly and uniquely define each activity name with a description of the work that is readily identifiable to inspection staff and the progress of each activity can be measured. Each Activity shall have a narrative description consisting at a minimum of a verb or work function (i.e. form, pour, excavate, etc), an object (i.e. slab, footing, wall, etc), and a location.

**vi)** **Section of Work Activities** - Include activities for all contract Section of Works that define significant contractual events such as Contract Award, Notice to Proceed, Contractor Start Work, Substantial Completion, Physical Completion, Contract Completion, and coordination points with outside entities such as utilities, State agencies, Authorities, municipalities, Time-Related Contract Provisions, etc.

- Section of Work for Any Interface activity shall be included.
- Minimum following Section of Works shall be inserted in the program;

a) Contract Effective Date

b) Civil Works Completions

c) Access for Telecom Installation

d) Erection Completions

e) Test Completion

f) NOSP Issued

g) Certificate of Operation

h) Taking Over Certificate

i) Contract Completion

**vii)** **Activity Durations** - Define the Original Duration of each activity in units of whole work days. Except submittal/procurement activities, durations shall not exceed 21 work days unless approved by the NEPCO. Durations for Department submittal reviews shall meet the requirements set forth in the contract documents. If requested by the Engineer, the Contractor shall justify the reasonableness of planned activity time durations.

**viii)** **Activity Relationships** - Clearly assign predecessors and successors relationships to each activity, and assign appropriate logic ties between activities (Finish to Start, Start to Start, Finish to Finish, etc). Do not have any open ended activities, with the exception of the first activity and last activity in the schedule. An activity may only appear once as a predecessor or successor to another specific activity, but may be assigned as a predecessor or successor to many different activities. Do not include inappropriate logic ties with Section of Work activities (i.e. – a finish Section of Work activity, and a predecessor assigned with a Finish to Start logic tie; or a start Section of Work, and a successor assigned with a Finish to Start logic tie). Lag time may not exceed 10 days. The Contractor shall not use negative Lag times. Lag report shall be submitted for all assigned lags in the schedule.

**ix)** **Activity Constraint Dates** – The Contractor shall not have any constrained activities, with the exception of contractual dates, unless Employer/Engineer accepts such constraints in writing. Only contractual/NEPCO-designated constraints are allowed unless specifically authorized by this specification.

**x)** **Activity Dates** – With the exception of contract Section of Work dates, “Actual Start” and “Actual Finish” dates and “Planned Start” and “Planned Finish” dates, activity dates shall be calculated by the project scheduler tool within the Primavera software. No Actual Start or Actual Finish dates shall be entered in the Baseline/Execution Schedule @ Award, with the exception of activities that were completed prior to the Contract Award.

**xi)** **Calendars** - All other calendars developed by a Contractor shall be established as Project Calendars, with the calendar name including the contract D# and describing the function (i.e., D260000 – NEPCO Calendar, D260000 – Procurement Calendar, D260000 – Construction Calendar, etc.). All work activities of the Contractor shall be assigned to Project Calendars and not global calendars. Activities for shop drawing reviews and other approvals by NEPCO personnel shall be assigned the NEPCO standard calendar – “Working Day, 5 Day Work Week w/govt. holidays, Field” Calendar that reflects all holidays observed by the NEPCO.

**xii)** Clearly define significant interaction points between the Contractor, NEPCO, and other entities including but not limited to: local agencies/authorities; and utilities. All activities of the NEPCO, utility companies, adjacent contracts, and other entities that affect progress and influence any contract required dates including durations shall be shown in the schedule. This includes dates related to all Permits or Agreements. The schedule shall give special consideration to sensitive areas such as outage requirements, connection to other substations and shall indicate any time frames required.

**xiii)** **Activity Resources** – The Contractor will be required to develop Labor resources, Equipment resources or Contract Pay Item resources in the Resource Dictionary, or assign them to schedule activities. However, the NEPCO will assume when reviewing the schedule that the Contractor's resources are unlimited. If labor, equipment and contract pay item resources are not assigned to activities in the schedule, it shall be the Contractor's responsibility to assure the activity logic in the schedule properly reflects their resource limitations.

**xiv)** **Narrative** - Include a narrative in Microsoft Word format that describes:

- The Contractor's general approach to construct the Work outlined in the baseline schedule. Address the reasons for the sequencing of work and describe any resource limitations, potential conflicts, and other salient items that may affect the schedule and how they may be resolved.
- If not provided in the contract plans, or if modified by the Contractor, provide copies of the appropriate contract plan sheets marked up as Key Plans, to correlate values on the contract plans to the Contractor's planned breakdown of the project (i.e.- Activity Codes, Activity Descriptions) for scheduling purposes.
- The justification(s) for each activity with a duration exceeding 21 working days.
- The reason for any lags assigned to any activities (Lag Report).
- The justification(s) for Contractor imposed activity constraints proposed in the schedule.
- A list of calendars which have been used in the schedule, along with the general reason for their use.
- The project critical path and challenges that may arise associated with the critical path.
- Anticipated coordination issues related to work activities by other entities, that require additional information from or action by the Engineer.
- Appendix 1 to the narrative shall be the "Schedule Log" report created when the project was scheduled.
- Appendix 2 to the narrative shall be an electronic schedule plot (Adobe Acrobat format), with activities sorted by Start Date in ascending order, Grouping of activities by WBS, and only the "Longest Path" filter applied. This plot shall provide a clear critical path from the Data Date to the last activity in the schedule.

**xv)** **List of Submittals –** The Contractor shall submit with the Progress Schedule a list of all Submittals (i.e. - Shop Drawings, required permits, Erection/Demolition plans, Heath and Safety Plan, etc.) generated from the Baseline Progress Schedule for review and approval by the Employer/Engineer. The Contractor shall use a Filter to limit the schedule activities shown in the report to only prepare/submit, review and approve activities related to submittals. For construction contracts that utilize Primavera Contract Manager, Shop Drawing submittal activities in the Progress Schedule shall be at the Submittal Package level.

Execution Program Submission package shall contain at least but not limited to following information;

a) Executive Summary (project information)

b) Overall Project Execution Strategy along with logic diagram.

c) Work Breakdown Structure (WBS)

d) Detailed Primavera Program (level 1,2 and 3)

e) Critical Path Analysis

f) Schedule of Cost Loading

g) Project Progress Table

h) Resource Histogram and S-curve (Manpower & Equipment)

i) Cash Flow Diagram

j) Detailed Procurement Log

k) Detailed Documents/Drawing Submission Log

l) Interface Schedule

m) Permits Approval Schedule

n) Method Statement for Progress Reporting

o) Weekly Report Format

p) Monthly Report Format

Contractor shall transfer to Employer/Engineer all computerized network data files electronically and *I* or on standard electronic media, clearly titled with data date, issue date, revision number etc. along with first submission and as and when required by Employer/Engineer.

### 6.3 Planning Levels

Planning documents to be produced by Contractor shall be presented in not less than three different levels of detail. The content, extent and output required for each level is listed hereunder. Employer/Engineer may ask introduction of more levels for the purpose of detailed monitoring, if felt necessary. The lower level summaries will roll to next higher levels.

- Level 1: SOW/Section of Work Level, per SOW/Section of Work items defined under specific Contract,
- Level 2: Project Phase Level, per Engineering, Procurement, Construction (Civil Works and Equipment Installation) and Commissioning,
- Level 3: Detailed Activity Level (Control Level).

**LEVEL 1 PLANNING AND SCHEDULING**

**Level 1 Bar Chart**

This is a summary time schedule logic bar chart covering the Scope of Work, including all project completion Section of Work dates and other key dates as specified by Contract. The Level 1 bar chart shall be updated once every month and at a regular interim period if deemed necessary by Employer/Engineer. The Level 1 bar chart shall contain the following information as a minimum planning requirement:

- Work Breakdown Structure (WBS) Identifier
- Activity description and duration
- Planned and Actual percentage progress
- Baseline start and finish dates (original)
- Current early start and early finish dates
- Forecast finish dates as on data date
- Actual start and finish dates
- Contractual Section of Work dates and other key dates (original, plan and actual)
- Major/critical material Section of Work dates
- Main interface dates

The Level 1 bar chart shall be presented as an A3 size document accompanied with a CD of the same information (if requested by Employer/Engineer).

**Level 1 Progress Status Table**

This table shall provide the following information for each Level 1 activity:

- WBS identifier and description
- Weight factor
- Planned and Actual Progress for previous period and reporting period

**Level 1 Progress S-Curves**

The Level 1 S-Curves shall provide the following information for each Level 1 activity:

- Overall S-Curve
- Level 1 S-Curves (for each SOW)
- Data table below each S-Curve diagram for Planned (monthly and cumulative) and Actual (monthly and cumulative) progress percentages.

**LEVEL 2 PLANNING AND SCHEDULING**

The Level 2 schedule shall consist of a set of computerized working documents to be issued by Contractor initially to control the job at the Project Phase level. For representation, Level 2 includes bar charts and progress/productivity tables. This schedule is a direct combination of Level 3 activities summarized at Level 2.

**Level 2 Bar chart**

The Level 2 bar chart shall be an aggregate bar chart for the complete Scope of Work. Level 2 shall be updated every week. The Level 2 bar chart shall contain the following information as a minimum planning requirement:

- Work Breakdown Structure (WBS) Identifier
- Activity description and duration
- Planned and Actual percentage progress

- Baseline start and finish dates (original)
- Current early start and early finish dates and total float
- Forecast finish dates as on data date
- Critical path relationships
- Contractual Section of Work dates
- Key interface dates (planned, actual & forecast)
- Facilities shutdown dates (if any)

The Level 2 bar chart shall be presented either as an A3 or A4 size document as agreed with Employer/Engineer, and accompanied by a CD of the same information, if required by Employer/Engineer.

**Level 2 Progress Status Table**

This table shall provide the following information for each Level 2 activity:

- WBS identifier and description
- Weight factor
- Planned and Actual Progress for previous and reporting period

**Level 2 Progress S-Curves**

The Level 1 S-Curves shall provide the following information for each Level 1 activity:

- Overall S-Curves for each Project Phase e.g. Overall Engineering, Overall Procurement, Overall Construction (Civil Works and Equipment Installation) and Overall Commissioning S-Curves
- Level 2 S-Curves for each Project Phase under every SOW e.g. SOW1 Engineering, Procurement, Construction (Civil Works and Equipment Installation) and Commissioning,
- Data table below each s-curve diagram for Planned (monthly and cumulative) and Actual (monthly and cumulative) progress percentages.

**LEVEL 3 PLANNING AND SCHEDULING**

**Level 3 Barchart**

Level 3 Barchart shall be supported by the project critical path network, reflecting all the individual work elements, including sub-contracts if appropriate, and shall demonstrate the viability of Contractor's overall execution plan. The activities in the Level 3 Barchart shall allow automatic roll up of activities, weightage, progress, etc to summary levels. All detailed activities in Level 3 Barchart shall be assigned with weighting factors. The weight factors, when approved by Employer/Engineer, shall be the basis for the detailed progress reporting system. Back-up details used by Contractor in deriving the weighting factors shall be submitted. Level 3 network shall be resource-loaded to reflect the resources (manpower, materials and equipment) planned to be used by Contractor in completing the project, and shall form the basis in generating the resource curves and histograms. Level 3 network shall also be assigned or loaded with approved weightages to obtain the overall s-curve (planned vs. actual). Contractor shall use the approved planning software system to develop the planning and scheduling function and to enable control of all aspects of the work. The scheduling software shall:

- Generate Contract Barchart schedules as per agreed WBS with planned, actual and forecast dates rolled up to Level 2.
- Enable extensive selection and sorting facilities by the activity codes It should also be able to generate tabular and graphic reports for baseline target and earned values.
- Be able to produce logical network, present critical path, total float etc.
- Cover the Design and Detailed Engineering, Procurement, Transportation, Fabrication,

Construction, Installation, Hook-up, Shut down, Tie-ins, Hot Turnovers, Pre-commissioning, Commissioning and As Built phases.

The content of activities and the choice of constraints shall identify all critical and sub-critical paths.

The following Level 3 computerized output shall be considered as:

- Complete electronic copy of the logic network on a CD
- Detailed Level 3 activity bar chart as per agreed WBS with resource, weightage and quantity loaded
- Activity listing with preceding and succeeding activities
- Activity listings sorted by WBS / Early start
- Any other activity listing required by Employer/Engineer

Information to be provided by activity shall include (as minimum) the following:

- Work Breakdown Structure (WBS) Identifier
- Activity Description
- Activity Percentage Progress (planned and actual)
- Activity Duration (original duration and remaining duration)
- Section of Work dates
- Predecessors and Successors
- Planned Start and Finish dates
- Early Start and Finish dates
- Late Start and Finish dates
- Total Float
- Free Float
- Resource content
- Quantity to Complete and Actual Quantity Achieved

## 6.4 Progress Monitoring

The objective of monitoring system is to monitor project performance in a precise way to cost based earned value, critical path analysis and physical progress measurement based on weight factors assigned to individual activities. Project shall be monitored at appropriate intervals (weekly, bi-weekly & monthly) to evaluate project performance.

Liquidated damages, penalties or award of extension of time is applicable for individual Section of Work hence contractor shall report status of each Section of Work (if any in the contract) separately.

Project program shall be updated on weekly basis, brief project analysis report with major constraints and issues shall be submitted with weekly report and detailed project performance report with other project information shall be submitted with the monthly report.

For weekly report, program shall be updated on Thursday to reflect progress up to Wednesday, and for monthly report program shall be updated up to cut off date of the report ($25^{th}$ of the month).

Planning updates shall determine by calculation, the Planned and Actual Progress values for each activity (or Work Package) using agreed Weight Factors and cost loaded in the program.

Contractor is not supposed to make any changes in the original approved program while updating. If there are any changes necessary (like change in activity duration, relationship or lags), prior consent from the Employer/Engineer shall be obtained.

To obtain consent for any changes to the program, contractor must submit copy of program with changes incorporated and detailed list of changes with proper justification.

Critical path analysis shall be carried out with each update to assess the progress status and if there are any delays to the original contract completion dates (or revised dates in case of revised program) that should be reflected in Impact analysis report with appropriate justification for delays occurred during reporting period.

For each Monthly Progress Schedule submission, the Contractor shall submit a narrative in Microsoft Word, or Adobe Acrobat format that includes, but is not limited to: (The narrative may be an annotated copy of the Claim Digger Report that includes the information below.)

i) List any problems experienced during this Progress Schedule submission period, the party responsible for the problems, and the Contractor's intentions to resolve the problems.

ii) List all activities for procurement of long lead time materials that are behind schedule and the reason(s) why.

iii) For major work items describe the differences between the actual work performed and the work planned for the period as represented in the preceding Progress Schedule submission, including explanations for the deviations.

iv) For all suspended work activities that could otherwise logically be progressed, identify the responsible party prohibiting the progression of the work, as well as the detailed reasons why.

v) Description of any changes to the critical path since the last Monthly Progress Schedule submission and the impacts of such changes.

vi) Change to NEPCO owned Float and/or Contractor Owned Float based on changes to the critical path.

vii) List of all added or deleted activities included in this Monthly Progress Schedule submission, and the reason(s) for and the impact(s) of such changes.

viii) List all changes in activity Original Durations, the justification for such change(s), and the impact(s) of such changes.

ix) List all changes in relationships between activities included in this Progress Schedule submission, and the reason(s) for and the impact(s) of such changes.

x) List any addition or deletion of activity or project constraints, and the reason(s) for and the impact(s) of such changes.

xi) List all changes to the project calendars, and the reason(s) for and the impact(s) of such changes.

xii) The major work elements, as defined in the WBS, to be accomplished during the next monthly work period.

xiii) Any potential problems that are anticipated for the next monthly work period and the proposed solutions to such problems. Identify potential problems or risks that either the Employer/Engineer or Contractor may be potentially responsible for. Explain what action the responsible party needs to take and the date by which time the action needs to taken to avoid the problem.

xiv) Any planned acceleration of activities that the Contractor anticipates to undertake within the next monthly work period that either the NEPCO directed, or that the Contractor believes is necessary.

xv) The following appendix in Adobe Acrobat PDF file format shall be included with the narrative.

- APPENDIX 1 – Contractor shall assign baseline schedule to the update schedule and submit status report with a listing of all work activities as of the data date, using the Classic Schedule Layout, sorted by Early Start Date, Total Float in increasing order, showing the Activity ID, Activity Description, Original Duration, Remaining Duration, Planned Percentage, Actual Percentage, Planned Start, Planned Finish, Actual Start, Actual Finish, Total Float. The Gantt chart shall clearly indicate the project critical (longest) path. Graphical representations shall be shown at a suitable scale to be legible and readable.

- APPENDIX 2 – A complete Scheduling/Leveling Report (SCHEDLOG.TXT file generated by the Primavera scheduling software application) which includes the Schedule Settings, Statistics, Errors, Warnings, Scheduling/Leveling Results, Exceptions, Activities with unsatisfied constraints, Activities with unsatisfied relationships, and Activities with external dates. The statistics shall include, # of Activities, # of Activities Not Started, # of Activities in Progress, # of Activities Completed, # of Activity Relationships, and # of Activities with Constraints. Total number of activities on the critical path, percent complete, activities without predecessors, activities without successors, and activities out of sequence.

- APPENDIX 3 – Claim Digger Report (generated by the Primavera software application) providing a comparison between this Progress Schedule submission and the previous Progress Schedule submission.

Based on the updated schedule project performance or delays shall be identified using 3 parameters i.e. earned cost, earned weight factors and total float.

Along with every report list of major concerns, minor concerns and issues shall be submitted with proposed solution and status action for the same.

List of contents and some sample formats for weekly and monthly reports can be found in Attachment 2 and 3 of this document. The list determines minimum requirement for NEPCO satisfaction, if in contractor opinion any additional information which may benefit the project, he can add in the report with prior consent of NEPCO.

### 6.4.1 Photographs

The Contractor shall make all arrangements to provide progress photographs of all tests and such sections of the work in progress as directed by the Employer. Each photograph shall be of size 25 cm x 20 cm and suitably entitled. The negatives of the photographs or the electronic file shall be the property of the Employer and no prints from these negatives/files shall be supplied to any persons unless under the authority of the Employer.

## 6.5 Progress Control

Contractor shall implement, maintain and update a computerized Progress Control System, which enables the monitoring, and follow up of Planned/Actual physical progress. Progress control shall be established based on realization of work such as in terms of deliverables and construction quantity/volume accomplished, including efforts put in by Sub Contractors and all other agencies that contribute towards the progress of the Contract.

GENERAL

Contractor shall prepare a control estimate for the WORK covering the resource (man hours and equipment hours) requirement. Such estimate shall consist of the breakdown of the WORK (in exact compliance with the WBS) into measurable activities. To each of these activities shall be allocated work content (Weightage) as an equivalent to man-hours and equipment hours, estimated to achieve it.

Weight Factors (Weightage), Planned and Actual Progress, at any level, shall always be calculated from estimated weight factors spread over the activity duration. Planned and Actual progress shall always be assessed at the lowest level of planning. For some specific activities (with long duration such as Manufacturing), Planned and Actual Progress may be calculated by the Estimated Completion Date.

Planned and Actual progress may be assessed by either one or a combination of the following methods, considering the nature of the activity concerned:

- From physically produced quantities e.g. number of drawings or material procured in case of Engineering or Procurement, refer to point next chapter: Progress Scales.
- From physically measurable quantities actually installed/tested (partially or completely) in the case of construction, pre-commissioning, commissioning and Start-up activities.

Actual progress shall always be based on physical achievement only. Actual progress shall not, under any circumstances, be assessed by pure estimate or reference to man-hours spent.

PROGRESS SCALES

For each Project Phase, Contractor shall propose to Employer/Engineer a set of progress scales to assess actual physical progress. Once mutually agreed and approved by Employer/Engineer, progress scales shall be utilized for distributing weighted factors over the duration of the activity. Actual progress shall be calculated at the lower level using several Progress Scales that differ depending upon the type of deliverables to be issued or type of work to be done.

DETAILED ENGINEERING:

Cumulative Scales of Progress should be compiled using controllable steps of physical work achievements for each generic type of document.

- Start on Drawing Board in a logical sequence ……5%
- Inter Disciplinary Check ……45%
- Issued for Comments……50%….(Rev. 0)
- Issued for Approval……65%....(Rev. 1)
- Re-Issued for Approval……...80% ....(Rev. 2)
- Issued for Construction (IFC)……...95%
- Issued As built……...100%

PROCUREMENT

For Procurement, Cumulative Scales of Progress shall be established to monitor each item from the purchasing up to the delivery and acceptance at site. Two different scales shall apply for Major Equipment and Bulk Supply (If deemed necessary by Employer/Engineer)

a) Equipment

- Issued Purchase Order…….... 10%
- Manufacturing Started ……..…....20%
- Manufacturing Completed ……..……..….65%
- Inspection Cleared and Factory Tested (FAT)..……....70%
- Freight……..….95%
- Arrival of Goods Confirmed (signed) ……..……...100%

b) Bulk Material (If deemed necessary by Employer/Engineer)

- Place order for Bulk material ……..….10%
- Complete Fabrication of Bulk material ……..…30%
- Ex work……50% (90% of estimated quantity)
- Material received at Construction Site……85% (90% of estimated quantity)
- All Material received and purchase order closed ……100%

CONSTRUCTION, PRE-COMMISSIONING, COMMISSIONING & START-UP:

Contractor shall submit Progress Reporting Methodology for Employer/Engineer approval. Contractor shall produce progress scales for all Construction, Pre-Commissioning, Commissioning & Start-Up activities. For activities where progress scales are not applicable progress shall be measured using actual quantities completed (e.g. meters, cubic meters, peaces etc.)

WEIGHT FACTORS

For higher level Progress consolidation, a Weight Factoring System is to be implemented. In all cases, Weight Factors shall be calculated using estimated or planned efforts (man-hours and equipment hours). However, consideration may be given to the summary level cost break down to estimate weight factors for different work phases e.g. Engineering, Procurement, Installation, Pre-commissioning, Commissioning etc. The basis of deciding summary level weight factors shall not be implemented without approval of Employer/Engineer. To retain consistency of Progress reporting, the Weight Factors shall not be modified, during the course of the Contract, except if requested or approved by Employer/Engineer.

PRODUCTIVITY

During the construction phase, Contractor shall keep up-to- date records of physical progress made for its work and that of its sub contractor's. Contractor shall present to Employer/Engineer on a monthly basis a comparison of the actual progress figures with the scheduled figures for a number of controllable items in representative categories such as (but not limited to):

- Number of Major Substation Equipment installed

- Meters of Overhead Line Conductor installed
- Number of Overhead Line Poles installed
- Number of instrument and control elements installed and connected
- Meters of trenches excavated
- Meters of Power Cables installed
- Quantity of concrete poured
- etc.

Contractor shall keep up-to-date records and inform Employer/Engineer each month on the productivity of the work force. Productivity records shall include work hours per category of item installed or erected.

## 6.6 Program Revision

If at any point of time it should appear to the Employer/Engineer that actual progress of the works does not conform to the Program to which consent has been given by Employer/Engineer, the Contractor shall produce, at the request of NEPCO, a revised programme showing the modifications to such programme necessary to ensure completion of the works within the time for completion. The Contractor shall produce any such revised program to the Employer/Engineer within 14 calendar days of being requested to do so by the Employer/Engineer. At any point of time if contractor see any need to revise the program he may do so with prior consent of NEPCO.

With every program revision following data must be submitted;

i) Reason for program revision

ii) Tables outlines changes done in the program

iii) Revised cash flow and earned value curves

iv) Impact on contractual completion date or previous agreed completion date.

v) Comparison sheet between original program and current program.

vi) All other data as submitted with the Execution Program.

## 6.7 Recovery Plan

If the latest completion time for any work on the current Progress Schedule results in an activity being delayed ten percent or more of the time beyond the required Contract duration or any specified Section of Work duration, as adjusted if appropriate, the Employer/Engineer may require the Contractor to submit a Recovery Schedule and written description of the plan to recover all lost time and maintain the required Completion Date or specified Interim Section of Work Date(s).

Therefore, at mutually agreed cut-off date, Contractor shall establish the balance of work remaining to be completed for the Contract, at a measurement level, and reschedule activities to achieve Completion Date. All plans shall be rescheduled based on the remaining duration and balance quantities to complete for each activity. Remaining duration values must be realistic and reflect the previous recorded value of productivity. Up to date information shall then be fed into the computer for a new time analysis run. A

revised document known as the Recovery Plan shall be produced with all back up documents for Employer/Engineer consideration

Under no circumstances shall the Recovery Plan indicate a revised Scheduled Completion Date without prior approval and agreement with NEPCO.

The proposed Recovery Plan shall include a revised resource (manpower and equipment) deployment program, in line with the remaining duration and shall be incorporated into the baseline schedule to achieve the Completion Date.

The revised baseline schedule along with the proposed Recovery Plan, critical path analysis, manpower deployment histogram (Revised & Original) and other planning reports shall be submitted to Employer/Engineer for approval. Contractor shall ensure that all the above mentioned reports substantiate the Recovery Plan to achieve handover by the Completion Date. Once this Recovery Plan is approved by Employer/Engineer, all planning and scheduling reports shall be corrected to reflect revised planned percentage progress and revised plan along with original planned percentage progress and original plan. The project shall be re-baseline to reflect the revised schedule.

## 6.8 Extension of Time Claims

Extension of time claim shall be submitted to Employer/Engineer with proper justification.

Extension of time claim will be entertained only for those delays for which Contractor has notified to the Employer/Engineer within specified time limit as per the contract.

Relevant documents such as change orders, Employer/Engineer instructions, correspondences for the subject and any other material proof which justifies contractors entitlement for extension of time for the event shall be submitted with the request, request submitted without relevant documentation will be considered incomplete and rejected.

A Time Impact Analysis (TIA) shall be submitted to the Employer/Engineer for each request by the Contractor for an adjustment of contract time, or when the Contractor or Employer/Engineer consider that an approved or anticipated change to the contract may impact the critical path and contract progress. The TIA shall be based on a revised Progress Schedule and shall be submitted as an electronic file (Primavera and Microsoft Word for the narrative) containing:

a. The TIA shall illustrate the impacts of each change or delay on the current scheduled completion date or internal section of work, as appropriate.

b. The analysis shall use the accepted Monthly Progress Schedule that has a data date closest to and prior to the event as the “Current Baseline”, this shall then be compared against the “What-if Project Plan Baseline” for the purpose of the TIA.

c. If the Employer/Engineer determines that the accepted schedule used does not appropriately represent the conditions prior to the event, the accepted schedule shall be updated to the day before the event being analyzed.

d. The TIA shall include an impacted schedule developed from incorporating the actual or anticipated event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities.

e. If the impact schedule shows that incorporating the event negatively modifies the critical path and scheduled completion date of the accepted schedule, and the Employer/Engineer accepts the impacted schedule, the difference between scheduled completion dates of the two schedules shall be equal to the proposed adjustment of contract time.

f. The Employer/Engineer may construct and utilize an appropriate project schedule or use another recognized method to determine adjustments in contract time until the Contractor provides the TIA.

g. If a TIA submitted by the Contractor is rejected by the Employer/Engineer, the Contractor shall meet with the Employer/Engineer to discuss and resolve issues related to the TIA.

The time Impact Analysis shall define the extent of adjustment and the basis therefore, in a form acceptable to the NEPCO and shall include (but shall not be limited to);

- Identification of activities which will require change, and
- An analysis of how float has been used to minimize the additional time required.

The time Impact Analysis shall indicate the date any extra or additional work or other special circumstances which have occurred, the status of the work at that time, and the resultant impact on the Completion Dates.

For any EOT claims which are compensable, contractor must submit detailed cost breakdown and actual records for justification of all associated costs. Any claimed amount without supporting records will not be approved.

After detailed analysis is submitted contractor to conduct presentation to Employer/Engineer to justify/explain his entitlement.