

CHAPTER 4

EXECUTION PLAN FOR THE PROJECT

The following execution plan in this study explains the stages when manage the project. The execution plan is normally managed by project manager to show how the project is managed and coordinated within the plan. From the interview with project manager, the execution plan for the project is explained below.:

4.1 Execution Plan for Engineering Stage

Engineers from each engineering departments or groups (equipment, civil & structure, piping, electrical, instrumentation) will be assigned into the project team in accordance with predetermined manpower on engineering content, quality assurance, quality control and schedule to ensure that all works issued are in conformance with the project requirements.

In general, application of CAE/CADD (Computer-Aided-Engineering / Design / Drafting) systems will be utilized to a maximum extent so as to assure quality and schedule controls on all engineering works.

The engineering works to be carried out under project are:

- Piperack foundation
- Equipment foundation
- Steel piperack design
- Mechanical equipment design (pumps & tanks)
- Piping design
- Instrument and control system
- Electrical grounding, lighting, and power

4.2 Execution Plan for Procurement Stage

In order to achieve efficient and high quality procurement works with minimum cost, contractor shall dispatch qualified procurement personnel, headed by the project procurement manager to the project task force. The execution of procurement will involve a project procurement team approaching for offshore purchase of equipment and materials, as well as for local purchase of equipment, materials, and subcontracting. Equipment and bulk material purchases will be performed simultaneously along with engineering progress and by means of the computer-aided procurement / requisition processing system. The procurement activities comprise of purchasing, subcontracting, follow-ups of vendor drawings, expediting, inspection, shipping, importation, customs clearance, inland transportation, insurance arrangements, payment and related services.

The purchasing effort will be tailored to meet the following goals.:

- To maintain the overall schedule in accordance with the project specifications and at an economical price.
- To comply with applicable project requirements to assure quality and technical acceptability.
- To select vendors with proven reliability and service experience.
- To assure deliveries consistent need dates at construction field.
- To timely to follow up of vendor prints.
- To consider the interchangeability of spare parts for similar types of equipments.

For critical equipment, contractor will release inquiry packages only to those approved vendors by client. However, if it is necessary to add some vendors other than those in the list, contractor will ask for client's approval. When contractor considers the addition of vendors into the vendor list, foreign manufacturers having local offices or agents in Thailand will have priority over others who do not have. For non-critical and some bulk materials, on the account of cost concern and better after-services, contractor will try

procure locally in Thailand as much as practical provided the local quality and services can meet client's requirements.

After preliminary review, the most commercially and technically attractive quotations will be forwarded to contractor's project engineering team for further technical evaluation. Questions against quotations during the technical evaluation will be clarified through contractor's project procurement team, the only authorized communication channel to contact bidders. Commercial evaluation will only be made for the technically-accepted quotations. If necessary, face-to-face negotiations and/or pre-award meetings will be arranged as to achieve the goal for best quality and shortest schedule. Finally, the bid tabulation, summarizing the technical evaluation will be approved by contractor's project engineering team and commercial evaluation approved by contractor's project procurement team. Generally, 2 to 4 weeks are required for receiving quotations of engineered equipment; 2 to 4 weeks for bid comparison and approval.

After approval, purchase orders in the name of contractor will be issued to successful vendors. All amendment of quotation for purchase orders, whether technical modifications or commercial matters, must be made by a formal supplement to the purchase order. Definite receipt schedules and approval requirements of vendor prints shall be also indicated in the purchase order documents according to the vendor's commitment during bid evaluation.

Close coordination between engineering groups and vendors through contractor's project procurement manager will be emphasized as to match with contractor's engineering progress and also shorten the shop-fabrication schedule of equipment and maintain high quality. Without contractor approval on vendor prints, vendor will not be allowed to proceed with fabrication.

Contractor will expedite all purchase orders from the date of order placement until FOB for offshore items and ex-work for local items as to maintain the delivery schedule. A chief expediter will be assigned to take overall responsibility of directing the day-to-day expediting activities and directly report to the project procurement manager. With reference to status of vendor's engineering and procurement efforts, status of major materials delivery, and status of manufacturing / fabrication, office expediting will

generally be made via telephone, telex, cable, telefax, or letter in case that any delivery problems are found. And the time of delivery will be predicted according to the vendor's progress and previous experience and/or knowledge of current circumstances.

Shop inspections and tests, if required by applicable data sheets, drawings and specifications, will be performed by qualified inspectors in accordance with testing specifications. Contractor will review all purchase orders to determine which equipment or materials are subject to inspection and the extent of inspection. Generally, contractor does not require the following items for inspection: piping bulk materials (valves, pipes, fittings / flanges, gaskets, bolts / nuts), instruments, electrical bulk materials, instrument bulk materials, tubes, tubesheets, nozzle forgings.

Shipping will be controlled by contractor purchase coordinators of the project procurement team to coordinate all phases of transportation activities. Contractor's standard import preparation and packing instructions define a general outline of offshore purchase. A project import preparation and packing standard will be developed to suit the necessary requirements for import equipment after contract award. Prior to shipment, all offshore equipment and materials shall be packed in sufficient conditions suitable for exporting and to ensure safe arrival at their destination without any damages. The selected forwarder shall work with contractor purchase coordinator and vendors to arrange ocean vessel or air cargo transport to the specified port. The forwarder must assure that all shipping documents are received by contractor well ahead of shipments arrival. Therefore, once the equipment and materials are ready for shipment, the forwarder will send shipping documents indicating the information such as packing list, ETD, ETA, name of ocean liner or flight no., description, value, weight, etc. for each shipment via courier service as soon as possible to contractor. Contractor purchase coordinators will coordinate the local customs broker to proceed with customs clearance and arrangement of inland transportation to plant site. Contractor will keep partial shipments to a minimum unless construction schedule requires so.

4.3 Execution Plan for Construction Stage

During construction phase, contractor shall assign an experienced project construction manager (PCM), who is responsible for all site activities and represents contractor to interface on a daily basis with client site office in all construction-related matters. He will be authorized to adjust construction procedure to suit client's requirements at the construction team consists of a group of specialists and supervisors for the execution of the project. Contractor construction team will also make use of our computer-aided Construction Management System (CMS) for efficient construction execution.

Right after the contract award, contractor construction specialists will visit the jobsite and collect technical information (such as site conditions, dumping areas and/or special requirements of nearby existing facilities) in order to study and develop the most suitable construction procedures and methods. Emphasis will be placed on subjects such as site conditions of existing plants and building, excavation plan, erection and installation of large or heavy equipment and tie-in works.

From the overall project schedule, a series of detailed construction schedules (such as temporary facility setup schedule, construction manpower mobilization schedule, construction equipment schedule) will be prepared. Meanwhile, contractor's qualified subcontractors will be utilized as to facilitate the planning as realistic as possible.

During the preparation of equipment installation, contractor's construction specialists will review and familiarize with the following information: plot plan and elevation, structure drawings, vendor prints / manual, special requirements of temporary foundations for cranes (if needed), etc., as to determine the access way, operation positions, boom length, and loads of cranes.

After plans and schedules are finalized, contractor will carry out each responsible construction activities in strict accordance with the plans, schedules, quality control manuals, safety procedures and construction specifications. Civil works such as foundations will start first. Meanwhile, erection of underground pipes will start as early

as possible in order to coordinate with the foundation work. Areas for receiving and storing structural steels and piping bulk materials will be set up.

Prefabrication of steel structure will be executed at temporary shop in jobsite or contractor shop. Construction equipment especially cranes, will be also mobilized into the jobsite according to the predetermined mobilization schedule. In general, the erection of major equipment will follow the sequences below.:

1. Heavy or large equipment
2. Remaining vessels such as tank, drums, and heat exchangers on steel structures and ground
3. Machinery such as pumps.
4. Tanks (field assembly and erection)
5. Packaged units
6. Miscellaneous or special equipment
7. Field hydraulic or pneumatic testing (if necessary)

Erection of aboveground piping will follow the equipment installation as quickly as possible. All aboveground electrical and instrumentation works will be also commenced at adequate time after piping work starts. Painting and insulation works will be the last items to be performed. Field inspections and testing will be performed for each completed items simultaneously as construction works progress. After completion of all construction works, contractor will assist client to perform pre-commissioning, commissioning and startup work.