

Chapter– 12

CONSULTANT'S SCOPE OF WORK

1.0 SCOPE OF WORK

CONSULTANT shall be the Project Management CONSULTANT for the Project as defined in Para-I: Chapter-5 and its implementation in accordance with the Project Implementation Strategy given in Para-II: Chapter-5 of this Tender Document. Unless otherwise specifically agreed, as such CONSULTANT shall perform and be responsible for the performance of all services as are necessary for or incidental to providing comprehensive project management and associated services for the Project commencing from pre-project works of detailed feasibility study, data collection, survey, soil investigation, various studies, project cost estimation and leading to the Basic & detailed Design, Engineering Feed/Process design phase, Pre-qualification of Contractors, preparation of Tender Documents & tender estimates, evaluation of bids, assistance in awarding and management of LSTK contract(s)/other contracts, assistance in obtaining statutory approvals by Owner, reviewing & approving vendors/contractor's design/drawings/documents, planning and project management, construction management, supervising at site, undertaking necessary visits as indicated elsewhere in this tender document, procurement, construction, testing and commissioning.

Some of the salient features of the scope of work for each facet of the Project activities is described hereinafter. These details are not limiting, and the CONSULTANT will be responsible for all other activities required to achieve completion of the Project, notwithstanding that the same are not specifically set out below.

1.1 PROJECT MANAGEMENT

Consultant on award of contract shall participate in the kick off meeting at owners's office/site for finalizing the various activities for the Project but not limited to following -

- Finalisation of Work programme
- Finalisation of Project/ Document control procedure
- Finalisation of Coordination procedure
- Finalisation of Activity weighting basis

The cost of deputing consultant's engineers/professionals shall be included in the Lumpsum rates

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CONSULTANT, during various phases of the Project, shall be responsible for total management of Project activities covering (but not limited to):

- (a) Basic Engineering & Design & estimate for all facilities of the Project including resitement /rerouting & dismantling of existing facilities. Preparation of cost Estimate based on basic engineering.
- (b) Detailed Engineering & Design & detailed estimate for all facilities of the Project including resitement /rerouting & dismantling of existing facilities .Preparation of cost Estimate(10% accuracy) based on detail engineering. Preparation of detailed cost estimates for the Project.
- (c) Data collection, Conducting topographical surveys of Plot and & approach road, soil investigation of Plot & approach road, development of layout/plot plans
- (d) Conducting various studies i Risk Analysis, EIA, Hazop /HAZAN,. Disaster management Plan, Environmental Impact Assessment (EIA) etc. & other studies required for environmental /Pollution control clearances/approval & assistance to IOC for obtaining approvals & clearances from various statutory authorities including developing documents & drawings required for all type of Statutory approvals /clearances for the Project from Ministry of Environment & Forest , New Delhi & Orissa Pollution Control Board, PESO/CCOE, Electrical Inspectorate, Central Electricity Authority, Factory Inspector, CPWD/PWD, District Magistrate, Fire services, Irrigation Deptt., Paradip Port Trust, Paradip Phosphate Ltd., Railways etc.& approvals from any other body as may be required for fulfilling local/state/central government requirement.
- (e) Pre-qualification of LSTK Bidders and other contractors.
- (f) Preparation of Lumpsum Turnkey (LSTK) Tender Bid Packages and other individual tender documents with tender wise detailed estimates(with +/-10% accuracy), rate analysis & basis of estimates
- (g) Assistance to IOC in Tendering, Evaluation and recommendations for Award of works on LSTK basis & for other tenders .Assistance in obtaining statutory approvals for the project.
- (h) Approval/review of detailed engineering & design , drawings/documents submitted by Vendors/Contractors etc.
- (i) Procurement Services & Expediting
- (j) Project Management & Construction Management & supervision at site including Quality Assurance/ control services for the works executed by selected LSTK contractor(s) and other contractors to ensure timely, economic, safe and quality completion of Project.
- (k) Pre-commissioning & Start up of the all facilities/units
- (l) Commissioning and performance testing of the entire Project facilities.
- (m) Facilitating handing over the plant from LSTK Contractor to Owner.

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- (n) Preparation of close out reports & handing over of as built drawings/documents to Owner.
- (o) The scope of Consultant also includes all visits of Consultant's personnel /professionals (from their design office as well as from Paradip site) to Owner/IOCL's offices or any third party offices or works or Paradip site as required for the job or as directed by Owner /IOCL for the completion of the works as per scope of work given in this tender and for project monitoring, presentation, meeting, inspection etc. The Lumpsum rates quoted by Consultant shall includes the cost of above visits as necessary for completion of works.
- (p) The consultant is required to undertake the visits immediately as directed by Owner/IOCL or as required for completion of the works/project. If Consultant fails to undertake visits within time frame advised by Owner/IOCL, Owner/IOCL shall deduct proportionate amount as assessed by Owner/IOCL towards visit charges from the Lumpsum rates quoted by Consultant (as per Price Part II in Chapter 16 , Form 2, 3 , 4)

1.2 PLANNING & CONTROL

- a. Developing project scope and procedures for the entire project.
- b. Preparation of Network for the project and updating of the same by periodic evaluation and review. Identifying the critical activities and its close monitoring to adhere to the overall project schedule. Preparation of networks for LSTK jobs as sub-projects.
- d. Preparation of detailed networks, bar chart schedule covering all concerned activities to be performed by CONSULTANT in keeping with the overall project schedule.
- e. Preparation of Master Project Schedule for mechanical completion, commissioning of the project including pre-project works.
- f. Preparation of Master planning document for the entire project and its regular updation.
- g. Preparation of major milestones for the entire project including that of LSTK works & other contracts.
- h. Developing an appropriate MIS covering monitoring, reporting, controlling, feedback, mid-term corrections. Assist OWNER in preparation of reports for ministries.
- i. PMC shall endeavour to minimise the deviations from the project specifications.
- j. Organize and participate in regular Project Review Meetings at Owner's Mumbai Office/at Paradip site on Fortnightly / Monthly basis & at Site on Daily / Weekly / Monthly basis and submit Monthly

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Progress Reports and Flash Reports on Daily / Weekly / Fortnightly basis, both for HO & Site Services.

- k. Ensuring submission of As-Built drawings and P&IDs & other drawings /Manuals ,documents by LSTK Contractors/other contractors.
- l. The CONSULTANT and the contractors (LSTK) shall use common computer software for ease of information exchange/ data integration.
- m. Furnish all data and drawings in electronic/CD format (text in MS-WORD, data in MS-EXCEL and drawings in AUTOCAD Rel-14) alongwith a hard copies.
- n. Suggest catch up plan to bring back the project on schedule, if delayed.
- o. Furnish weekly report of progress on catch up plan.

1.3 DEVELOPMENT OF PROJECT PROCEDURES

- a) Developing overall project execution philosophy and project coordination procedure.
- b) Preparation of procedures covering mechanical completion, pre-commissioning, commissioning, start-up, performance test runs for the Units and their take over from the LSTK Contractors and other contractors.

1.4 PROJECT QUALITY ASSURANCE

1.4.1 CONSULTANT shall perform the following Quality Assurance & Quality Control activities:

- a. Prepare & enclose the following as a part of LSTK bid documents after taking due approval from the OWNER:
 - (i) Overall generic Quality Assurance and Quality Control (QA/QC) System for the various phases of the Project (i.e. Engineering, Procurement, Construction and Commissioning).
 - (ii) Overall QA/QC plan for the project
 - (iii) QA/QC procedures for common equipments & bulk materials
- b. Review/approval (in consultation with the OWNER) of Quality Assurance Programme of each LSTK Contractor in respect of all materials to be supplied and works to be performed by the respective LSTK Contractors /other contractors. CONSULTANT shall ensure that the Quality Assurance Programme of LSTK Contractors/other contractors is based on the documents enclosed by CONSULTANT in the LSTK bid documents/other tenders.
- c. Keeping regular surveillance and audit Quality Assurance Program of LSTK contractor, other contractors and vendors and ensure its implementation.

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- d. Preparing and updating QA/QC report for the entire project on a regular basis identifying areas for corrective action by concerned agencies and implementing the same.
 - e. Preparing detailed scope and stages of inspection for all procurement items viz. equipment and bulk materials and & works at site
 - f. Ensure that the LSTK Bid / other tender contains a clause that the LSTK contractor will forward to IOCL for review the plan for design describing the responsibility for various activities and technical interfaces, necessary resources required for effective planning.
 - g. Ensure that the LSTK contractor/other contractors shall adhere to design control exactly as per ISO 9001. LSTK Contractor/other contractors should submit required records as evidence for review of IOCL as and when required and shall carry out changes based on Consultant / IOCL review.
- 1.4.2 In order to achieve superior QA during all stages of construction, CONSULTANT besides carrying out strict monitoring as per drawn up QA plan, should undertake measures to identify & liquidate problem w.r.t. mix up of various material such as piping, flanges, joints etc., & flange joint box-up with particular emphasis to High pressure & High temperature section, hydrogen circuits for the entire project. Use of modern gadgets like positive material identification (PMI) & Torque wrenches etc. have to be ensured for this purpose.
- 1.5 **MONITORING, COORDINATION & SUPERVISION OF LSTK CONTRACTORS/OTHER CONTRACTORS**
- CONSULTANT, as Engineer-in-Charge of LSTK Contractors /other contractors at site shall perform the following activities:
- a. Establishing of project control system to control, monitor and report to the OWNER by LSTK Contractors/other contractors.
 - b. Providing an effective, continuous liaison and control both at site and design office of the LSTK contractors to ensure prevention of slippage in project schedule.
 - c. Monitoring of LSTK contractors's various activities particularly focusing on purchase, expediting and suggesting corrective actions thereof.
 - d. Study, analyse, review, check, certify and recommend to OWNER any change orders, claims, additions/deletions in the LSTK contractors during the project execution.
 - e. Studying of systems, adequacy check of existing equipment and recommendation to the OWNER for necessary augmentations/ changes, if any.
 - f. Supervision and co-ordination of all LSTK contractors's and other contractors's activities viz. planning, organizing, controlling, monitoring.

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- g. Define clear and unambiguous boundary limit conditions for each of the LSTK Contractors/ other contractors.
- h. Co-ordinate, liaison with all LSTK Contractors/other contractors to ensure no overlaps or left out activities in the total project work.
- i. Ensure all drawings prepared by successful LSTK bidder/other bidders will conform to statutory regulations and standards.
- j. Ensure all hook-up connections are covered in the LSTK package for piping, electrical, civil, mechanical, instrumentation, DCS etc. to integrate the entire project activity & sort out discrepancies between various agencies/ contractors.
- k. **Preparation of re-routing drawings for piping, electrical and instrument cable routing along with the corridors.**
- l. Checking, certifying and recommending the billing break-up/ billing schedule furnished by LSTK Contractors/other contractors.
- m. Close follow up/ expediting of delivery of critical equipment.
- n. Certification of Wage/attendance of labours, witnessing of labour payments, certification of PF/ ESI challans etc.
- o. Certifying the LSTK Contractors's documents/other contractor's documents, invoices, bills of the supplies and/or works as the case may be to enable the OWNER to release the payment to the LSTK Contractors as per respective billing schedule.

1.6 PROJECT COST CONTROL

CONSULTANT shall undertake:

- i. Cost budgeting, expenditure profile and forecasting for the entire project .Preparation of estimates based on basic engineering & design.
- ii. Preparation of detailed cost estimate alongwith rate Analysis & basis for estimates for each of the LSTK tenders and other tenders in consultation with the OWNER.
- iii. Preparation of report highlighting planned expenditure profile vis-à-vis actual expenditure on an annual basis for budgetary control purposes of the OWNER.
- iv. Preparation of cost status reports including cash flow analysis on monthly basis.
- v. Furnish the following information for OWNER to take up preparation of Completion Report of the Project as per guidelines of Department of Public Enterprises (DPE).
 - a. Final project cost variations from approved project cost estimates and justifications for the same.
 - b. Delays in completion schedule, if any, and reasons for the same.

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1.7 DRAWING/ DOCUMENT APPROVAL

CONSULTANT shall :

- i) Finalize plot plan/layout Plan based on equipment sizes, site restrictions, maintenance & shutdown considerations, operational, safety, construction access and statutory requirements like PESO, Oil Industry Safety Directorate (OISD) etc.
- ii) Specify the Lists of critical drawings for the project including categorization of drawings as "Drawings requiring Approval" and "Drawings for Reference". Further Electronic mail transfer facility / other state-of-the art communication facilities should be adopted for approval of drawings and documents for expediting the entire process. CONSULTANT shall approve all critical drawings / documents submitted by LSTK contractors/other contractors within 10 (ten) working days from the date of submission. To expedite the process, approval across the table at designate design centres (within India) may also have to be taken up.
- iii) If the approval of a drawings or documents or other proposal(s) is not granted by the CONSULTANT within 10(ten) working days from the date of submission by the LSTK Contractors/other contractors, such drawings or documents or other proposal(s) will be deemed to have been approved by the CONSULTANT. Full responsibility of quality and/or correctness of the job carried out using such drawings or documents or other proposal(s) shall rest with the CONSULTANT.
- iv) For drawings/ documents the updated consolidated status indicating their submission, review & approval etc should be made available by CONSULTANT to OWNER through electronic mail. All drawings shall be properly signed & stamped with type of approval for identification.
- v) Review/ Approval of MR (Material Requisition) prepared by each LSTK contractors/other contractors in respect of all material to be supplied by them.
- vi) Review/ Approval of PR (Purchase Requisition) prepared in respect of all material to be supplied by respective LSTK contractors/other contractors.

1.8 ARCHIVES MANAGEMENT

CONSULTANT shall undertake management of archives including proper documentation, listing, indexing and updation of all documents/drawings under the project etc.

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2.0 PROJECT PHASING :

The entire scope of CONSULTANT services for the Construction of LPG Marketing Terminal Project at Paradip is divided into following phases:

- Basic Engineering & Design & estimate phase.
- Detailed Engineering & Design & estimate phase.
- Project cost estimation for investment decision /approval.
- Data Collection, surveys , Soil Investigation & Conducting various studies.
- Preparation of Tender Documents for LSTK Contracts & other contractors, assistance to IOC in tendering, evaluation and award of Contracts.
- Management of LSTK Contractor(s)/other contractors during following phases:
 - Detailed Engineering
 - Procurement
 - Approval of Design, Drawings /documents
 - Construction
 - Commissioning

The detailed scope of CONSULTANT's work for each of these phases is covered in the following paragraphs, which will not be limiting, as CONSULTANT is required to ensure completion of the entire scope of the Project (as per details in Para-2.0, Chapter-5 of this document).

3.0 SERVICES DURING PRE-PROJECT PHASE

3.1 Consultant should identify initial data required to be collected for sound engineering /design of the Project. Data like meteorological data, earthquake/ seismic, Flood level, survey reports, rain fall etc. etc for previous 25 years for Paradip are to be collected from various authorities by the Consultant at its own expense. In addition consultant have also to initiate action for obtaining other data like electrical system data from Utility ,Water supply sources available and other requisite data from available sources/authorities. If and so far as such data is not available such data will have to be generated by appointing contractor(s) at its own expenses to undertake relative studies as approved by the OWNER. The CONSULTANT will within the scope of work undertake all services necessary for and in relation to such appointments, including the preparation of tender documents, recommendation of contractor and supervision of the contractor(s) work.

3.2 Preparation of Detailed Project Report comprising of all facilities of the Project, capital cost, operating cost, project implementation plan / schedule, environmental aspect, effluent summary, plot plan / equipment layout etc.

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- 3.3 Preparation of Cost Estimate for total project(+/-10% accuracy) for Investment Approval.
- 3.4 CONSULTANT will undertake survey & soil investigation of the land & approach roads and will work out an initial Plot Plan of the LPG marketing Terminal Project at Paradip to facilitate development plans for site grading, layout for roads, approach roads, widening of existing roads, peripheral roads, watch towers, lighting system, drainage, etc. The Plot plan will be subsequently reviewed, updated and detailed by CONSULTANT, as necessary.
- 3.5 CONSULTANT shall carry out identification, analysis, basic design, preparation of specifications /cost estimates, Vendor list etc. in respect of various technical support facilities such as communication, computer software, communication link among various offices of CONSULTANT/LSTK Contractors/other contractors/OWNER through wide area network, testing facilities etc. OWNER, on the advice of CONSULTANT may decide either to include all or any of such facilities in the scope of LSTK Contractors/other contractors or appoint a separate contractor for the same. All services related to award of work, construction supervision and construction management in respect of these facilities shall be provided by CONSULTANT at no extra cost. Cost of acquiring such facilities shall be borne by the OWNER.
- 3.6 Conducting various studies i Risk Analysis, EIA, Hazop /HAZAN,. Disaster management Plan, Environmental Impact Assessment (EIA) etc. & other studies required for environmental /Pollution control clearances/approval & assistance to IOC for obtaining approvals & clearances from various statutory authorities including developing documents & drawings required for all type of Statutory approvals /clearances for the Project from Ministry of Environment & Forest , New Delhi & Orissa Pollution Control Board, PESO/CCOE, Electrical Inspectorate, Central Electricity Authority, Factory Inspector, CPWD/PWD, District Magistrate, Fire services, Irrigation Deptt., Paradip Port Trust, Paradip Phosphate Ltd., Railways etc.& approvals from any other body as may be required for fulfilling local/state/central government requirement.
- 3.7 Organization and Training
CONSULTANT will evaluate and identify the manning requirement, the plant operation organization structure, and training program for OWNER staffing.
- 3.8 CONSULTANT will develop the following, in close coordination with OWNER, by adopting an appropriate pre-qualification procedure for each category:
- Preparation of short list of LSTK contractors and Detailed Engineering Contractors

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- Preparation of Vendor short list (Indian/international) for equipment and materials
- Preparation of Construction Contractor's short list (Indian/international) for LSTK and other Contracts.
- Documents/Drawings Distribution System identifying review/approval/information types.

4.0 SERVICES DURING ENGINEERING & DESIGN PHASE

4.1. BASIC ENGINEERING & DESIGN

Preparation of Basic Engineering design, drawings, documents, technical specification, Data sheets, BOQ & estimates for all facilities of the proposed Terminal including but not limiting to following (The basic engineering shall be done by the consultant giving one or more alternatives ,out of which owner shall select based on optimum cost & site conditions) :

4.1.1 Process Engineering: Preparation of Process flow diagrams including flow diagrams for all system/sub-systems & utilities of Terminal showing major process flows, process temperatures & pressures in equipment and piping, critical control elements, heat/ material balance listing, qualities/ composition of streams, line specifications/ schedules, fire-proofing/ insulation requirements, sequences/ emergency shutdown requirements, flare system, P&I diagrams and equipment list (giving item number, description & and specification). Supervisory operating Manual sufficient for start-up operation and shutdown and suitable for expansion into detailed instructions.

4.1.2 Mechanical & Instrumentation: Basic Engineering & Design, calculation for sizing/capacities of equipment , listing selection criteria ,preparation of drawings , General Arrangement Drawings, Equipment layouts, providing equipments list with calculation for capacity , preparation of BOQ & estimates for mechanical & Instrumentation works & equipments, fittings etc INCLUDING LPG/PROPYLENE Storage Tanks (Mounded Bullets) , water Storage Tanks etc. required for the terminal .

Preparation of Piping and Instrumentation Diagrams giving:

- a. Complete piping and instrumentation including hook-ups for all Products (LPG, Propylene), Air, Water and utility piping including start-up, by pass, shutdown and emergencies etc.
- b. Line Specifications/ line schedule including sizes, materials of construction and code numbers, rating.
- c. Instrumentation control loops including any sequences or emergency shutdown requirements.

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- d. Control valve and relief valve sizes, types and response on air failure.
- e. Evaluation of equipment wherever they are critical for the process.
- f. P&ID furnished in the package should incorporate necessary preventive measures to prevent the hazards.

EQUIPMENT DATA SHEETS

These data sheets are required to initiate mechanical design and specifications. These data sheets shall be prepared for each piece of equipment, Product Storage Vessels and cover process requirement. Tanks, Vessels, Cooling Water System, Raw Water System, Plant Air/Instrument Air system, Waste Water System, Fire Fighting System, Power System, Flare System, DM plant, Pumps, Compressors, Bullet etc. shall be covered by a Sketch and Tabular Specification. Other equipment shall be covered by tabular specifications only. In general, the data sheets shall indicate:

- a. Type and capacity
- b. Skeleton Drawings showing fundamental construction and main dimension including all internals.
- c. Operating pressure, temperature and other conditions.
- d. Design pressure, temperature and other conditions
- e. Material(s) of construction
- f. Corrosion Allowance(s)
- g. Insulation and/or refractory lining(s)
- h. Details of all internals required

Instrument Data Sheets for listing all numbered instruments appearing on the P&I Diagrams and covering all process requirements.

Utility summaries showing connected, normal and maximum load of fuel, water, power and other utilities shall be furnished. In addition, Block Flow Diagrams for dematerialized water shall be prepared. These are subject to refinement during detailed engineering. Effluent summary containing the flow and critical specifications of various process effluents (for the entire project).

- 4.1.3 Electrical System :** Consultant shall submit basic engineering & design for electrical system of the Terminal indicating preliminary Load summary, calculation for sizing/capacities of equipment, listing selection criteria, listing of power consumers, incomer and distribution networks, Single Line Diagrams, Area Classification Diagrams, Electrical schemes, electrical equipment layouts, earthing system layout, Lightning protection layouts,

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Cable layout General arrangement Drawings etc.. The consultant shall give BOQ & estimates based on basic engineering.

- 4.1.4 **Civil, structural & Architectural works** :Preparation of Basic Engineering design, drawings, documents, technical specification, BOQ & estimates for all civil, structural & architectural works required for all the facilities related to the project including Buildings, sheds, land development ,boundary wall roads , drains, foundations , approach roads etc.
- 4.1.5 **Hazard detection(gas, heat, flame, smoke detection) and suppression system(hydrant/ MV spray /gas based suppression) including Fire Fighting system**: Consultant shall specify requirements and shall give basic design/engineering & drawings including types of detection devices, equipment list (giving item number, description & and specification), water & water storage requirements/Tanks , other suppression agent requirements/ storage, emergency response provisions etc. The consultant shall give estimates based on basic engineering.
- 4.1.6 **Environmental, Health and Safety requirements**: Consultant shall prepare basic design/engineering & drawings for effluent management and disposal system , pollution control system, noise control system, Water Harvesting System etc. The consultant shall give estimates based on basic engineering.
- 4.1.7 **Terminal Automation system, Electrical Substation Management System, Communication system, Access Control System, Closed Circuit Television, Metering system including custody transfer**: Consultant shall submit basic engineering & design for the systems including estimates based on basic engineering.
- 4.1.7 **Water harvesting & water treatment**: Consultant shall submit basic engineering & design for the systems including estimates based on basic engineering.
- 4.1.8 **Control System**: Instrumentation, instrument loops metering, terminal automation, control networks, Consultant shall submit basic engineering & estimates for control systems/ devices, voice communication systems, video surveillance systems, and shutdown systems including CCR (Central Control Room) facilities.
- 4.1.9 **Rerouting of pipelines passing through the plot & dismantling of existing structures including diversion/rerouting of nallah/streams, structures etc.** :Consultant shall submit BOQ, drawings, other engineering documents & estimates for the works.

Consultant to carry out basic engineering/design of any other system/sub system required for the Project or decided by owner for completion of Project . CONSULTANT will ensure the design packages are complete and

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comprehensive to enable take-off for subsequent detailed engineering. CONSULTANT will carry out detailed engineering so that final packages to be specified by CONSULTANT in Tender Documents for EPCC jobs or other tenders are complete, uniform and suitable for tendering.

4.2 ENGINEERING DESIGN BASIS

4.2.1 CONSULTANT shall develop an Engineering Design Basis Document in consultation with OWNER for the project to ensure uniformity of the systems and design for all process units and enable optimal integration of common utilities and general facilities of the project.

4.2.2 The Engineering Design Basis shall comprise information as follows:

- i. Definition of the Project complex/individual unit(s)
- ii. Location/ Site data/ Meteorological data
- iii. Seismic considerations and design criteria
- iv. Utility specifications
- v. Equipment design considerations (e.g. economic criteria, standardization, constructability issues, sparing philosophy, limitation of size, weight, capacity etc.)
- vi. Design guidelines
 - a. Systems (units) of Measurement
 - b. Codes, standards and Practices
 - c. Noise level, Maintenance facilities
 - d. Plant & equipment layout guidelines
 - e. Numbering (coding) systems for equipment, pipelines, valves, instruments etc.
 - f.. Legends/symbols for equipment, piping, electrical, instrumentation, etc. (as per the process package)
 - g. Insulation/ fire proofing requirements
 - h. Electrical and Instrumentation and **automation requirements**
 - i. Piping specifications
 - j. Specifications for Civil/Structural work, Buildings (Including architectural features).
 - k. Environmental and Safety requirements
 - l. Drawing and documentation Procedures
 - m. Telecommunication facilities
 - n. Fire fighting network and system

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- o. Roads and other Infrastructure.
- p. Utilities like Plant and Instrument Air, Service Water etc.
- q. Flare system
- r. Internal Fuel Oil/Gas network
- s. OWS/ Storm water system
- t. Installation Standard of Instrumentation
- vii. Criteria for interchangeability of rotary equipment
- viii. Criteria for selection of commissioning, mandatory, Operation and maintenance spares of various equipment.
- ix. Criteria for carrying out stress analysis of various piping systems.

4.3 DETAILED ENGINEERING DESIGN (DED)

CONSULTANT shall prepare the detail Engineering Design (DED) for various units including offsite & utilities as follows:

CONSULTANT shall prepare DETAILED ENGINEERING DESIGN (DED) for all facilities & utility facilities including detailed Bill of quantity (BOQ), detailed engineering estimates with rate analysis & basis of estimates. The DED package developed shall be comprehensive to facilitate LSTK contractor(s) to take up detailed engineering, procurement activities immediately on award and shall contain the following details as a minimum:

4.3.1 MECHANICAL

4.3.1.1 Requirements of Design & Data sheet

- i. CONSULTANT SHALL PREPARE EQUIPMENT DATA SHEETS to initiate mechanical design and specifications. These data sheets shall be prepared for each piece of equipment and shall cover all process requirements and other information/ data developed by the CONSULTANT. These equipment include Pressure Vessels, Air coolers, Air Dryers, Rotating equipments, Package equipment and all other miscellaneous/ special equipment as given in the Basic Engineering.
- ii. The data sheets shall cover Tabular Specification along with required drawings/ sketches as follows:
 - a. Type and capacity
 - b. Skeleton Drawings showing basic construction and main dimension including details of all internals. c
 - c. Operating pressure, temperature and other process conditions
 - d. Design pressure and design temperature
 - e. Material(s) of construction

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- f. Corrosion Allowance(s)
- g. Insulation requirement and specifications thereof.
- h. Minimum thickness requirement.
- i. Covering codes, standards and specifications including local codes and regulations.
- j. Instrument Data Sheets for all numbered instruments appearing on the P&I Diagrams and covering all process requirements.
- k. Complete details of nozzles viz. size, schedule, orientation, reinforcement requirements etc.
- l. Insulation, painting and fireproofing systems requirements.
- m. Inputs for mechanical design to suit the process operating conditions
- n. Inputs for preparation of mechanical drawings with sufficient details for the fabricators to prepare fabrication drawings.
- o. Inputs for preparation of specification and material requisitions for purchase of equipment and materials.

4.3.1.2 Additional Requirements of Design and Data

In addition to the requirements stated above the data sheets of following equipment developed by the CONSULTANT shall include additional information as below:

- i. **LPG/PROPYLENE STORAGEVESSELS**
 - a. Any special requirements like Cathodic Protection, Insulations etc.
- ii. **ROTATING EQUIPMENT**

This includes all items such as pumps, compressors, agitators, mixers, fans, blowers, air-conditioning and ventilation equipments etc.

 - a. General specifications
 - b. Minimum efficiency, minimum flow, drive requirements, sealing and flushing plans, requirements of accessories and auxiliaries etc.

4.3.1.3 PIPING

CONSULTANT shall carry out the following jobs for piping which includes all types of piping viz. process piping, utility piping, flare piping, instrument air piping etc.,

- a. Development of preliminary equipment layout including corridor pipe-rack preparation

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- b. Preparation of criteria and requirement for stress calculation, flexibility analysis & configuration
- c. Furnishing material specifications for pipes, pipe fittings valves, flanges, gaskets, fasteners, steam traps, drains, vents etc.
- d. Inputs on welding & erection, testing, NDT specifications & requirements.
- e. Identification, finalization and indicating on the relevant drawings of all hook-up points in consultation with OWNER.

4.3.1.4 FIRE PROTECTION/ Hazard detection(gas, heat, flame, smoke detection) and suppression system(hydrant/ MV spray /gas based suppression) including Fire Fighting system:

CONSULTANT shall prepare DETAILED ENGINEERING DESIGN (DED) including detailed Bill of quantity (BOQ), detailed engineering estimates with rate analysis & basis of estimates. CONSULTANT shall specify the fire protection, fire fighting, fire alarm, hydrocarbon detection requirements for all equipment and plant.

4.3.2 ELECTRICAL

CONSULTANT shall perform the following jobs in connection with the general electrical requirements for the project :

A. ELECTRICAL REQUIREMENT FOR THE PLANT

CONSULTANT shall undertake the following jobs:

- a. Estimate the projected load requirements, maximum demand, emergency power, the selection of voltages and distribution network configuration, substation locations etc.
- b. Prepare the load data, the emergency power requirements and assess the electric power requirements of the project
- c. Undertake the Engineering and other related services for hook up from Grid Power to sub-station
- d. Review the process operating requirements and classify the electrical loads into critical and non critical according to the effect on combined plant operation and equipment safety and arrange power distribution accordingly.
- e. Specify realistic ambient conditions for electrical equipment, considering the Site conditions as well as process originated environments.
- f. Specify the installation methods of electrical equipment such as cable trench arrangement, method of laying, spacing, marking and termination.

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- g. Highlight in the specifications all the specific requirements of Indian Electricity (IE) rules, and appropriate Electrical Inspectorate's requirements.

B. LIGHTING AND COMMUNICATION SYSTEM

CONSULTANT shall develop the following designs :

- a. Lighting layout, lighting distribution arrangement for the plant, offsites, roads, security, plant roads and material storage yards including illumination levels (LUX levels) etc.
- b. Suitable communication system to meet the needs of construction as well as operational phases viz. Paging systems, Walkie Talkies, type & number of telephone connections, extensions, size of exchange etc.

C. PROJECT POWER DISTRIBUTION SCHEMES

CONSULTANT shall develop the following:

- a. Design the distribution network(s) with adequate redundancy with cable routes and sizes, substation locations, layout configuration, protection scheme, metering, indications, alarm annunciation and earth bus layouts.
- b. Design electrical network to provide for remote substation operation. For this, centralized supervisory system shall be provided to permit remote monitoring of breaker operation & remote metering.
- c. Specific studies covering system stability, dynamic behavior of the generators, dynamic stability studies for load shedding and load sharing control, relay co-ordination and load flow to ensure system reliability.
- d. Selection of suitable system for startup of the motors.

D. PLANT ELECTRICAL EQUIPMENT

CONSULTANT shall prepare SLDs & area classification drawings and specify suitable requirement for electrical equipment like motors, field control stations, lighting, fittings, communication call points, etc.

E. STANDARDIZATION

CONSULTANT shall ensure standardization in light fittings, motor frame sizes, HT/LT Switchgears, cables, DC systems, UPS systems and Plant Communication systems to minimize spares.

F. EMERGENCY POWER AND HVAC

- a. CONSULTANT shall prepare the emergency power requirements including lighting and specify emergency diesel generator

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capacity with automatic quick start and changeover features and stipulate criteria for selection of DC systems & UPS types, its capacity, locations etc.

- b. CONSULTANT shall provide input for HT AC system to LSTK contractor for designing.

4.3.3 INSTRUMENTATION, TERMINAL AUTOMATION, COMMUNICATION SYSTEM, ACCESS CONTROL SYSTEM , CCTV , METERING SYSTEM INCLUDING CUSTODY TRANSFER & ENVIRONMENTAL , HEALTH & SAFETY REQUIREMENTS & OTHER SYSTEMS /FACILITIES

CONSULTANT shall prepare detailed engineering & Design, Drawings , Engineering estimates, technical specification ,requirements/standards for Instrumentation works, Terminal Automation , Communication System, Access Control System, CCTV, Metering system including custody transfer, Environmental, Health and Safety requirements & other systems required for the Terminal.

CONSULTANT shall perform the following jobs for Instrumentation part of the Project

- a. Prepare the process control philosophy of the total project. The philosophy should be so defined to accommodate future developments in the field of instrumentation.
- b. The Control philosophy should include as a minimum type of Distributed digital Control System (DCS), SCADA, Redundancy concept in control/data acquisition system, Type of operator interface, Type of Advanced control/optimization interface with DDCS system, Type/Concept of different layers of controls, Interlocks, detectors, analyzers, LAN, WAN. Type of different field instruments viz. Transmitter, I/P converters, control valves, Pressure/temp. gauges/ switches, shutdown valves, actuators etc.
- c. Based on the Process optimization philosophy, CONSULTANT shall develop scheme for its integration to DDCS system. CONSULTANT to define the type of computer environment required for Process optimization/ MIS purpose.
- d. Prepare installation standard and Loop checking philosophy of different types of instrumentation based on application.
- e. Prepare guidelines for Engg. standard/ essential technical specification for procurement of different types of instrumentation and control equipment.
- f. Review/sizing of safety valves, all control loop elements e.g. control valves, DP transmitters, controllers, interlocks etc.
- g. Develop basic spec. for DCS, PLC and associated Control Room instrumentation
- h. Finalize inputs for developing software for DCS/PLC in consultation with OWNER.

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- i. Develop Control Room arrangements.
- l. Develop/ generate MIS reports, log sheets report through DCS.
- m. Review of all construction drgs. of instruments e.g. Control & Signal cable layout, JB layout, Trench & duct layout, Control room instrumentation, Power cable layout etc.
- n. Consultant shall develop basic schematic of Complex Control Loop and also provide the write-up for the same for better understanding.
- o. Extension of Existing LAN/ Implementation of new LAN system.

4.3.4 CIVIL,STRUCTURALS & ARCHITECTURAL

- A.** CONSULTANT shall prepare detailed engineering & Design, Drawings , Engineering estimates, technical specification ,requirements/standards for all types of civil engineering work ,structural work , architectural work for all facilities of the project but not limited to the following:
- a. Fire Water system & RCC Water Storage Tanks
 - b. Cooling water system
 - c. Raw Water system, Water Harvesting system
 - d. Drinking water system
 - e. Effluent collection and disposal
 - f. Foundations of equipment/buildings , LPG/PROPYLENE Storage tanks , mounds, RCC water storage tanks etc.
 - g. Internal Roads/approach roads, Boundary walls, Land developments, Drains, Bridges, Culverts, Nallah etc.
 - g. Structures/Platforms/Ladders etc. of concrete/steel.
 - h. Raw material inputs/ requirements/ specifications like aggregate, cement, steel and other materials for buildings, roads, drainage as well as other construction material
 - i. The sampling/testing procedures will also to be established (While formulating the standards, suitability of local materials available in the region should be considered).
 - j. Buildings /sheds etc.
- ii. Specify design features for plant/non-plant buildings, taking care of stipulations of various statutory bodies in respect of compliance with respect to safety, health and environment etc. The design concepts should provide both for architectural beauty features and functional requirements to be merged effectively during basic/ detailed design of various facilities, keeping in view quality and economy.
 - iii. Prepare preliminary plot plan showing arrangement of buildings, structures, tankages, Internal roads , approach roads, bridges, culverts , nallah etc. Prepare land development drawings

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showing the finished ground level, quantity of filling/cutting , specification of fill materials etc.

- iv. Include detailed/specific soil investigation requirements in the LSTK bid. However, the Consultant shall make the Preliminary soil investigation reports available.
- v. Study and include in the respective LSTK Contracts & other contracts , the unit wise and overall OWS/ Fire Water Network, Sewage/ storm water disposal systems required for the project.
- Vi Prepare detailed design/engineering & drawings for diversion/rerouting of natural stream/Nallah passing through the Plot and rerouting of underground pipelines, structures etc. passing through the land.

B. CIVIL STRUCTURALS

- i. Prepare inputs for foundations, structures, platforms & ladders
- ii. Prepare inputs for installation of equipment, technological platform, foundation attached to various equipment and other structures.
- iii. Review and approval of Contractors/Vendors drawings and document as per contracts specifications and QAP for all the items as above.
- iv. Scrutinizing and approval of the detailed engineering design/drawings for all the above item viz. Civil, Structural, Architectural.
- v. Suggest necessary change / modifications wherever necessary in conformity with tender spec.

4.3.5 DRAWING CATEGORIZATION

CONSULTANT should develop the list of construction & fabrication drawings categorizing them as "Drawings requiring Approvals" and "Drawings for reference"

4.3.6 ELECTRONIC COMMUNICATION SYSTEM

In order to facilitate transfer of various documents/ drawings electronically/ through E-mail/ internet among OWNER, CONSULTANT and LSTK contractors, CONSULTANT shall develop a suitable communication system for implementation by CONSULTANT, LSTK Contractor and OWNER. All hardware and software required for CONSULTANT's Site office/ Head office/ Design office shall be arranged by CONSULTANT. However common facilities, if any, shall be by arranged by OWNER by himself or through LSTK Contractor(s).

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4.4 **Project Cost:**

Definitions, assumptions and itemwise estimate of costs for the proposed Project will be determined by CONSULTANT. The cost of all items from engineering design through construction and commissioning of the plant will be developed by CONSULTANT. The desired accuracy of Project cost estimate at end of FEED phase is +/-10%.

4.5 **Operating Costs:**

The cost of production will be tabulated by CONSULTANT taking all relevant factors into consideration. CONSULTANT will, for this purpose, provide detailed proforma with itemized schedules of production costs along with rates of consumption of materials, utilities and other inputs. This shall also include such items as maintenance costs, spares, replacement cost of catalyst(s) and other consumables.

4.6 CONSULTANT will assist OWNER by providing data on Project technical matters, costs, schedule, progress reports and other documentation that will be required from time to time for the project.

5.0 **LSTK CONTRACTORS/ OTHER CONTRACTOR MANAGEMENT DURING VARIOUS PHASES**

CONSULTANT shall undertake the following jobs towards management of LSTK Contractors AND OR other contractors during various phases of the project:

- i. Pre-Qualification of LSTK and /or other tenders
- ii. LSTK Bid and /or other tenders Preparation
- iii. Assistance in Tendering and Award of contracts
- iv. Management of LSTK contracts and /or other contracts after award

5.1 **PRE-QUALIFICATION OF LSTK BIDDERS /OTHER BIDDERS**

- a) Preparation of pre-qualification criteria along with OWNER for selection of LSTK bidders and /or other bidders/tenderer
- b) Prepare pre-qualification bid document for pre-qualification of Bidders for LSTK bid(s) and/or other tenders in consultation with OWNER.
- c) Assistance in Invite pre-qualification bids.
- d) Assistance in Analysis & evaluation of the pre-qualification bids.
- e) Recommend to OWNER the list of pre-qualified bidder

5.2 **LSTK BID & OTHER BID PREPARATION**

5.2.1 Prepare tender documents alongwith tender estimates with rate analysis/break ups for engineering, procurement, construction and commissioning (EPCC) of the Project for lump sum turnkey (LSTK) tenders & other tenders, **as indicated in Para-3: Chapter-8 of Execution Philosophy for the Project**. Tender documents shall be reviewed/approved by OWNER

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for which adequate time should be given. The evaluation criteria will be developed by CONSULTANT in consultation with the OWNER.

5.2.2 The CONSULTANT should prepare EPCC tender documents & other tender documents as above after **detailed engineering/Design** and keep provision in the tender documents to enable LSTK Contractor/other contractors to prepare the detailed engineering in conformity with international standards and sound engineering practices for cross checking. The EPCC tender documents/other tenders will have to be comprehensive, sufficiently detailed, self-contained, to enable getting competitive lump sum bids, without scope of subsequent corrigenda/ addenda/ modifications during bidding stage. Any delay on account of extension of time granted in submission of bids by LSTK bidders on account of corrigenda/ addenda/ modifications issued by the Consultant shall be attributed to the CONSULTANT if it is established beyond doubt that Consultant is solely responsible for issue of Corrigenda/Addenda/Modification for its own act of omission/mistake/lapse. The Bid should ensure adoption of uniform specifications and standards for good quality for the entire project.

5.2.3 For finalizing the tenders for the Project, Indian Oil Corporation Ltd (IOCL) shall perform the following :

i) IOCL will invite the bids from prospective pre-qualified Indian/international bidders based on technical bid prepared by consultant for the tenders

ii) Conduct pre-bid conference with prospective bidders. Consultant shall participate in pre-bid/Pre price Bid meetings & other meeting during tendering stages. (by depute their concerned engineers at OWNER advised offices/location).

iii) Perform bid evaluation in all aspects such as technical, financial, contractual, legal matters. During bid evaluation IOCL shall take recommendation from consultants on technical bids Consultant shall participate and assist OWNER in negotiations, prepare and print the final contract documents etc..by depute their concerned engineers at OWNER advised offices/location .

The cost of deputing consultant's engineers/professional shall be included in the Lumpsum rates

5.2.4 The Commercial Conditions to be included in the tender documents shall be provided by the OWNER. An index of the Contents of the proposed tender documents for LSTK tenders & other tenders should be enclosed by prospective CONSULTANTS with their offer. The document should broadly include the following to get substantially responsive offers from LSTK bidders/ other tenderers:

- i. Commercial Conditions
- ii. Engineering /Design Package
- iii. Technical Requirements covering but not limited to Civil, Structural, Architectural, Pressure Vessels, Piping, Mechanical Equipment, Rotating Equipment, Electrical, Instrumentation & automation , Heat

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& Mass Transfer (HMDT) Details, Fire Protection system, Terminal Automation & Environment etc.

- iv. Engineering Drawing & Data sheets for various equipment and works.
- v. Standard specifications for various equipment, works and materials.
- vi. Engineering codes standards & sketches for various equipment for fabrication, erection, procurement etc.
- vii. Other miscellaneous items
- viii. Inspection and test plan, inspection, monitoring and expediting methodology including stage wise inspection procedures for mechanical, electrical, civil, instrumentation equipment, consignment movement and other jobs of LSTK contracts & other contracts.
- ix. Project execution plan covering purchase procedure, tendering procedures
- x. Statutory clearances and statutory requirements etc.
- xi. Construction management philosophy including pre-commissioning, commissioning, start-up, test run and performance guarantee runs.
- xii. Any other Conditions, Specifications as deemed necessary to make comprehensive LSTK bid document & other tender documents.

5.2.5 CONSULTANT shall include a clause in LSTK bid/other tenders that the LSTK contractor/other contractors shall adhere to design control exactly as per ISO 9001. He should submit required records as evidence for review of IOCL as and when required and shall carry out changes based on IOCL review.

5.3 AWARD OF LSTK CONTRACTS & OTHER CONTRACTS

5.3.1 CONSULTANT shall undertake the following jobs during the process of award of LSTK tendering /other tendering(s)

- a) Participate in techno-commercial discussion and furnish clarifications to the bidders alongwith OWNER.
- b) Prepare technical commercial addenda points including issuance to the Bidders for compliance.
- c) Evaluate techno-commercial bids, price bids alongwith OWNER.
- d) Furnish final recommendations to OWNER regarding Award of work.
- e) Prepare Contract Documents.

5.3.2 CONSULTANT shall perform the following jobs in the event of off-loading of LSTK contractor /other contractors in the Project:

- a) Perform all the jobs arising out of any off-loading of LSTK/ other contractor(s) alongwith IOCL viz. issue of termination/ other notices to LSTK Contractors/other contractors ,re-estimating ,re-tendering for lining up fresh agency etc.

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- b) Perform all the jobs related to any change orders/ addenda/ deviations including its analysis, recommendation with proper justification and obtain approval from the OWNER for issue.

6.0 SERVICES FOR DETAILED ENGINEERING

6.1 PREPARATION OF ENGINEERING DESIGN BASIS

The Engineering Design Basis for the project developed during the design phase as detailed in para 4.3 herein, shall be applicable for detailed engineering of the plants & facilities for the project,

6.2 REVIEW OF DESIGN DOCUMENTS AND DRAWINGS

Review all important design documents and drawings of LSTK and other contractors to ensure consistency and adherence to contractual engineering specifications and adherence to QA/QC plans. Such documents, for example, are:

- **P & ID&S**
- **Rotating Equipment**
Specifications and data sheets of critical equipment such as compressors, identified critical pumps, ID fans etc.
- **Pressure Vessels**
Engineering data sheets and specifications for Storage Vessels Typical Vessels and Drums and Typical Tanks, including internals.
Fabrication Specification of equipment with special metallurgy.
- **Mechanical Equipment**
 - Specifications and data sheets of cranes , Air dryers , flare and its components, special purpose machines
 - Pneumatic handling system
 - Ventilation and Air conditioning System
 - System of Pressurized ventilation and air conditioning of various buildings (Plant/non-plant) as required.
- **Piping**
 - Equipment layouts
 - Isometric drawings of critical lines
 - Flexibility analysis and supporting system of critical lines
- **Electrical Engineering**
 - Single line diagram/Schematics (Distribution plan based on use of Load Base Station System (LBSS).
 - Metering and protection coordination
 - Area classification drawings
 - System design including fault analysis

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- Control & Logic diagrams and inter-locks
- Interconnecting drawings
- Specifications of critical equipment
- Insulation Coordination
- Equipment layout drawings
- Terminal & Wiring Diagrams
- Cable specifications, cable routing including trenching/overhead cable trays, cable numbering
- Lighting/Earthing Layout
- UPS specifications
- Fire alarm layout drawings and its cable schedule
- O&M Manuals and Instruction Manuals
- Civil and Structural Engineering and Architectural works
 - Land Development
 - Boundary wall and Fencing
 - Underground piping i.e. oily sewers, storm water sewers and sanitary sewers etc.
 - Dismantling & Rerouting/Diversion of Nallah/ water Streams , Underground product pipelines etc.
 - Roads & Pavements, approach Road
 - Culverts, Bridges
 - Foundations of all structures, especially critical equipment such as heavy duty rotary machines , compressors, Pumps, other equipments etc. stacks, multi-story framed structures, Storage tankages etc.
 - Fire Protection work for equipment/piping
 - Plant as well as non plant buildings
 - Water Supply (drinking/Plant/cooling water etc.)
 - Architectural plans and elevations of plant buildings
- Instrumentation
 - Distributed Digital Control System(DDCS) SCADA specification including computer control
 - Programmable Logic Controller(PLC) and Hard wired shutdown system
 - Specifications for critical items such as chromatography, analyzer, etc.
 - Typical and critical control valves, safety valves
 - Interlocks and logic diagrams

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- Cabling and Tubing layout including Trenching and overhead trays
- MMS hardware / software.
- Terminal automation , Communication System, Access Control System, CCTV & other Systems/Facilities.

6.2.1 CORROSION PROTECTION & INSPECTION REQUIREMENTS

CONSULTANT will be required to specify suitable measures for corrosion protection of material and equipment for all the services involving corrosive media and also to ensure that suitable provisions are made for installation of inspection facilities in most vulnerable locations to assist in periodic inspection and condition monitoring.

6.3 SAFETY AND ENVIRONMENTAL ENGINEERING

CONSULTANT will consider and incorporate major features necessary to ensure the safety of the plant and personnel. CONSULTANT will take into consideration local and international standards pertinent to pollution and environmental control, including effluents and solid waste, atmospheric emissions, noise control etc. and the stipulations indicated in the Environmental Clearances from State Pollution Control Board as well as Ministry of Environment and Forests, Govt. of India for all units and processes emitting any gaseous, liquid or solid waste or effluent including (but not limited to) the following:

- Liquid, gaseous and solid waste treatment and disposal facilities, including discharge route/point for effluents
- Influent and Effluent quality monitoring stations
- Air pollution control measures and monitoring system
- Noise pollution control measures and monitoring system

6.4 MONITORING OF LSTK CONTRACTOR'S ENGINEERING AND DESIGN ACTIVITIES

During the LSTK Contractor's engineering and design activities, CONSULTANT will provide a staff of professionals, as required, at the LSTK Contractor's office (in India) to monitor the progress and ensure adherence to the Contract and Project schedule. In addition to this staff, CONSULTANT will schedule visits by lead engineers, on and as needed basis, from the Home office to the LSTK Contractor's Office (in India), to review specific engineering and design deliverables, to provide clarifications and to help in removing bottlenecks, if any. Regular reports of such visits and of supervision undertaken by CONSULTANT at LSTK Contractor's office (in India) will be furnished to Owner for information/recommended action, as necessary.

CONSULTANT's services during the detailed engineering phase will include identification of the requirement of LSTK contractor's field engineering cell, development review, and monitoring of QA and QC Plans

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and to review and recommend changes in the scope of work by LSTK Contractors and other contractors and associated extra claims if any.

The cost of deputing consultant's engineers/professional shall be included in the Lumpsum rates.

6.5 REVIEW OF PLOT PLAN

The detailed plot plan of the LPG Terminal will be reviewed by CONSULTANT during progress of detailed engineering so that civil work could proceed at site by release of appropriate areas.

6.6 RISK ANALYSIS , ENVIRONMENTAL IMPACT ASSESSMENT, HAZOP STUDY AND HAZAN DURING DETAILED ENGINEERING PHASE

CONSULTANT shall perform Risk Analysis study alongwith EIA & Disaster Management Plan , HAZOP study and HAZAN of the plants and other facilities at the detailed Engineering phase of the Project. CONSULTANT will coordinate and ensure that all recommendations of Risk Analysis study alongwith EIA & Disaster Management Plan , HAZOP study and HAZAN are implemented during construction. Further CONSULTANT shall incorporate all the necessary recommendations in the P&IDs. CONSULTANT shall also ensure that all the requirements of OISD are implemented.

7.0 PROCUREMENT SERVICES

7.1 GENERAL

CONSULTANT will perform various procurement activities and will maintain close supervision of Procurement activities of contractors to ensure timely delivery of materials to adhere to the schedule.

7.2 BID EVALUATION OF MAJOR EQUIPMENT

CONSULTANT will review and comment on the LSTK Contractor bid/other tenderer's bid and send evaluation report and recommendations for procurement of major equipment listed in the Project specification.

7.3 VENDOR LIST PREPARATION

- i) CONSULTANT shall prepare and include the vendor list in the LSTK bid/other tenders. The CONSULTANT shall include a suitable clause in LSTK contract/other contracts indicating that LSTK contractors/other contractors shall submit the list alongwith techno-commercial bid for approval of CONSULTANT/ OWNER.
- ii) Vendor list prepared & recommended by the CONSULTANT shall be reviewed & approved by the OWNER.

7.4 PROCUREMENT INSPECTION SERVICES

- i) CONSULTANT shall prepare the inputs for complete Inspection and Quality Assurance Program of the LSTK contractors, which will

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provide OWNER with acceptable and quality products. The Inspection test plan/ QAP shall include all the items (including non-critical items like CS fitting) to be procured by the LSTK and other Contractors. Additionally the Inspection test plan/ QAP shall have the provision of minimum 10% dimensional checks of each size, pressure rating and type of pipe fittings at vendors' works by Third Party Inspection (TPI) and 1% dimensional checks of each size, pressure rating and type of pipe fittings at site by the CONSULTANT and surprise checks by the OWNER. This Inspection test plan/ QAP shall be included in the LSTK bid /other tenders.

- ii) CONSULTANT will review and recommend to OWNER for approval the above QAP/ inspection test plan to be submitted by the LSTK Contractor/other contractors which as a minimum shall include:
 - a) In-house inspection programs.
 - b) Inspection procedures consistent with mandatory codes.
 - c) Procedures for material identification and transportation.
 - d) Certification of non-destructive testing.
 - e) Independent inspection of all critical equipment at vendor's works (with approval of OWNER) and issue inspection reports alongwith factory acceptance test reports to OWNER.
 - f) Certify invoices submitted by LSTK Contractors/other contractors.
- iii) CONSULTANT may have to perform the expediting and follow-up job with vendors for critical items.

7.5 MISCELLANEOUS PROCUREMENT ACTIVITIES

- a) Review and recommend for OWNER's approval all procurement forms and procedures.
- b) Review of purchase orders and purchase requisition to be issued for major and critical equipment to ensure proper/complete documentation, compliance with the Project specification, spare parts and other specific requirements.
- c) Review and recommend for OWNER's approval the material movement and handling procedures proposed for the Project.
- d) Review, analyze and recommend purchase orders for quoted delivery dates to ensure compatibility with the approved Project schedule and ability to meet site material requirements during the construction phase.
- e) Closely monitor actual delivery dates and ensure adherence to expediting functions and prepare plans for remedial actions in case of any delay foreseen in delivery of equipment/material.

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- f) Ensure that the inspection and quality assurance programs are being followed and that proper documentation is provided for all equipment and bulk materials.

8.0 CONSTRUCTION MANAGEMENT

CONSULTANT will be responsible for effective monitoring of all construction areas of the Project. 100% coverage of the jobs at construction site shall be provided by the CONSULTANT irrespective of working hours & no. of CONSULTANT's personnel required for the same. Accordingly, it will establish requisite site organisation staffed by competent and experienced specialists. Requisite number of specialised personnel shall be provided to site, as and when necessary with prior approval of the OWNER. Before mobilising site personnel, CONSULTANT shall submit the detailed CV of such person proposed to be posted at site, to OWNER for concurrence and approval. The specialized personnel proposed to be deputed at site shall be well qualified, highly experienced and capable of handling their respective activities independently and shall meet all the requirements & responsibilities of the CONSULTANT described hereunder collectively. Personnel proposed to be deployed at site shall either be on the rolls of the CONSULTANT or their Sub-Contractor as specified at the proposal stage. **Bidders shall note that sub-contractor's personnel are limited to first level supervisory and non-supervisory category only and same shall be kept in mind while quoting.** Should the performance of such personnel be found unsatisfactory by OWNER during the EPCC phase, replacement of such personnel shall be carried out by CONSULTANT within 15 days of notification by the OWNER. Any concurrence / approval of OWNER does not relieve CONSULTANT for his responsibilities and all the liabilities to this effect shall be of the CONSULTANT.

Construction management shall include but not be limited to the following:

8.1 CONSTRUCTION PLANNING & PROCEDURE

CONSULTANT shall

- i. Finalize co-ordination procedure between OWNER, CONSULTANT and LSTK Contractors./other contractors
- ii. Establish detailed construction plans and schedules with LSTK Contractors to match the overall Contract schedule.
- iii. Identify construction/field organization of LSTK Contractors/other contractors and monitor for deployment at site including mobilization of specialist services.
- iv. Conduct periodic review meetings with LSTK Contractors/other contractors.
- v. Finalise construction codes and standards to be followed during construction.

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- vi. CONSULTANT will be responsible for effecting various construction activities are completed as per tender specifications, quality criteria, within the agreed time schedule. For this purpose CONSULTANT will act as overall Engineer-in-Charge at site and would therefore coordinate with all LSTK Contractors/other contractors & OWNER for effective enabling/interfaces functions.

8.2 CONSTRUCTION SCHEDULING & MONITORING

CONSULTANT shall

- i. Review construction schedule of the LSTK Contractor/other contractors.
- ii. Review site mobilization plan of LSTK Contractor/other contractors and pursue for required mobilization for all manpower/resources/equipment etc.
- iii. Monitor LSTK contractor's/other contractor's work schedule, progress against program and review of monthly progress/exception reports highlighting percentage completion of work, areas of concern with respect of schedule/inputs to be deployed and recommend corrective actions and remedial measures to remove back log in progress.
- iv. Review the construction work/progress regularly to ensure that the LSTK Contractor's/other contractor's allocation of number and type of manpower is adequate, and to ensure that construction equipment, cranes, tools, scaffolding, lighting etc. for the execution of the work are adequate and in safe working condition.
- v. **Verify the actual work completed by the LSTK Contractors/other contractors and recommend to OWNER for release of each progress payment according to the contract.**

8.3 CONSTRUCTION QUALITY ASSURANCE

CONSULTANT shall

- i. Review the construction quality assurance plans prepared by the LSTK Contractors /other contractors to ensure that it covers as a minimum the areas as under and confirm their compliance to approved codes/ standards/ specifications, etc:
 - a. Site preparation
 - b. Tie-ins
 - c. Buildings and structures
 - d. Incorporation of all witness tests and hold points of the construction work
 - e. Welding/fabrication
 - f. Clean-up testing/ chemical cleaning

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- g. Instrumentation installation and construction
- ii. Stage inspection of quality of work performed by LSTK Contractors /other contractors as per approved QA plan and contract specifications.
- iii. Review and audit, approved welding procedures and welders qualification procedures that are approved by LSTK Contractors/other contractors for their works.
- iv. Monitor compliance of various statutory rules, regulations and safety measures and cause LSTK Contractor/other contractors to arrange and co-ordinate site inspection, testing etc. as required under local statutory rules and regulations prevalent in India.
- v. Cause LSTK Contractors/other contractors to take all necessary precautions to protect construction work and material from damage by climate, outside elements and construction activities.
- vi. **Alert OWNER and the LSTK Contractor/other contractors immediately of any use of materials not in accordance with the drawings and Project specification and take immediate corrective action.**
- vii. Review safety procedures prepared by the LSTK Contractors/other contractors for compliance with applicable codes, regulations and OWNER requirements.
- viii. Review LSTK contractors/other contractors schemes for heavy/critical equipment's erection/lifts/rigging before contractor effects such critical/heavy lifts.
- ix. Review alignment (hot/cold) of all critical rotary equipment/machinery by contractors and their upkeep/maintenance as per suppliers recommendations.
- x. Monitor that the LSTK Contractors/other contractors perform house-keeping activities which include maintaining sanitary facilities, sweeping clean-up, removal of excess materials/temporary facilities, scaffolding, as necessary.
- xi. Conduct periodic Quality/Technical Audits to identify the LSTK Contractors/other contractors work that may be unsatisfactory in quality, and/or is not conforming to the contract.
- xii. Advise LSTK Contractors/other contractors to take immediate appropriate corrective actions as & when such discrepancy arises to fulfil quality, safety obligations.

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8.4 **CONSTRUCTION INSPECTION**

CONSULTANT shall

- i. Ensure that the LSTK Contractors /other contractors make arrangements for the required field inspection and tests required by the standards/specifications under the LSTK Contracts/other contracts and by local authorities/agencies and submit inspection procedures for review/approval of CONSULTANT/OWNER. CONSULTANT will ensure that these Inspection procedures will at least include the following requirements:
 - a. A construction activity will not start until all prescribed quality pre-conditions and prerequisites have been met.
 - b. The contractors will not proceed beyond identified witness tests and hold points without CONSULTANT's clearance. CONSULTANT will plan their activities to prevent undue delays in inspection at these points. Construction schedules shall allow a reasonable time for inspection, as required.
 - c. If it is observed that work is not conforming to specifications and drawings. CONSULTANT will promptly bring this information to the attention of the contractor concerned and will ensure that remedial works are carried out.
 - d. In those situations, where continued work would cause damage, preclude further inspection or make remedial action ineffective. CONSULTANT's inspection responsible for that work will have the authority to stop the work in progress. He will immediately notify OWNER and the concerned contractor of such action.
 - e. All material handling equipment should be subjected to required load test, initially and then periodically, to ensure safe/stable operation including witnessing and maintaining record of all such tests.
 - f. Review the results of all field inspections and tests carried out by LSTK Contractors/other contractors that are necessary to comply with the Project specification.
 - g. Ensure that the inspector engaged by LSTK Contractors/other contractors for carrying out radiographic inspection and interpretation of radiographs of welds is well qualified and acceptable to perform the tasks.
 - h. Ensure Contractors to maintain a proper up-to-date documentation system of the radiographs which can identify the location of the weld and the welder concerned.
 - i. Ensure LSTK Contractor/other contractors to submit all inspection reports and files with proper cross identification to OWNER within stipulated time as per contract.

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- j. Witness Hydro-test, Pneumatic and other field tests for Mechanical, Electrical and Instrumentation items.
 - k. Witness review, analyze and certify all proof of proper construction provided by the LSTK/ other contractors to ensure compliance with the Project specifications.
 - l. Witness and certify the final inspections of equipment by the LSTK Contractor(s)/ other contractors.
 - m. Ensure that all inspection reports and files with proper cross identification with field materials are handed over to OWNER within one (1) month after completion of Mechanical Completion of any part of the Project.
 - n. Any other work required to ensure construction quality as envisaged in the design/ specification.
- ii **SPECIAL REQUIREMENTS**
- a. CONSULTANT shall Inspect and certify the piping supports. Load data of spring supports shall be recorded and certified and necessary adjustments for unlocking of spring supports shall be made prior to commissioning by the CONSULTANT.
 - b. CONSULTANT shall Inspect & certify the short bolting prior to commissioning. Records of bolt tightening for high pressure lines shall be certified by the CONSULTANT.
- iii **CONSTRUCTION QUALITY AUDIT**

CONSULTANT shall carry out a Construction Quality Audit of the project facility every three months during construction phase of the project by an independent group of CONSULTANT's personnel not reporting to the site in-charge. The audit shall employ special tools such as include positive material identification through alloy analyzers etc.

An additional audit of total piping system shall also be carried out by CONSULTANT's piping specialist group.

The cost of deputing consultant's engineers/professionals shall be included in the Lumpsum rates

8.5 MATERIAL CONTROL AND WAREHOUSE MANAGEMENT

CONSULTANT shall perform the following activities :

- a) Review/audit receipt of equipment and materials at site, ensure proper site inspection and storage by LSTK Contractors/other contractors, ensure all steps are taken to avoid any intermixing of materials and with other project material.
- b) Ensure LSTK Contractor(s)/other contractors to prepare Material Receipt Status with relation to material delivery schedule.

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- c) Develop Material Control Plan / procedure of LSTK Contractors/other contractors.
- d) Issue reconciliation statement on completion of WORK to enable OWNER take over the balance materials including coordination of the activity till completion. All such materials shall be got codified through LSTK Contractors/other contractors as per SAP code alongwith cost of materials etc. before handing over the same to the OWNER.

8.6 SPARE PARTS MANAGEMENT

The following activities will be performed by the CONSULTANT :

- a) Checking of spare parts and other supplies to be made available by the Contractor(s) /vendors to ensure compliance with the construction contract requirements and supervision of their handing over to OWNER.
- b) Recommendations of spare parts inventory and future ordering schedule for safe conditions/trouble free operation.
- c) CONSULTANT will advise OWNER for establishing necessary Electrical Testing & Instrumentation lab with recommendations of appropriate testing equipment.
- d) CONSULTANT shall develop spare parts lists along with criteria for selection of quantity for Commissioning spares, Mandatory spares and Operation & Maintenance Spares for each equipment & piping system in consultation with OWNER for inclusion in LSTK bid document(s).
- e) CONSULTANT shall check the list of Spare Parts and other supplies to be made available by the LSTK Contractors/other contractors to ensure compliance with the contract requirements and ensure their handing over to the OWNER. CONSULTANT shall also recommend Spare Parts inventory and future ordering schedule for trouble free operation of the PLANT.

9.0 PRE-COMMISSIONING, COMMISSIONING AND PERFORMANCE TEST RUN

9.1 GENERAL

The CONSULTANT shall provide necessary assistance to OWNER in planning and organizing pre-commissioning, commissioning, start-up and performance test run of the Project facilities. The Scope of Work will comprise but not limited to the following:

- a. Carry out system checking to ensure correctness to avoid / reduce check list & punch list.
- b. Set-up, review and implement start-up program.

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- c. Review of pre-commissioning, commissioning and standard procedures for start-up, normal operation, shutdown and handling of abnormal situation.
- d. Review LSTK contractor's/other contractor's operating/instruction manuals for each unit, data from equipment vendors etc.
- e. Coordinate and supervise commissioning schedules, start-up schedule etc. with LSTK contractors/other contractors, others agencies and OWNER
- f. Review punch/check lists.
- g. Supervise pre-start up inspections of all equipment and systems including certification of its proper functioning.
- h. Conduct safety audits of the entire plant (for each unit) and prepare checklist / get corrected the discrepancies before pre-commissioning activities can be started.
- i. Ensure adequate manpower, special tools and spare parts necessary for assisting commissioning activities such as:
 - i. Operational tightness testing.
 - ii. Pre-startup inspections
 - iii. Gas -in
- j. Assist pre-commissioning audit nominated by the OWNER.
- k. Conduct all checks as per check list in the contract
- l. Prepare project close up report.
- m. Finalize commissioning schedule in CONSULTANT with OWNER/Vendors.

9.2 PRE-COMMISSIONING

Ensure that all the pre-commissioning/commissioning activities of the Project are carried out by LSTK contractor/other contractors/agencies in accordance with established procedure, schedules and program, as detailed below:

- a. Hot alignment checks and running of rotating equipment.
- b. Equipment operation checks e.g. vibration, trips, functioning of safety devices and other required operating tests and adjustments.
Note: CONSULTANT shall witness & certify the testing of all SRVs & TSVs.
- c. Flushing, blowing and chemical cleaning.
- d. Installation of temporary screens, strainers, and blinds.

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- e. Adjustments and replacements, if necessary, of mechanical seals, packing and accessories as required.
- f. Necessary purge operations, including installation of temporary purge piping or hoses to equipment connections.
- g. Checking of bores of orifice plates and installing them after flushing operations.
- h. Instrument calibrations with standard test equipment and all required adjustments and control point settings.
- i. Functional check on all instruments and controllers.
- j. Check all instrument loops for proper functioning.
- k. Checking and recording positions of all valves.
- l. Checks on pipe hangers, supports; and guides for hot/cold settings and necessary adjustments.
- m. Ensure that all defects and deficiencies found during the course of Commissioning shall be rectified by the LSTK contractor/other contractors.
- n. Preparation of operation and maintenance manuals
- o. Checking of operation and maintenance manual prepared by LSTK contractor.
- p. Checking the availability of spares for pre-commissioning & commissioning.
- q. Collection of base data for future predictive and preventive maintenance.
- r. Checking and certification of Complex Loops, Interlocks and Shutdown Logic for their proper functioning.

9.3 COMMISSIONING

The CONSULTANT will undertake the following jobs:

- a. Supervision/monitoring of check-up and calibration of the various instruments to be used in plant system commissioning and testing.
- b. Supervision of all activities for commissioning and testing of various systems in accordance with the startup schedule.
- c. Preparation of a check list of all defects and chalking out program for their correction and completion.
- d. Development of criteria for Initial and Final Acceptance.
- e. Analysis and evaluation of the test results obtained during testing and commissioning in order to determine actual performance of equipment, units w.r.t. Vendor's guarantees.

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- f. Review and approve the performance test and advise OWNER the procedures provided by LSTK and other contractors and specify, among other things, the following:
 - i. Operating data to be recorded in a log sheet
 - ii. Sampling methods
 - iii. Analytical methods
 - iv. Methods of calculations
 - v. Interpretation and measurement of tests
 - vi. Manner of taking operating data and its frequency
 - vii. The manner of evaluating the performance of the unit, raw material consumption, utilities consumption and energy consumption, yields etc. including appropriate corrections if any. LAB tests to ensure quality of products
 - viii. Safe commissioning of unit/ monitoring of condition till stable operation.

9.4 PERFORMANCE TEST RUN

CONSULTANT to ensure that performance test of all units are conducted in accordance with the (conditions as laid down in the contract) professional engineering practices, plant safety and operating standards.

- a. To demonstrate the units meets the CONSULTANT guarantees, one or more performance test-runs shall be carried out under the technical direction of CONSULTANT.
- b. The performance test-runs shall be carried out in accordance with the detailed programme to be drawn by CONSULTANT in mutual consultation with OWNER and would be conducted under normal operating conditions.
- c. Within five days after successful completion of the test-run, all operating conditions, figures, actual achievements should be recorded. The format for the same will be developed by the CONSULTANT in discussion with the OWNER.
- d. On completion of performance test runs, prepare independent report for OWNER on performance of each unit with recommendations (in consultation with vendors and OWNER) on ways and means of improving performance.
- e. CONSULTANT will evolve formats for handing over of plants to OWNER including all required documentation, completion certificates etc.

10.0 PROCESS GUARANTEES, RECTIFICATION AND DEFECT LIABILITY

- 10.1 All works by LSTK and other Contractors with reference to the Project will be subject to a Defect Liability period during which the LSTK Contractor(s)/other Contractors would be liable to correct, repair and/or rectify any and all defects and/or imperfections in the design of the work (in so far as the Contractor shall be concerned with the design of the work or
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any part thereof), in the work performed and/or in the materials components or other items incorporated therein. CONSULTANT shall, upon the written request of the OWNER, undertake such supervisory and/or consultancy services as may be required to monitor the Defect Liability obligations of LSTK Contractor(s)/other Contractors and/or to ensure that LSTK Contractor(s)/other Contractors perform in accordance with the requirements the corrective work, repairs and/or replacements necessary to rectify defects and/or imperfections.

11.0 HEALTH, SAFETY & ENVIRONMENT

- a) CONSULTANT shall develop comprehensive specification for Health, Safety & Environment protection and the same is to be made part of all LSTK bids.
- b) CONSULTANT shall be responsible for ensuring adherence to all safety requirements by LSTK Contractor(s)/other contractors. Any violation(s) shall be dealt with as per provisions of para 8.10 of Conditions of Contract.

12.0 MISCELLANEOUS

CONSULTANT shall perform the following jobs :

- a. Perform all repetitive jobs involving revision of drawings, any re-tendering etc. within the quoted price.
- b. Prepare Revised / updated documents such as P&IDs, Data Sheets etc. in electronic form.
- c. Documentation, coordination & liaisoning with State Govt., TAC/ PESO/ Boiler Inspector and other statutory authorities for approval.
- d. Preparation and development of final plot plan of the Terminal, so that it meets all statutory and safety requirement. Further, CONSULTANT shall develop and optimise overall plot plan showing all units and facilities including main pipeways/ pipe racks, roadways, construction access, temporary storage area & construction area etc. CONSULTANT shall provide the required services for enabling works for locating the Plant.
- e. Archives management.
- f. Reconciliation of Mandatory Spares after commissioning of the plant before handing over to owner.

13.0 COMPUTER SOFTWARE/ COMMUNICATION REQUIREMENT

- i. Entire plant shall be designed on a computer based reputed Plant Design Systems On Windows NT platform to furnish the following :
 - a. Plot plan
 - b. Orthogonal drawings

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- c. General Arrangement Drawings (GADs)
- d. Isometrics
- e. Bill of materials
- f. 3D model of the plant
- ii. 3D model shall be developed and demonstrated with dynamic walk through facility to check any interference, requirements of operation and maintenance for getting the approval of the OWNER. CONSULTANT shall ensure and cause LSTK Contractor/other contractors to demonstrate their capability through walk-through of one of such 3D models developed by them.
- iii. CONSULTANT shall ensure that facilities for viewing & modification of the Plot Plan, Drawings, 3-D Model etc. are available at CONSULTANTs and LSTK Contractorss respective site offices. Also, the CONSULTANT within the scope of services envisaged under para 4.3. herein, facilitate the OWNER to install such facilities in the OWNERs site office.
- iv. CONSULTANT shall ensure availability of Electronic Data Communication (EDC) system and other modes of communication such as video projectors etc. in CONSULTANT & LSTK Contractorss respective offices (Home, Design & Site). Also, the CONSULTANT within the scope of services envisaged under para 4.3.6 herein, facilitate the OWNER to install such facilities in the OWNERs site office.
- v. PERT Network and other project planning documents shall be done on Primavera Project Planner or Project Scheduler 7
- vi. All text data shall be on MS Word in Windows XP
- vii. All Spread sheet work shall be on MS Excel in Windows 98/Windows XP
- viii. All other documents like presentations etc. and other data shall be in MS Office in Windows XP
- ix. All drawings shall be furnished in PDS / PDMS format
- x. All the above drawings and documents shall be delivered in required copies on CDs and also on 1.44 MB diskettes alongwith hard copies.
- xi. CONSULTANT shall ensure maximum utilization of E-mail to save time.
- xii. All LSTK documents/other documents shall be furnished on separate compact discs and the contents shall be in MS office compatible packages

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14.0 PLANNING AND MONITORING OF CONSULTANT's ACTIVITIES

- 14.1 CONSULTANT shall, in consultation with the OWNER, develop and provide a detailed planning and scheduling system to the OWNER covering all aspects, activities and inputs falling within and related to the CONSULTANT's Scope of Work up to the award of the LSTK Contract(s)/other contracts.
- 14.2 On award of the LSTK Contracts/other contracts, CONSULTANT shall develop and provide detailed planning and scheduling system to the OWNER covering all aspects, activities and inputs falling within the Scope of Work of the CONSULTANT in relation to such LSTK contract(s)& other contracts. Such planning and scheduling systems shall cover the scheduled status of each function of the CONSULTANT and all functions and inputs of the CONSULTANT with respect to the contract including, but not limited to, the following:
- a) Services
 - b) Engineering
 - c) Procurement
 - d) Fabrication
 - e) Transportation
 - f) Installation and construction
 - g) Commissioning

15.0 GENERAL

- a) Consultant shall clearly work out and co-ordinate various interface with other LSTK contractors/other contractors for Instrumentations, Electrical, Instrument Air, pipe lines requirement and all other utilities required for smooth commissioning of all units / facilities, shall be the responsibility of Consultant.
- b) It is Consultant's responsibility to develop PMS (Piping Material Specification) and VMS (Valve Material Specification) for all LSTK packages /other packages to meet Process requirement as per standard engineering practices.
- c) Consultant shall develop all necessary details of tie-in points along with suitable drawing as per standard engineering practices for all the LSTK bidders/other tenderers.
- d) The Tanks, Building and Structures / underground structures / cables / pipelines etc., if any, where the new units are coming are to be demolished by respective LSTK contractors/other contractors, the necessary Barricading shall be in the scope of LSTK contractors/other contractors, the supervision, necessary co-ordination and development of engineering drawing and to hand over

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site to respective LSTK bidders/other tenderers shall be responsibility of Consultant.

- e) The interfacing and Hook-ups of all Instrumentation, Power, Utilities, Feed and Product Piping of all LSTK packages/other tenders shall be the responsibility of Consultant.
- f) CONSULTANT's responsibility shall, in general, include the following:
 - Review of vendor/contractors' design and drawings and undertake engineering that would be necessary to incorporate such package units/ systems into the overall PLANT configuration.
 - Review and approve data, documents & drawings (GA, Piping, Tie-in Points, Vessels etc.) received from the vendors / Contractors .
 - Review of Quality Assurance Plans.
 - Monitor the receipt of documentation, warranties and back-up guarantees, operation manuals and as-built drawings from the vendor / Contractors..
 - All other activities such as Construction/ Installation Supervision and Project Management Services etc. as detailed elsewhere in the Bid Document.

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DIVISION OF RESPONSIBILITY FOR MAJOR ACTIVITIES

	Item	By CONSULTANT	By OWNER
1.	Data Collection	✓	
2.	Survey, Soil Investigation	✓	
3.	Development of Plot Plan/Layout	✓	
4.	Conducting Studies like, RA,EIA,HAZOP/HAZAN etc.	✓	
2.	Basic Engineering & Design AND Detailed Engineering & Design	✓	
(a)	Mechanical	✓	
(i)	Design, Engineering ,Drawings , P & IDs, Sizing/Capacity calculations ,Specification and Data sheets , QA Plans & other documents for all mechanical systems & sub systems / Mechanical equipments /piping /Pressure Vessels/Safety fittings/ Gauging/Metering etc, for the project		
(ii)	Additional requirement of Design & Data, Standardization		
(iii)	Cost Estimates based on basic engineering & design		
(iv)	Cost Estimates based on detailed engineering with rate analysis & basis of estimates.		
(b)	Electrical	✓	
(i)	Design, Engineering ,Drawings , Single Line Diagrams, Area Classification Diagrams, Sizing/Capacity calculations, Specification and Data sheets , QA Plans & other documents for all Electrical systems & sub systems /Electrical equipments /Cables / Subi Station/Earthing System, Lightning Protection System/Lighting system /metering etc, for the project		
(ii)	Construction Power, Lighting & Communication		
(iii)	Project Power Distribution Schemes		
(iv)	Plant Electrical Equipment		
(v)	Standardization		
(vi)	Cost Estimates based on basic engineering & design		
(vii)	Cost Estimates based on detailed engineering with rate analysis & basis of estimates		
(viii)	Emergency Power & HT AC Supply		
(c)	Hazard detection(gas, heat, flame, smoke detection) and suppression system(hydrant/ MV spray /gas based suppression) including Fire Fighting system:	✓	

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	Item	By CONSULTANT	By OWNER
(d)	Instrumentation, Terminal Automation, Communication System, Access Control System, CCTV, & Environmental, Health & Safety requirements and other systems required for the Project	✓	
(e)	Rerouting of pipelines passing through the plot & dismantling of existing structures including diversion/rerouting of nallah/streams, structures etc.		
(f)	Civil/Structural/Architectural works		
(i)	General Civil Works	✓	
(ii)	Civil & Structural & Architectural		
(g)	Drawing Categorization	✓	
(h)	Electronic Communication System	✓	
3.	LSTK Works/other works		
(a)	Pre qualification of Bidders		
(b)	LSTK Bid Preparation/other tender preparation	✓	
(c)	Evaluation and recommendation for Award of jobs		
(d)	Award of jobs		✓
(e)	Jobs after Award of contracts	✓	
4.	Procurement Services		
(a)	General		
(b)	Bid evaluation of major equipments (for LSTK)		
(c)	Vendor list	✓	
(d)	Procurement/ Inspection of selected equipment		
(e)	Miscellaneous Procurement Activities		
(f)	Follow up & Co-ordination including expediting		
5.	Project Management		
(a)	Planning & Control		
(b)	Development of Project procedures		
(c)	Project Quality assurance	✓	
(d)	Monitoring co-ordination & supervision of LSTK & other contractors		
(e)	Project cost control		
6.	Review of Design & Drawing approval	✓	
7.	Construction Management		
(a)	Construction planning & procedures		
(b)	Construction scheduling and monitoring		
(c)	Construction quality assurance	✓	
(d)	Construction Inspection		
(e)	Material Control & Warehouse management		

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	Item	By CONSULTANT	By OWNER
(f)	Spare parts management		
(g)	Reconciliation of materials & handing over of project surplus materials to operation group		
8.	Assistance in Pre-commissioning, Commissioning & Performance Test Run		
(a)	General	✓	
(b)	Pre-commissioning		
(c)	Commissioning		
(d)	Performance Test run		
(e)	Submission of Close out report and submission of As built Drawings & documents. Finalisation/ settlement of Bills of contractors, etc.	✓	
9.	Visits of Consultant's personnel /professionals (from their design office as well as from Paradip site to Owner/IOCL's offices or any third party offices or works or Paradip site as required for the job or as directed by Owner /IOCL for the completion of the works as per scope of work given in this tender and for project monitoring, presentation, meeting, inspection etc. The Lumpsum rates quoted by Consultant shall includes all charges & expenses towards above visits /travel by Consultant's professional/Engineer like Professional charges, local transport, travel cost, hotel accommodation and living expenses, incidental costs etc. for deputing Consultant's engineer/Professionals required for completion of project .	✓	

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Chapter– 13

**INDICATIVE LIST OF EXPENSES TO BE
REIMBURSED/DIRECTLY PAID BY THE OWNER**

1. Cost of Third Party Inspection charges at actuals, if any.

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Chapter– 14

TIME SCHEDULE

The time period for **MECHANICAL COMPLETION OF PROJECT**, for Start-up and successful Commissioning and Overall Project Completion shall be as under:

The time period for MECHANICAL COMPLETION of the entire PROJECT shall be 26 **(Twenty six) months**. Start-up and commissioning time for the project is **01 (One) months** from successful Mechanical Completion of the Project. The CONSULTANT's Services shall however, be provided to OWNER upto 4 **(four) months** after MECHANICAL COMPLETION OF THE PROJECT for Settlement of Final Bills, handing over of documents etc.

Thus the total Time Schedule for the Project shall be 30 (Thirty) Months which shall be reckoned from the date of issue of Letter of Intent to the CONSULTANT.

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Chapter– 15

BANK GUARANTEES

INSTRUCTIONS

1. The Bank Guarantee towards Earnest Money Deposit is to be furnished in the enclosed performa only annexed herewith as Annexure BG-1. **Any change/modification in this shall be liable for rejection of the tender.**
2. The Bank Guarantee(s) toward Down Payment & Performance Guarantee shall be submitted by the successful bidder, as per the performa annexed herewith as Annexure BG-2 & Annexure BG-3 respectively.
3. The Bank Guarantee(s) is to be executed on the Non-Judicial Stamp paper of appropriate value.
4. Each page of the Bank Guarantee(s) must be stamped & signed by the authorised signatory(ies) of the Bank. Corrections, if any, must also be initialed by the authorised signatory (ies) of the Bank.
5. **The Bank Guarantee(s) should be issued by any Bank recognized as Scheduled Bank by the Reserve Bank of India. Further, Bank Guarantee from any Foreign Bank is acceptable only if the same is countersigned by their Indian Branches which are scheduled banks or any Scheduled Indian Bank in India.**
6. The Bank is required to send a copy of the Bank Guarantee(s) in confirmation directly to the Tendering Authority at the address given in the Notice Inviting Tender alongwith Address, Telephone & Fax No. of the issuing authority.

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ANNEXURE BG-1

**PERFORMA FOR BANK GUARANTEE IN LIEU OF
EARNEST MONEY DEPOSIT**

(TO BE EXECUTED ON STAMP PAPER OF Rs. 100)

BG NO: _____
DATED: _____
VALID UPTO: _____

To,
Indian Oil Corporation Limited
(Marketing Division)

Dear Sirs,

In consideration of Indian Oil Corporation Limited (Marketing Division) (hereinafter called the Corporation) which expression shall include its successors and assigns), having agreed inter alia to consider the tender of _____ (Name of the Tenderer) _____ having its Head Office/Registered Office at _____ (Address of the Tenderer) (hereinafter called the Tenderer) which expression shall include its successors and assigns), for the work of _____ (Name of the Project/Work) _____ at _____ to be awarded under Tender No. _____ upon the Tenderer furnishing an undertaking from the Bank as hereinafter appearing in lieu of cash deposit of the Earnest Money.

We (Name of the _____ Bank) a _____ Bank constituted/Registered under the _____ Act having our Head Office/Registered Office at _____ (hereinafter called the Bank) which expression shall include its successors and assigns), at the request of the Tenderer and with the intent to bind the Bank and its successors and assigns do hereby unconditionally and irrevocably undertake to pay the Corporation at Mumbai forthwith on first demand without protest or demur or proof or satisfaction or condition and without reference to the Tenderer, all sums payable by the Tenderer as and by way of Earnest Money to the Corporation, upto an aggregate limit of (Amount in figures and words).

AND THE BANK DOETH HEREBY FURTHER AGREES AS FOLLOWS:

1. This Guarantee/Undertaking shall be a continuing guarantee and shall remain in full force and effect for all claims or demands made by the

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Corporation on the Bank until the Corporation discharges this Guarantee/Undertaking subject, however, that the Corporation shall have no claims under this Guarantee/undertaking after the midnight of 200___ or any written extension(s) thereof.

PROVIDED that if the aforesaid work tendered for or any part thereof shall be awarded to the Tenderer on or before the said date, whether on the basis of accompanying tender or any other basis, then the validity of this guarantee/undertaking shall stand automatically extended for all claims and demands made by the Corporation for further three months.

2. The Corporation shall have the fullest liberty without reference to the Bank and without affecting in any way the liability of the Bank under this Guarantee/undertaking at any time and/or from time to time any wise to postpone and/or vary any of the powers, rights, and obligations exercisable by the Corporation against the Tenderer and either to enforce or to forbear from enforcing all or any of the terms and- conditions of or governing the said Tender and/or any contract consequent upon any award of work or the said Earnest Money Deposit or the securities available to the Corporation or any of them and the Bank shall not be released from its liability under these Presents and the liability of the Bank hereunder shall remain in full force and effect notwithstanding any exercise .by the Corporation of the liberty with reference to any or all the matters aforesaid or by reason of any other act, matter or thing whatsoever which under law relating to the sureties or otherwise which could, but for this provision have the effect of releasing the Bank from all or any of its obligations hereunder or any part thereof, and the Bank specifically waives any and all contrary rights whatsoever.
3. It shall not be necessary for the Corporation to proceed against the Tenderer before proceeding against the Bank and the Guarantee/Undertaking herein contained shall be enforceable against the Bank as principal debtor notwithstanding the existence of any other undertaking or security for any indebtedness of the Tenderer to the Corporation and notwithstanding that any such security shall at the time when claim is made against the Bank or proceedings taken against the Bank hereunder, be outstanding or unrealised.
4. The amount stated by the Corporation in any demand, claim or notice made with reference to this guarantee shall as between the Bank and the Corporation for the purpose of these Presents be conclusive of the amount payable by the Bank to the Corporation hereunder.
5. The liability of the Bank to the Corporation under this Guarantee/Undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the Tenderer and the Corporation, the Tenderer and the Bank and/or the Bank and the Corporation or otherwise howsoever touching these Presents or the liability of the Tenderer to the Corporation, and notwithstanding the existence of

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INDIAN OIL CORPORATION LTD.(MD)
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any instructions or purported instructions by the Tenderer or any other person to the Bank not to pay or for any cause withhold or defer payment to the Corporation under these Presents, with the intent that notwithstanding the existing of such difference, dispute or instructions, the Bank shall be and remain liable to make payment to the Corporation in terms thereof.

6. This Guarantee/Undertaking shall not be determined or affected by the liquidation or winding up or dissolution or change of constitution or insolvency of the Tenderer or any change in the legal constitution of the Bank or the Corporation.
7. Without prejudice to any other mode of service, a demand or claim or other communication may be transmitted by the Corporation to the Bank either by post or by fax. If transmitted by fax, the transmission shall be complete as soon as acknowledged by bank.
8. Notwithstanding anything contained herein:
 - (i) The Bank's liability under this guarantee/undertaking shall not exceed
(Amount in figures & words):
 - (ii) This guarantee/undertaking shall remain in force upto _____ and any extension(s) thereof; and
 - (iii) The Bank shall be released and discharged from all liability under this guarantee/undertaking unless a written claim or demand is issued to the Bank on or before _____ or the date of expiry of any extension(s) thereof if this guarantee/undertaking has been extended.

The Bank doth hereby declare that Shri _____ who is authorised to sign this Guarantee/Undertaking on behalf of the Bank and to bind the Bank thereby.

This _____ day of _____ 200_____

Yours
faithfully

Signature: _____

Name & Designation: _____

Name of the Branch: _____

NOTE:

1. This Guarantee/Undertaking is not to be witnessed.
2. This Guarantee is required to be stamped as an agreement according to the Stamp Duty Act.

(STAMP AND SIGNATURE OF TENDERER)

ANNEXURE -BG-2

(TO BE EXECUTED ON STAMP PAPER OF Rs. 100)

**FORM OF BANK GUARANTEE TO
COVER LUMP SUM ADVANCE (MOBILISATION)**

BG NO: _____

DATED: _____

VALID UPTO _____

INDIAN OIL CORPORATION LIMITED
(Marketing Division)

Dear Sirs,

WHEREAS Indian Oil Corporation Limited (hereinafter called "the Corporation" which expression shall include its successor and assigns) has awarded to _____ (Name & Address of the Contractor) hereinafter called "the Contractor" which expression shall include its successors and assigns) the work (Name of the Project / Work) _____ under and in terms of a Contract as evidenced by a Letter of Acceptance No. _____ dated _____ issued by the Corporation to the Contractor read with the relevant Tender Documents (hereinafter collectively called "the Contract" which expression shall include any formal contract entered into between the Corporation and the Contractor in super session of the said Letter of Acceptance and all amendments and/or modifications therein or in the terms of the said advance as herein stipulated)

AND WHEREAS the Corporation has agreed to advance the Contractor, inter-alia, a sum of Rs. _____ (Rupees _____ only) (hereinafter called "the said Advance"), upon the condition, inter-alia, that the said Advance together with interest thereon at the rate of ____% (percent) per annum on the amount of the said Advance for the time being outstanding shall without prejudice to any other mode of recovery available to the Corporation be recoverable by the Corporation by deduction from the gross accepted amount of any Running Account Bills and the Final Bill of the Contractor commencing from the first Running Account Bill of the Contractor, and meanwhile, the said Advance shall be secured by an undertaking from a Bank as hereinafter appearing.

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
TENDER NO: LPG/ENG/PT- 252/2010

We _____ (Name of the Bank), a body registered/constituted under the _____ Act, having Registered Office/Head Office at _____ (hereinafter called the "Bank" which expression shall include its successors and assigns), at the request of the Contractor and with the intent to bind the Bank and its successors and assigns, do hereby unconditionally and irrevocably undertake to pay the Corporation at Patna forthwith on first demand without protest or demur or proof or satisfaction and without reference to the Contractor, any and all amounts demanded from us by the Corporation with reference to this Undertaking upto an aggregate limit of Rs. _____ (Rupees _____ only) and interest thereon at the rate hereinabove provided.

AND the Bank doth hereby further agree as follows: -

- i) This Guarantee/Undertaking shall be a continuing guarantee and shall remain valid and irrevocable for all claims of the corporation upon the Bank made up to the midnight of _____ provided that the Bank shall upon the written request of the Corporation made upon the Bank at any time within 6 (six) months from the said date extend the validity of the Bank Guarantee by a further 6 (six) months so as to enable claims to be made under this Guarantee by a further 6 (six) months from the said date with the intent that the validity of this Guarantee shall automatically stand extended by a further 6 (six) months upon such request by the Corporation.
- ii) The Corporation shall have the fullest liberty without reference to the Bank and without affecting in any way the liability of the Bank under this guarantee/undertaking, at any time and/or from time to time to amend or vary the contract and/or any of the terms and conditions thereof or relative to the said Advance and/or to extend time for performance of the said contract in whole or part and/or payment of the said Advance in whole or part or to postpone for any time and/or from time to time any of the said obligations of the Contractor and or the rights, remedies or powers exercisable by the Corporation against the Contractor and either to enforce or forbear from enforcing any of the terms and conditions of or governing the said Contract and/or the said Advance, or the securities, available to the Corporation and the Bank shall not be released from its liability under these Presents and the liability of the Bank shall remain in full force and effect notwithstanding any exercise by the Corporation of the liberty with reference to any or all the matters aforesaid or by reason of time being-given to the Contractor or any other forbearance, act or omission on the part of the- Corporation or any indulgence by the Corporation to the Contractor or of any other act, matter or thing whatsoever which under any law could (but for this provision) have the effect of releasing the Bank from its liability hereunder or any part thereof and the Bank hereby specifically waives any and all contrary rights whatsoever.

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
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- iii) The obligations of the Bank to the Corporation hereunder shall be as principal to principal and shall be wholly independent of the Contract and it shall not be necessary for the Corporation to proceed against the Contractor before proceeding against the Bank and the guarantee/undertaking herein contained shall be enforceable against the Bank as Principal debtor notwithstanding the existence of any undertaking or security for any indebtedness of the Contractor to the Corporation (including relative to the said Advance) and notwithstanding that any such undertaking or security shall at the time when claim is made against the bank or proceedings taken against the Bank hereunder, be outstanding or unrealised.
- iv) As between the Bank and the Corporation for the purpose of this undertaking, the amount stated in any claim, demand or notice made by the Corporation on the Bank with reference to this undertaking shall be final and binding upon the Bank as to be the amount payable by the Bank to the Corporation hereunder.
- v) The liability of the Bank to the Corporation under this undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the Contractor and the Corporation, the Contractor and/or the Bank and/or the Bank and the Corporation or otherwise howsoever touching or affecting these presents or the liability of the Contractor to the Corporation, and notwithstanding the existence of any instructions or purported instructions by the Contractor or any other person to the Bank not to pay or for any cause withhold or defer payment to the Corporation under these presents, with the intent that notwithstanding the existence of such difference, dispute or instruction, the Bank shall be and remain liable to make payment to the Corporation in terms hereof.
- vi) This undertaking shall not be determined or affected by any change in the constitution of the Bank or that of the Contractor or the Corporation or any irregularity in the exercise of borrowing powers by or on behalf of the Contractor
- vii) Without prejudice to any other mode of service, a demand or claim or other communication may be transmitted by the Corporation to the Bank either by post or by fax. If transmitted by fax, the transmission shall be complete as soon as acknowledged by bank.
- viii) Notwithstanding anything contained herein:
 - (i) The Bank's liability under this Guarantee/undertaking shall not exceed (Amount in figures & words):

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
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- (ii) This guarantee/undertaking shall remain in force upto ____ and any extension(s) thereof; and
- (iii) The Bank shall be released and discharged from all liability under this guarantee/undertaking unless a written claim or demand is issued to the Bank on or before ____ or the date of expiry of any extension(s) thereof if this Guarantee/undertaking has been extended.

The Bank doth hereby declare that, Shri _____ who is the _____(designation) of the Bank is authorised to sign this Undertaking on behalf of the Bank and to bind the Bank thereby.

Yours faithfully,

Signature: _____

Name: _____

Designation &. Name of the Branch:

Dated: _____

NOTE:

1. This Guarantee/Undertaking is not to be witnessed.
2. This Guarantee is required to be stamped as an agreement according to the Stamp Duty Act.

(STAMP AND SIGNATURE OF TENDERER)

ANNEXURE -BG-3

**FORM OF COMPOSITE BANK GUARANTEE FOR MOBILISATION ADVANCE
AND SECURITY DEPOSIT/CONTRACT PERFORMANCE**

(TO BE EXECUTED ON STAMP PAPER OF Rs. 100)

THIS UNDERTAKING made this _____ day of _____,
20__ by _____ (hereinafter
called the 'Bank' which expression shall include its successors and
assigns) in favour of INDIAN OIL CORPORATION LIMITED (herein after
called the 'Corporation' which expression shall include its successors and
assigns)

WHEREAS _____(N
AME) _____ (CONSTITUTION)
of _____

_____ (address) (hereinafter called the 'Contractor' which expression shall include
its/ his / their successors and assigns/ executors, administrators,
representatives and assigns) has been awarded a contract in terms, inter-
alia, of the Corporation's letter of Acceptance No. _____ dated
_____ for construction of _____ for
_____ at a total value of Rs. _____ (Rupees
_____ only) (hereinafter called the 'Said contract' which
expression shall include any formal contract entered into subsequent
thereto or in super session thereof and all modifications to and amendments
in the said contract) :

AND WHEREAS the Corporation agreed to advance to the Contractor , at his
request, a sum of Rs. _____ (Rupees _____ only)
for utilization in the performance of the work covered by the said contract
(hereinafter referred to as the 'said advance') on production of an
undertaking from an bank in respect of the said advance, which shall,
without prejudice to any other mode of recovery available to the corporation
be recoverable by deduction from the gross accepted value of the running
account bills and final bills of the contractor commencing with the first
running account bill.

(STAMP AND SIGNATURE OF TENDERER)

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AND WHEREAS the contractor is also required to furnish an undertaking from a bank in lieu of cash deposit of Rs. _____ (Rupees _____ only) towards security deposit (hereinafter referred to as the 'Security Deposit') valid till the end of the defect liability period as specified in the said contract.

AND WHEREAS the Corporation has agreed to accept a single undertaking from Bank to cover both the said advance and the Security Deposit.

NOW, THEREFORE, in consideration of the promises afore going the Bank hereby irrevocably and unconditionally undertakes to pay to the Corporation at _____ forthwith on first demand, from the Corporation, from the Corporation, without protest or demur or proof or condition any and all amounts demanded by the Corporation in writing from the Bank with reference to this undertaking up to an aggregate limit of Rs. _____ (Rupees _____ only).

AND the Bank doth hereby further agree as follows :

- i) The Corporation shall have the fullest liberty without reference to the bank and without affecting in any way the liability of the bank under this undertaking, at any time and/ or from time to time to anywise vary the said contract and / or any of the terms and conditions thereof or of the said advance and / or to extend time for performance of the said contract and/ or payment of the said advance in whole or part or to postpone for any time and / or from time to time any of the said obligations of the contractor and/ or the rights, remedies or power exercisable by the Corporation against the contractor and either to enforce or forbear from enforcing any of the terms and conditions of or governing the said contract and/ or the said advance, or the securities, if any, or any of them available to the Corporation and the bank shall not be released from the liability under these presents and the liability of the bank shall remain in full force and effect notwithstanding any exercise by the Corporation of the liberty with reference to any or all the matters aforesaid or by reason of time being given to the contractor or any other forbearance, or omission on the part of the Corporation or any indulgence by the Corporation to the contractor or of any other act, matter or thing whatsoever which under any law could (but for this provision) have the effect of releasing the bank from its liability hereunder or any part thereof.

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
TENDER NO: LPG/ENG/PT- 252/2010

- ii) It shall not be necessary for the Corporation to proceed against the contractor before proceeding against the Bank and the undertaking herein contained shall be enforceable against the bank as principal debtor notwithstanding the existence of any security for any indebtedness of the contractor to the Corporation (including relative to the said advance or for the security deposit) and notwithstanding that any such security shall at the time when claim is made against the bank or proceedings taken against the bank hereunder, be outstanding or unrealized.
- iii) As between the bank and the Corporation for the purpose of this undertaking the amount claimed or demanded by the Corporation from the Bank with reference to this undertaking shall be final and binding upon the bank as to the amount payable by the bank to the Corporation hereunder.
- iv) The liability of the bank to the Corporation under this undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the contractor and the corporation, the contractor and the bank and/ or the bank and the corporation or the liability of the contractor to the corporation, and notwithstanding the existence of any instructions or purported instructions by the contractor or any other person to the bank not to pay or for any cause withhold or defer payment to the corporation under these presents, with the intent that notwithstanding the existence of such difference, dispute or instruction, the bank shall be liable to make payment to the corporation in terms hereof.
- v) This undertaking shall not be affected by any change in our constitution or that of the contractor or the corporation or any irregularity in the exercise of borrowing powers by or on behalf of the contractor.
- vi) This undertaking shall be valid for all claims/ demands made by the corporation to or upon us up to the midnight of _____, 20____ provided that the bank shall upon the written request of the corporation extend this guarantee by a further period of six months.

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
TENDER NO: LPG/ENG/PT- 252/2010

- vii) The bank both hereby declare that Shri _____ who is the _____ (designation) of the bank is authorized to sign this undertaking on behalf of the bank and to bind the bank thereby.

Yours faithfully,

For _____

Name _____

Designation _____

Date-----

NOTE:

1. This Guarantee/Undertaking is not to be witnessed.
2. This Guarantee is required to be stamped as an agreement according to the Stamp Duty Act.

(STAMP AND SIGNATURE OF TENDERER)

ANNEXURE-BG-4

**PERFORMA OF BANK GUARANTEE IN LIEU OF
CONTRACT PERFORMANCE GUARANTEE**

(ON NON-JUDICIAL PAPER OF APPROPRIATE VALUE)

INDIAN OIL CORPORATION LIMITED
(REFINERIES DIVISION)

Dear Sirs,

In Consideration of Indian Oil Corporation Limited (Marketing Division) having its registered office at G-9 Ali Yavar Jung Marg, Bandra(East), Mumbai-51 (hereinafter called the Corporation) which expression shall include its successors and assigns) having awarded work order No:

_____ of the Corporation
to é é é é é é é é é é é . (Name and Address of CONSULTANT, herein after called CONSULTANT) the CONSULTANT upon certain terms and conditions mentioned in the Corporation's Letter of Documents (hereinafter collectively called the Contract) which expression shall include any formal contract entered into between the Corporation and the CONSULTANT in suppression of the said Letter of Acceptance and all amendments and/or modifications in the contract) inclusive of the condition that the Corporation may accept a Bank Guarantee from Schedule Bank in India which includes the Indian Branch of a Foreign Bank acceptable to the Corporation in lieu of due performance of the CONSULTANT.

We é é é é é a body registered/constituted Under the (Name of the Bank) after called the BANK which expression shall include its successor and assigns) with the intent to bind the Bank and its assigns, do hereby unconditionally and irrevocably undertake to pay to the Corporation at the LPG-ENGINEERING Deptt. of the Indian Oil Corporation at Mumbai on first demand in writing without pretest or demur or proof or condition any and all amounts from time to time stand as due to the Corporation from the CONSULTANT with reference to the Contract upto an aggregate limit of Rupees _____ (Rupees _____ only) and US\$ _____ (US\$ _____ only).

AND the Bank both hereby further agree as follows:

1. The Guarantee/Undertaking herein contained shall remain in full force and effect during the entire period that would be taken for the performance for the Contract and until the claims of the Corporation relative thereto are satisfied and/or discharged and the Corporation accordingly under this Guarantee/Undertaking subject, however, that the Corporation shall have no claim under this Guarantee/Undertaking after midnight of é é unless a notice of the claim under this Guarantee/Undertaking has been served on the Bank before the expire of the said date, in which event the same shall

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INDIAN OIL CORPORATION LTD.(MD)
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TENDER NO: LPG/ENG/PT- 252/2010

be valid notwithstanding that the same is enforced after the expire of the said date.

2. The Corporation shall have the fullest liberty without reference to the Bank and without affecting in any way the liability of the Bank under this Guarantee/Undertaking, at any time and/or from time to time anywise to vary the contract and/or any of the terms and conditions thereof or of or relative to the Contract Performance deposit or to extend time of performance of the Contract in whole or part or to postpone for any time and/or from time to time any of obligations of the CONSULTANT and/or powers exercisable by the Corporation against the CONSULTANT and either to enforce or forbear from enforcing any of the terms and conditions of or governing the Contract or the security deposit or the securities available to the Corporation or any of them and the Bank shall not be released from its liability under these presents and the liability of the Bank shall remain in full force and effect notwithstanding any exercise by the Corporation of the liberty with reference to any or all the matters aforesaid or by reason of time being given to the CONSULTANT or any other forbearance, act or omission of the part of the Corporation or any indulgence by the Corporation to the CONSULTANT or of any other act, matter or thing whatsoever which under the law relating to sureties could but not this provision, have the effect of releasing the Bank from its liability hereunder or any part thereof.
3. It shall not be necessary for the Corporation to proceed against the CONSULTANT before proceeding against the Bank and the Guarantee/ Undertaking therein contained shall be enforceable against the bank notwithstanding the existence of any other security for any indebtedness of the CONSULTANT to the Corporation(including relative to the Contract Performance and down payment)and notwithstanding that any such security shall at the time when claim is made against the Bank or proceeding taken against the Bank hereunder, be outstanding or unrealised.
5. The amount stated by the Corporation in any demand, claim or notice as due to the Corporation from the CONSULTANT shall as between the Bank and the Corporation for the purpose of these presents be conclusive of the said amount.

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
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5. The liability of the Bank to the Corporation under this Guarantee/ Undertaking shall remain in full force and effect notwithstanding the existence of any difference or dispute between the CONSULTANT and the Corporation, the CONSULTANT and the Bank and/or the Bank and the Corporation, or otherwise howsoever touching or affecting these presents or the liability of the CONSULTANT to the Corporation, and notwithstanding the existence of any instructions or purported instructions by the CONSULTANT or any other person to the Bank not to pay or for any cause withhold or defer payment to the Corporation, under these presents, with the intent that notwithstanding the existence of such difference, dispute or instruction, the Bank shall be and remain liable to make payment to the Corporation in terms hereof.
6. The Bank shall not revoke this Guarantee/ Undertaking during its currency except with the previous consent of the Corporation in writing and also agree that any change in the constitution of the CONSULTANT or of the Bank or of the Corporation shall not discharge the Bank's liability hereunder.

The Bank doth hereby declare that (Mr é é é é é é é é é é é é é é .)
(name of the person signing of behalf of bank) who
is é é é é é é é é é é é (His designation) is authorised to sign this
Guarantee/Undertaking on behalf of the Bank and to bind the Bank thereby.

Dated this é é é é é é é .day of é é é .2003.

Yours faithfully,

For _____

Signature _____

Name & Designation _____

Name of the Branch _____

NOTE:

1. This Guarantee/Undertaking is not to be witnessed.
2. This Guarantee is required to be stamped as an agreement according to the Stamp Duty Act.

(STAMP AND SIGNATURE OF TENDERER)

INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
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[EXHIBIT-1](#)

(STAMP AND SIGNATURE OF TENDERER)



INDIAN OIL CORPORATION LIMITED
(MARKETING DIVISION)

**LPG MARKETING TERMINAL PROJECT
AT
Paradip(Orissa)**

TENDER DOCUMENT

FOR

TENDER FOR CONSULTANCY SERVICES FOR PROJECT MANAGEMENT, BASIC & DETAILED ENGINEERING, COST ESTIMATES, PREPARATION OF TENDER PACKAGES, CONSTRUCTION MANAGEMENT, SUPERVISION AT SITE AND OTHER SERVICES INCLUDING ASSISTANCE IN START-UP COMMISSIONING & PERFORMANCE TEST RUNS FOR LPG MARKETING TERMINAL PROJECT AT PARADIP (ORISSA).

(TENDER NO: LPG/ENG/PT- 252/2010)

PART – II (PRICE PART)

- NOTE : 1. PRICES ARE **NOT** TO BE QUOTED IN THIS PART OF THE BID DOCUMENTS.
2. BIDDERS ARE REQUESTED TO QUOTE PRICE IN THE PRICE PART II GIVEN SEPARATELY AND SUBMIT THE SAME IN A SEPARATE SEALED COVER.

Prepared and Issued By:

**LPG-ENGINEERING DEPARTMENT
INDIAN OIL CORPORATION LTD.
(MARKETING DIVISION)**

**G-9 ALI YAVAR JUNG MARG, BANDRA (EAST),
MUMBAI – 400051**

(STAMP AND SIGNATURE OF TENDERER)

**INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
TENDER NO: LPG/ENG/PT- 252/2010**

I N D E X

Sl. NO.	DESCRIPTION	
1.	FORM ĩ 1	SUMMARY OF SCHEDULE OF RATES
2.	-	COMPENSATION
3.	FORM ĩ 2	LUMPSUM PRICES
4.	FORM ĩ 2A	BREAK-UP OF LUMPSUM PRICES
	-	PAYMENT SCHEDULE FOR PAYMENT OF LUMPSUM PRICE
6.	-	MAN-MONTH RATES
7.	-	REIMBURSABLE EXPENDITURE ITEM LIST
8.	FORM ĩ 3	MAN-MONTH RATES FOR CONSTRUCTION MANAGEMENT AND SUPERVISION FOR LPG MARKETING TERMINAL & ASSOCIATED FACILITIES
10.	FORM ĩ 4	MAN-MONTH RATES FOR ASSISTANCE IN START-UP, COMMISSIONING & PERFORMANCE TEST RUNS ETC FOR LPG MARKETING TERMINAL & ASSOCIATED FACILITIES
12.	FORM - 5	MOBILISATION ADVANCE REQUIREMENT

- Notes :**
- 1) **Prices are not to be quoted/ filled in this part of Bid Document.**
 - 2) **Prices shall be quoted separately in the PART-II and submitted in the separate sealed cover.**

(STAMP AND SIGNATURE OF TENDERER)

**INDIAN OIL CORPORATION LTD.(MD)
LPG-ENGINEERING, HEAD OFFICE, MUMBAI
TENDER NO: LPG/ENG/PT- 252/2010**

FORM-1

SUMMARY OF SCHEDULE OF RATES

FOR CONSULTANCY SERVICES FOR PROJECT MANAGEMENT, BASIC & DETAILED ENGINEERING, COST ESTIMATES, PREPARATION OF TENDER PACKAGES, CONSTRUCTION MANAGEMENT, SUPERVISION AT SITE AND OTHER SERVICES INCLUDING ASSISTANCE IN START-UP COMMISSIONING & PERFORMANCE TEST RUNS FOR LPG MARKETING TERMINAL PROJECT AT PARADIP (ORISSA) AS DESCRIBED IN CHAPTER 8, CHAPTER -11 AND CHAPTER - 12, OWNER SHALL PAY TO CONSULTANT THE REMUNERATION AS UNDER:

Sr. No.	Description	Unit	Qty	Amount in INR	
				In Figure	In Words
1.	Total Lumpsum Charges for CONSULTANT services as per Form 2.	LS	LS	INR:	NOT TO BE QUOTED HERE
2.	For services towards Construction Management and Construction Supervision for LPG Marketing Terminal Project & associated facilities, CONSULTANT shall be paid on Man-Month basis as per FORM 3.	LS	LS	INR:	
3.	For services towards Start-up & Commissioning Assistance at site for LPG Marketing Terminal project & Associated facilities, CONSULTANT shall be paid on Man-Month basis as per FORM 4 .	LS	LS	INR:	
4.	Total (1+2+3)			INR:	
5.	Less Rebate offered, if any on 4 above _____%			INR:	
6.	Net & Final Prices after considering Rebate given in 5 above			INR:	
7.	Service Tax @ _____ on 6.			INR:	
8.	Quoted amount Grand Total (6 + 7)			INR:	

(STAMP AND SIGNATURE OF TENDERER)

COMPENSATION

1.0 Preamble

Bidders shall quote their prices in Indian Rupees only.

1.1 Total Contract Price

The contract price payable to CONSULTANT shall be broken up in to 2 (two) components, namely:

- a) The **Total Lumpsum Price**, which shall cover all services under the contract except for the services, compensation for which is payable at Man-Month Rates under (b) herein below or the reimbursement of expenditure as per reimbursable expenditure item list as listed at para 4.0 hereof below.
- b) For services covering Construction Supervision and Start-Up & Commissioning Assistance as set out 3.0 hereof below, the OWNER shall, in addition to the Lumpsum price, compensate CONSULTANT on the basis of the **Man-Month Rates** settled pursuant to Clause no. 3.0 hereof below.

1.2 Contract Price Entitlement

1.2.1 OWNER shall compensate CONSULTANT, where specified, for full and complete performance of the Work accepted by OWNER if:

- a. CONSULTANT has complied with all the terms and conditions in all parts of the Contracts and
- b. CONSULTANT has fulfilled all of its financial obligations incurred as a result of its performance of the work.

Compensation shall be the sum of the Lumpsum prices and Man-Month Rates and reimbursement of expenditure as per reimbursable expenditure item list as listed at para 4.0, all of which are subject to the provision of the Contract and all of its part which shall constitute the totality of the payments and compensation due to CONSULTANT.

1.2.2 The contract price specified in 1.1 (a) above shall be subject to reduction if there is any reduction in the CONSULTANT's Scope of Work and rebate offered, if any in the Summary of Schedule of Rates.

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1.3 Basis of Lumpsum Prices and Other Rates

1.3.1 The compensation as determined under 1.1 hereof above shall constitute the entirety of the compensation and remuneration that CONSULTANT is entitled to receive under the contract, and no further or other payments whatsoever shall become due and payable to CONSULTANT under the Contract.

The fixed Lumpsum prices and other rates set forth herein shall be inclusive of:

- a. All costs, risk and expense, taxes including income and withholding taxes on Dollar/ FC and Rupee components, overhead, profit and/or total fee related to the satisfactory performance and completion of the Work.
- b. All costs related to management, supervision, **design**, engineering, , inspection, testing and quality assurance/ quality control of the Work, as more particularly described in the Scope of Work, or elsewhere in the Contract; (Inspection & Testing in this context implies witnessing, checking, verifying of Inspection & Testing of works performed by LSTK Contractor/ other contractors at site).
- c. The Professional charges including Air fares/rail fare/Road fares, charges for local transport, hotel accommodation and living expenses for deputing Consultant's engineer /professional for attending all Pre bid tender meeting/Pre price bid tender meeting, Project review /monitoring meetings/other meetings, presentation, inspection etc. by consultant's engineer/professionals with OWNER/other authority/LSTK Contractors/Other contractors Vendors etc. outside their home office(whether at OWNER's premises at Mumbai; OWNER's nominated location or Paradip site or any other location in India as directed by Owner) as applicable prior to and/or during construction phase of the project) shall be included in the Lumpsum rates..

The consultant is required to undertake the visits immediately as directed by Owner/IOCL or as required for completion of the works/project. If Consultant fails to undertake visits within time frame advised by Owner/IOCL, Owner/IOCL shall deduct proportionate amount as assessed by Owner/IOCL towards visit charges from the Lumpsum rates quoted by Consultant (as per Price Part II in Chapter 16 , Form2, 3 , 4)

- d. The cost of all CONSULTANT's personnel, supervision, **management**, (including but not limited to wages, benefits, payroll, over time, taxes, conveyance and accommodation expenses and other costs thereto as are paid to employees), ,all office equipment, rental of third party office equipment, computers communications equipment, communication charges (including those incurred by OWNER while in CONSULTANT's offices),all administrative costs of CONSULTANT's operation (including home office, site office and any other office), all

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reproduction and graphic costs of whatever kind, postage and courier expenses;

- e. The cost of all travel and related expenses undertaken by the CONSULTANT's personnel posted at Paradip site to OWNER's premises at Mumbai; OWNER's nominated any other location or Office/works of Vendors/Contractors, other authorities etc or any other location in India as directed by Owner as applicable prior to and/or during construction phase of the project for the performance of CONSULTANT's services towards the construction supervision , inspection , meeting/deliberations, project monitoring & start up/ commissioning assistance.

The consultant is required to undertake the visits immediately as directed by Owner/IOCL or as required for completion of the works/project. If Consultant fails to undertake visits within time frame advised by Owner/IOCL, Owner/IOCL shall deduct proportionate amount as assessed by Owner/IOCL towards visit charges from the Lumpsum rates quoted by Consultant (as per Price Part II in Chapter 16 , Form 2, 3 , 4)

- f. The cost of royalties, license fee and other fees, duties, penalties and damages whatsoever payable for or in respect of any patented goods, materials, equipment or processes being employed by CONSULTANT in or relative to the performance to the performance of the work and/or for ht acquisition or use of any right, license, consent or other privileges required by the CONSULTANT for or relative to the performance of the work.
- g. The cost of all guarantees, indemnities to the OWNER and insurance premia required in terms of the Contract or under any law, rule or regulation or otherwise CONSULTANT deems fit to take out and the cost of all risks whatsoever (foreseen and unforeseen) including, but not limited to the risk to delay or reduction or increase in the Scope of Work and/or cancellation of contract and/or accidents, strikes, civil commotion, labour trouble, third party breach, fire, lightening, inclement weather, storm, tempest, flood, earth quake and other acts of God, restriction of dislocation of road/rail and other transport for access, suspension of work and sabotage.
- h. The **MECHANICAL COMPLETION of the entire PROJECT** is scheduled for 26 (**Twenty six**) months, the successful Start-up and Commissioning by 1 (**one**) months thereafter and Completion of CONSULTANT's Services in all respects by 4 (**four**) months from MECHANICAL COMPLETION. Hence, **the prices given in Para 1.1 above shall be FIRM for the entire period till the completion of CONSULTANT's Services in all respects.**

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The rates stated in the Schedule of Rates shall not be subject to escalation or increase on any account whatsoever till completion of job in all respect.

- i. All supervision charges, establishment overheads, finance charges and other cost and expenses of CONSULTANT.
- j. All other costs or expenses of any kind which directly or indirectly relate to accomplishing the Work and complying in full with the provisions of the Contract, and which are not otherwise specifically set forth or referred to in the Contract.

2.0 Schedule of Lumpsum Prices

For satisfactory performance and completion of the Work by CONSULTANT, as described in the Scope of Work, OWNER shall compensate CONSULTANT, the following:

2.1 Summary of Milestone payments:

Bidder shall quote the Lumpsum charges, inclusive of all taxes & duties except Service Tax in the Lumpsum prices in Form-2.

FORM – 2

**TOTAL LUMP SUM PRICE FOR ALL CONSULTANT SERVICES FOR LPG
MARKETING TERMINAL PROJECT AT PARADIP**

ITEM NO.	DESCRIPTION		QUOTED PRICES IN INR
1.	TOTAL LUMP SUM PRICE (INCLUSIVE OF ALL TAXES & DUTIES EXCEPT SERVICE TAX)	IN FIG.	NOT TO BE QUOTED HERE
		IN WORDS	
2.	SERVICE TAX @ _____		
3.	TOTAL INCLUSIVE OF SERVICE TAX (1 + 2)		

SERVICE TAX SHALL BE REIMBURSED TO TENDERER ON PRODUCTION OF DOCUMENTAERY EVIDENCES..

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FORM – 2A

BREAK-UP OF LUMPSUM PRICE FOR ALL CONSULTANT'S SERVICES FOR
LPG MARKETING TERMINAL PROJECT AT PARADIP

MILESTONE NO.	DESCRIPTION OF MILESTONES	% BREAK-UP OF LUMP- SUM PRICE
1.	Completion of collection of all data required for the Project by the Consultant	0.5%
2.	Completion of survey & soil Investigation & submitting report by the consultant	2%
3.	Finalisation of Plot Plan by the Consultant	0.5%
4.	Completion & submitting reports for various studies viz Risk Analysis, EIA, Hazop/ Hazan etc by the Consultant .	5%
5.	Submission of Basic engineering & Design including cost estimates by the Consultant	5%
6.	Submission of detailed engineering & Design including detailed cost estimates by the Consultant	15%
7.	Submission of tendering packages for invitation of tenders by IOC .	2%
8.	Prequalification of agencies for LSTK Contracts and invitation of LSTK tenders & other tenders by IOC	2%
9.	Award of LSTK contracts/other contracts based on final recommendations by consultant and finalisation of project cost estimate by consultant	3%
10.	Review of Detailed Engineering and Approval of Drawings/documents etc. submitted by LSTK Contractors, other contractors & Vendors	20%
11.	Procurement Services	5%
12.	Project Management Services	15%
13.	Mechanical Completion	10%
14.	Commissioning & Performance Test Runs	5%
15.	Completion of CONSULTANT'S Services in all respects	10%
	TOTAL	100%

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PAYMENT SCHEDULE for Lumpsum price in form 2 shall be as follows:

1.	90% of amount at milestone 1 above alongwith service tax shall be released on prorata basis on completion of data collection & submission of report to the satisfaction of IOC. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
2.	90% of amount at milestone 2 above alongwith service tax shall be released on prorata basis on completion of survey & soil investigation and submission of report to the satisfaction of IOC . Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
3	90% of amount at milestone 3 above alongwith service tax shall be released on prorata basis on completion of Plot Plan to the satisfaction of IOC. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
4.	90% of amount at milestone 4 above alongwith service tax shall be released on prorata basis on completion of studies like Risk Analysis , Environmental Impact Assessment ,Hazop & other studies required for Environmental & Pollution Control Board clearances for the project, preparing Disaster Management Plan etc. and submission of reports to the satisfaction of IOC. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
5	90% of amount at milestone 5 above alongwith service tax shall be released on prorata basis on completion of Basic engineering & Design including cost estimates to the satisfaction of IOC. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
6	90% of amount at milestone 6 above alongwith service tax shall be released on prorata basis on completion of detailed engineering & Design including detailed cost estimates to the satisfaction of IOC. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
7	90% of amount at milestone 7 above alongwith service tax shall be released on prorata basis on preparation /completion of tendering packages for invitation of tenders to the satisfaction of IOC. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
8	90% of amount at milestone 8 above alongwith service tax shall be released on prorata basis on completion of Prequalification of agencies for LSTK Contracts and invitation of LSTK tenders & other tenders by IOC . Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
9	90% of amount at milestone 9 above alongwith service tax shall be released on prorata basis on Award of LSTK contracts/other contracts based on final recommendations by consultant and finalisation of

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	project cost estimate by consultant . Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
1 10	90% of amount at milestone 10 above alongwith service tax shall be released on prorata basis on completion of review of Detailed Engineering and Approval of Drawings/documents etc. submitted by LSTK Contractors, other contractors & Vendors. Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
11	90% of amount at milestone 11 above alongwith service tax shall be released on prorata basis on completion Procurement Services . Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
12	90% of amount at milestone 12 above alongwith service tax shall be released on prorata basis as per percentage completion of Project . Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
1 13	90% of amount at milestone 13 above alongwith service tax shall be released on completion of mechanical completion of Project . Balance 10% payment shall be released with final bill on completion of Consultant's services in all respect.
14	90% of amount at milestone 14 above alongwith service tax shall be released on completion of satisfactory Commissioning & Performance Test Runs . Balance 10% payment shall be released with final bill on completion of Consultant's services in
1 15	Balance amount against the Lumpsum payment alongwith service tax shall be released on completion of CONSULTANT'S Services in all respects.

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3.0 Man-Month Rates

- 3.1 Bidders shall separately indicate in their bids in the FORM - 3 & 4 (attached here below) the Man-Month Rates payable in addition to the Lumpsum prices as set forth in 2.1 here above of this Price Part with respect to the following services to be rendered by CONSULTANT covering Construction Supervision and Start-Up & Commissioning Assistance at site or in the construction of the Project as set out in the various Clauses of the "Scope of Work":
- Construction Monitoring/ Supervision
Construction Management and Quality Assurance
Construction Inspection
Mechanical Completion
Services for Commissioning and Start-up Management
Testing and Commissioning.
Process Guarantees.
- 3.2 The Man-Month Rates for different categories of personnel for the Project shall be quoted in FORM - 3 and FORM - 4 .
- 3.3 The Man-Month Rates shall be indicated for personnel of different categories and/or qualifications likely to be deployed for construction, supervision & monitoring, start-up and commissioning assistance specifying a monthly rate with respect to each. The quoted man-month rates shall be inclusive of all wages / salaries, compensations, allowances, overtime, mobilization & de-mobilization, Cost of construction of site offices, travel & related expenses, overheads & profits etc. It is intended that the deployment of personnel at site will be confined only to those persons whose deployment is considered imperative and for such period(s) with respect to each category for which the deployment is considered imperative.
- 3.4 Bidders will separately indicate in their bids the estimated man-months for (CONSULTANT's Employee on their rolls) which the bidder envisages are likely to be involved in the performance of the activities and to be paid for at Man-Month Rate basis under 3.1 hereof above, as also indicate the maximum amount in Indian Rupees, inclusive of cost of all Travels & related expenses, all Taxes & Duties except Service Tax., which the bidder shall be entitled to claim by way of Man-Month Rates for the said services. The maximum amount quoted by the bidder or any lower amount settled in this behalf between the OWNER and the successful bidder in this behalf shall operate as **ceiling** for the Man-Month Rates payable to the CONSULTANT for the services covered under 3.1 above.
- 3.5 The maximum amount specified by the bidder as payable for the services specified in 3.1 hereof above shall be added to the Lumpsum price quoted under 2.1 to evaluate the bids.
- 3.6 Payment for deployment of personnel with respect to which Man-Month Rates are payable shall be paid on the rates quoted and for the actual duration of their respective deployments at site and duly certified by

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Engineer-in-Charge. Any deployment for duration less than complete month shall be paid proportionately.

- 3.7 **CONSULTANT shall be paid for deployment of personnel in relation to the services covered under 3.1 and 3.2 hereof above against certified monthly bills, i.e. monthly bills/ invoices raised by the CONSULTANT and certified by the OWNER's representative for each Georgian calendar month.**
- 3.8 Prior to deployment by CONSULTANT of personnel with respect to any services covering construction supervision, startup and/or commissioning assistance at site for and in the construction of the Project in relation to any services specified in 3.1 hereof above, CONSULTANT shall submit the detailed CVs of such person proposed to be posted at site to OWNER for concurrence & approval. The CONSULTANT shall also obtain clearance from the OWNER for the various types/ categories/nos. of personnel required and the approximate duration(s) of their stay. Any concurrence/ approval of OWNER does not relieve CONSULTANT of his responsibilities and all the liabilities to this effect shall be of CONSULTANT.
- 3.9 The OWNER and CONSULTANT shall jointly maintain a record of all CONSULTANT's personnel chargeable at Man-Month Rates deployed each day which shall be used as the basis for calculating payments due to the CONSULTANT for the services covering construction supervision, start up and commissioning assistance at site.
- 3.10 Should the performance of any of CONSULTANT's personnel be found unsatisfactory by OWNER, the replacement of such personnel shall be carried out by CONSULTANT within 15 days of notification by OWNER.
- 3.11 While working out & proposing the Site Organisation for Construction Management & Supervision and Assistance in Start up, Commissioning & Performance Test Runs, Bidders shall take the utmost care and shall accordingly proposed the Man-months for different categories of personnel (CONSULTANT's permanent employees on their rolls) which the bidder envisages are necessary for such required period for the performance of all the Services required at 3.0 (Man-Month Rates). The Bidder shall indicate these man-months for different categories of personnel in Form 3 & 4 of their Price Bids.
- 3.12 Without prejudice to the Bidder's responsibilities and the obligations under the clause/ Contract, Bidder shall consider the following **minimum requirements** while working out & suggesting proposed Site Organization & furnishing Man- Months details in Form-3 & 4;

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- | | |
|---|---|
| A) Construction Monitoring/ Supervision, Construction Management and Quality Assurance, Construction Inspection, HSE, Mechanical Completion, Labour Officer etc. for LPG Terminal & Associated Facilities etc. | Technical personnel -120 Cumulative Man-months.

Administrative / Ministerial Staff - As per Bidder's requirement |
| B) Commissioning & Start-up Management, Testing and Commissioning, Guarantees for LPG Terminal & Associated Facilities etc. | Technical personnel - 15 Cumulative Man-months (excluding Site In-charge) |

Technical Personnel proposed by Bidder for deployment at site for performance of above services should be adequately qualified & have the experience of min. 10 years in execution of projects in their respective field. Engineer-in-Charge shall be adequately qualified and have the experience of approx. 15 years in project execution and should have handled & successfully completed one Project of similar magnitude in the refinery/ petrochemical sector.

3.13 The rates stated in the Schedule of Rates shall not be subject to escalation or increase on any account whatsoever till completion of job in all respect.

4.0 Reimbursable expenditure item list

The Lumpsum prices quoted in FORM ' 2 are exclusive of the following, which shall be directly paid by OWNER or reimbursed at actuals on submission of the sufficient documentary evidence:

- * Cost of Third Party Inspection charges at actuals, if any.

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FORM – 3

SL. NO.	CATEGORY OF PERSONNEL	NO OF PERSONNEL	NO OF MAN MONTHS	MAN-MONTH RATE IN INR	AMOUNT IN INR
1	2	3	4	5	6
		NOT TO BE QUOTED HERE			
		TOTAL OF COLUMN - 4		TOTAL OF COLUMN - 6	

SERVICE TAX @ ON TOTAL OF COLUMN 6 ABOVE : Rs

SERVICE TAX SHALL BE REIMBURSED TO TENDERER ON PRODUCTION OF DOCUMENTAERY EVIDENCES..

2. Bidder to quote Man-Month rates for different categories of personnel (Engineers & Others).
3. Bidder to quote Cumulative Man-Months for different categories of personnel Engineers & Others) for all the Plants/ entire Project.
4. The above quoted Man – Month Rates shall be inclusive of cost of all Travels & related expenses, all Taxes & Duties except Service Tax.
5. Payments towards Man-Month shall be calculated & made on the basis of above quoted rates & actual deployment at site. However, total amount quoted at Column-6 shall act as ceiling for this purpose.

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FORM - 4

MAN-MONTH RATES FOR ASSISTANCE IN START-UP, COMMISSIONING & PERFORMANCE TEST RUNS ETC. FOR LPG TERMINAL & ASSOCIATED FACILITIES ETC. AT PARADIP(ORISSA)

SL. NO.	CATEGORY OF PERSONNEL	NO OF PERSONNEL	NO OF MAN MONTHS	MAN-MONTH RATE IN INR	AMOUNT IN INR
1	2	3	4	5	6
		NOT TO BE QUOTED HERE			
		TOTAL OF COLUMN - 4		TOTAL OF COLUMN 5	

TOTAL AMOUNT (COLUMN-6) IN WORDS (in INR): _____

SERVICE TAX @ _____ ON TOTAL OF COLUMN 6 ABOVE : Rs

TOTAL INCLUSIVE OF SERVICE TAX : Rs. _____ (In Words Rupees _____)

SERVICE TAX SHALL BE REIMBURSED TO TENDERER ON PRODUCTION OF DOCUMENTAERY EVIDENCES..

NOTE: 1. Bidder to quote strictly as per the above PROFORMA.

2. Bidder to quote Man-Month rates for different categories of personnel (Engineers & Others).
3. Bidder to quote Cumulative Man-Months for different categories of personnel (Engineers & Others) for all the Plants/ entire Project.
4. The above quoted Man – Month Rates shall be inclusive of cost of all Travels & related expenses, all Taxes & Duties except Service Tax.
5. Payments towards Man-Month shall be calculated & made on the basis of above quoted rates & actual deployment at site. However, total amount quoted at Column-6 shall act as ceiling for this purpose

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FORM-5

MOBILISATION ADVANCE REQUIREMENT

NAME OF WORK: CONSULTANCY SERVICES FOR PROJECT MANAGEMENT, BASIC & DETAILED ENGINEERING, COST ESTIMATES, PREPARATION OF TENDER PACKAGES, CONSTRUCTION MANAGEMENT, SUPERVISION AT SITE AND OTHER SERVICES INCLUDING ASSISTANCE IN START-UP COMMISSIONING & PERFORMANCE TEST RUNS FOR LPG MARKETING TERMINAL PROJECT AT PARADIP (ORISSA)

TENDER NO. : **LPG/ENGG/PT-252/2010**

NAME OF TENDERER :

1. State whether Mobilisation Advance (Interest Bearing at the rates & terms & conditions mentioned in the tender. & Recoverable) is required. : _____

(Confirm in **YES or NO** only)

(STAMP AND SIGNATURE OF TENDERER)