



Plant 1.0 MTPA ALUMINA REFINERY STREAM-5	Client NALCO	Contract Code NAL	Document ID 6695-PMG-G00-BD-0005	Contract No. 66-6695
	PROJECT EXECUTION PLAN FOR LSTK CONTRACT			 नेशनल एल्युमिनियम कम्पनी लिमिटेड National Aluminium Company Ltd.
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tkIS India / Vendor		tkIS India / Owner / Client	
Category Codes (Submission Purpose)	<input type="checkbox"/> 1 For Approval <input type="checkbox"/> 2 For Review / Comments <input type="checkbox"/> 3 For Information <input type="checkbox"/> 4 For Engineering <input type="checkbox"/> 5 For Enquiry <input type="checkbox"/> 6 For Order Placement <input type="checkbox"/> 7 Final & Approved <input type="checkbox"/> 8 Released for Construction	Category Codes (Submission Purpose)	<input type="checkbox"/> 1 For Approval <input type="checkbox"/> 2 For Review / Comments <input type="checkbox"/> 3 For Information <input type="checkbox"/> 4 For Engineering <input type="checkbox"/> 5 For Enquiry <input type="checkbox"/> 6 For Order Placement <input type="checkbox"/> 7 Final & Approved <input type="checkbox"/> 8 Released for Construction
Acceptance Codes (Approval Codes)	<input type="checkbox"/> 1 Approved <input type="checkbox"/> 2 Approved for Manufacturing / Fabrication with Comments as marked <input type="checkbox"/> 3 Not Approved / Resubmit <input type="checkbox"/> 4 Retained for Information / Records <input type="checkbox"/> 5 Reviewed <input type="checkbox"/> 6 Reviewed as Noted / Resubmit	Acceptance Codes (Approval Codes)	<input type="checkbox"/> 1 Approved <input type="checkbox"/> 2 Approved for Manufacturing / Fabrication with Comments as marked <input type="checkbox"/> 3 Not Approved / Resubmit <input type="checkbox"/> 4 Retained for Information / Records <input type="checkbox"/> 5 Reviewed <input type="checkbox"/> 6 Reviewed as Noted / Resubmit
Remarks for AC2 : This marked-up drawings is hereby approved for fabrication / manufacturing and shall be re-submitted after revision. This drawing should be revised only to the extent of tkIS India / Owner / Client comments. Any other changes made by you will not be considered unless clearly highlighted in covering letter asking for approval.			
This approval / review does not absolve the supplier from the full responsibility for design and fabrication.			
Date : __/__/____ Name : _____		Date : __/__/____ Name : _____	

01	-	Finalised and Issued for tender.	31.01.18	SAK	31.01.18	WAR	31.01.18	WAR	-	
Rev.	Status	Description	Date	Prepared	Date	Checked	Date	Approved	AC	
				Barcode						Category Code:





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1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the Project Execution Philosophy as a guideline that shall be followed for the execution of the Project by LSTK contractor.

This document is intended to provide consolidated guidelines for communication, deliverables, activities to be carried out and work procedures to be adopted for the execution of the project under the terms and conditions of the contract agreement between OWNER and LSTK Contractor.

In the event of any omission or any contradiction between this document and the contract agreement, provisions of contract agreement shall prevail. The definitions used in the Contract Agreement are also applicable to this document.

Design & Engineering carried out by LSTK Contractor shall be in line with the requirements/specifications/technical details furnished in Tender.



1.2 Brief on Project

National Aluminium Company Limited (NALCO), hereafter referred to as OWNER, a Government of India undertaking and Navaratna Company, owns and operates a large integrated Mines-Alumina-Aluminium Complex in India.

As a part of its growth plan NALCO is planning to set up one more Stream (5th Stream) in its Alumina Refinery under 3rd phase expansion at Damanjodi based on Pottangi Bauxite Deposits. Since Pottangi Bauxite mine is not yet allotted to NALCO, mining of bauxite is envisaged from South Block of the Panchpatmali mine to meet the present requirement. The stream capacity would be 1.0 MTPA Alumina and processing technology will be based on medium pressure digestion keeping in view of higher liquor productivity and its associated advantages.

At port facilities, Visakhapatnam one Alumina silo of capacity 25000 MT and one Caustic Soda tank of capacity 5000 MT shall be constructed for export of Alumina and import of caustic soda liquor respectively.

NALCO has appointed thyssenkrupp Industrial Solutions (India) Private Limited (tkIS-India) (Formerly Uhde India Private Limited), as their EPCM Contractor & PMC for LSTK Packages (hereafter referred as CONSULTANT).

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1.3 Process Licensors

The technology for Alumina Refinery Expansion is being provided by M/s RTAIL (Rio-Tinto Alcan Limited).

2. PROJECT DETAILS

Project Name	:	1.0 MTPA Alumina Refinery Stream-5
OWNER	:	National Aluminium Company Limited (NALCO)
CONSULTANT	:	thyssenkrupp Industrial Solutions (India) Pvt Ltd. (tkIS-India)
Project No. (tkIS-India)	:	66-6695
Site Location	:	Damanjodi, Odisha, India
Name of Unit Licensors	:	Rio-Tinto Alcan Limited (RTAIL)
tkIS India's Project Management & Contact Particulars	:	<p>1) Mr. Arun Kumar Ladia, Project Director Tel : +91 22 4047 8287 Mobile : +91 9891065794 Email : ak.ladia@thyssenkrupp.com</p> <p>2) Mr. Waibhav Raut, Project Coordinator Tel : +91 22 4047 8266 Mobile : +91 9930429343 Email : waibhav.raut@thyssenkrupp.com</p> <p>Mailing Address : thyssenkrupp Industrial Solutions (India) Pvt Ltd Uhde House, L.B.S. Marg , Vikhroli (W), Mumbai 400 083, India</p>
NALCO, Project Manager & Contact Particulars	:	<p>Mr. Rabin Brahma, General Manager (Projects & Technical)</p> <p>Phone Number : +91 674 2302491 Mobile No. : +91 9437015567 Email : rabin.brahma@nalcoindia.co.in</p> <p>Mailing Address: Nalco Bhavan, P/1, Nayapalli, Bhubaneswar - 751013</p>

3. PROJECT GOALS



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The project shall be executed by LSTK Contractors with following goals:

- ✓ To ensure an Incident Free Project, including Zero Loss Time Incident (LTI) and High Standards of Safety.
- ✓ To ensure compliance with internationally & nationally recognized Quality Standards for Engineering, Procurement and Construction.
- ✓ To ensure the Project is executed within Schedule.

4. SCOPE AND RESPONSIBILITIES OF LSTK CONTRACTORS

- ❖ The scope of LSTK Contractors comprises of Residual Process Engineering, HAZOP Study with participation by Licensor / CONSULTANT / OWNER, SIL Study, Detailed Engineering, Project Management, Procurement, Fabrication, Manufacturing, Quality Assurance, Inspection & Expediting, Third Party Inspection, Supplies, Transportation, Stores Management, storage of all equipment, materials, items and other construction materials, Construction Management & Supervision, Construction, Installation, Testing, Insulation, Painting, Pre-commissioning including Mechanical Completion of Plant, Start-up, Commissioning and Performance Guarantees Test Run and handing over the plant, including spares along with Final and "As Built" documentation to the OWNER/CONSULTANT, on single point responsibility basis.
- ❖ LSTK Contractors shall check and satisfy themselves that the Data of Tender technical documents meets the requirements of accuracy, correctness and completeness, to meet the agreed guarantees. In case of deficiency, LSTK Contractors shall inform the OWNER/CONSULTANT the modifications proposed to be carried out to overcome the deficiency and rectify the same at no extra time & cost implications to OWNER/CONSULTANT. The LSTK Contractors, if required, shall carry out corrective technical studies and engineering, as may be required, without any time and cost implications to OWNER/CONSULTANT.
- ❖ Generally, the work shall be performed in accordance with the Licensors documents and various other documents like, process descriptions, specifications & standards, procedures, drawings and other requirements specified in the tender. LSTK Contractors shall submit necessary documents for review of OWNER/ CONSULTANT, as and when required and shall carry out modifications based on OWNER/ CONSULTANT review.
- ❖ Minimum of the following activities shall be performed by the LSTK Contractors directly, and shall not be sub-contracted :
 - Overall Project Management
 - Planning, Scheduling, Monitoring
 - Engineering
 - 3-D Modelling



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- Procurement
- HSE
- Quality Assurance
- Construction Management / Construction Supervision
- Pre-commissioning, Start-up and Commissioning

- ❖ LSTK Contractors shall execute the Project on Lump sum Turnkey basis, in accordance with and supported by the Engineering Procedures, Procurement Procedures, Construction Procedure, Project Management & Planning Controls, IT / Software System, to effect the maximum efficiency and quality of the Project.
- ❖ LSTK Contractors shall establish requisite Project Organization, giving due consideration to the following main aspects:
 - Effective execution & timely completion of the Project.
 - Maintaining High quality and safety throughout the execution of the Project.
 - Good co-ordination with OWNER / CONSULTANT.
 - Assignment of experienced personnel & proper resources for smooth execution of the Project.
 - Effective planning & execution of all Tie-ins & further routing, electrical modification & other jobs, as specified in the tender documents. LSTK Contractors to note that the desired pressures at various tie-ins are indicated in the tender. If the OWNER/CONSULTANT is unable to provide fluids at the tie-in at the desired pressure, boosting the pressure to the desired level is also included in the scope of work of the LSTK Contractors, without any cost or schedule implication to the OWNER/CONSULTANT.
- ❖ The successful LSTK bidders will only have to sign a NDA with the licensor.
- ❖ Insurance requirement is elaborated elsewhere in the Tender document.
- ❖ LSTK Contractors shall refer to the detail scope of work and scope of supplies, defined discipline wise elsewhere in Tender document.

5. ENGINEERING

Scope of work of LSTK Contractors includes, but is not limited to, Residual Process Engineering, HAZOP with participation by Licensor / CONSULTANT / OWNER, SIL Study, Detailed Engineering, and preparation of Engineering drawings, documents, data sheets, etc. making use of standard specifications, standards, design guides and Technical Documents enclosed in the bidding documents. HAZOP/SIL shall be conducted in the Home Office of the LSTK Contractors. The Chairman for these studies shall be appointed by the LSTK Contractors. The CV's of such Chairman shall be submitted to OWNER/CONSULTANT for review/approval. All costs and schedule impact associated with such studies shall be borne by the LSTK Contractors. Any changes that are required based on HAZOP/SIL studies, has to be carried out by the LSTK Contractors, without any time & cost implication to the OWNER/CONSULTANT.

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Technical requirements, engineering details, data sheets, standard specifications, engineering standards of CONSULTANT & Guide lines, General Engineering Specifications etc. that are to be followed for different type of engineering works, have been described in Tender Documents.

LSTK Contractors need to develop Residual Engineering for all engineering disciplines as required and carry out the Detailed Engineering. Any revision /changes / updating in Engineering Documents due to Vendors' Drawings for Manufactured / Fabricated / Purchased Equipment / items, statutory requirements, Govt. Regulations, safety requirements, site conditions and any other item not mentioned herein, but required to complete engineering activities as per defined scope, shall be carried out by LSTK Contractors without additional cost & time implication to OWNER /CONSULTANT. Any additional Equipment/ materials /items resulting out of the above, shall be procured and supplied by LSTK Contractors, without additional cost & time implication to OWNER /CONSULTANT.



It has been endeavoured to make the technical Tender documentation as correct and complete as possible. LSTK Contractors need to validate the technical Tender documentation and take ownership of the same, which have been provided as guidelines in terms of the intent of the Licensor. LSTK Contractors shall perform the Residual Process Engineering and Detailed Engineering services for the project, based on the tender documents furnished by the OWNER/CONSULTANT. The services shall also cover any additional detailed engineering required for execution and completion of the project without additional time & cost impact to OWNER /CONSULTANT.

LSTK Contractors shall carryout PDMS modelling of the entire LSTK Package.

Drawings / documents of LSTK Contractors / Vendors to be reviewed / approved by OWNER / Licensor / CONSULTANT are listed elsewhere in the Tender. Review and approval of any documents by OWNER/CONSULTANT shall, however, not absolve the LSTK Contractors of their responsibilities.

Supporting OWNER for all obtaining necessary statutory approvals by way of providing necessary documentation & technical support, as needed, shall be the responsibility of the LSTK Contractors and the same is included in their scope of work.

For completing the Project within Schedule, it may be necessary in some cases to prepare the drawings in stages and release those progressively for construction to take up simultaneous execution at site along with detail-engineering. Any revisions/rework arising out of simultaneous & parallel execution is included in the scope of work of LSTK Contractors, without additional cost & time implication to OWNER /CONSULTANT. Further, any change(s) required for meeting the site conditions / statutory requirements shall have to be carried by LSTK contractors and is included in the scope of work of the LSTK Contractor.

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Plant design, detailed engineering and construction, shall be based on applicable codes & standards. However, they shall also be based on good engineering practices. List of applicable codes, standards and mandatory rules to be followed in design is also mentioned elsewhere in Tender documents. The LSTK Contractors should carry out their engineering considering all the process, safety, operation and maintenance requirements. Any changes required to meet this requirement, has to be carried out by the LSTK Contractors without any time & cost implication to the OWNER/CONSULTANT.

Engineering support from engineering office of LSTK contractors shall be provided to site during construction /erection phase, including deployment of engineering specialists for field engineering as and when required by LSTK Contractors/ OWNER/ CONSULTANT. Contractor shall prepare necessary documents for all field engineering as required.

English language and SI / Metric Units shall be used in all documents, drawings, reports, correspondences etc. under this contract.

6. PROCUREMENT



The procurement services to be provided by the LSTK Contractors shall cover purchasing, inspection, expediting, custom clearance, transportation activities, site deliveries, etc. for all Equipment's/Materials/items required for the Project.

Contractor shall strictly follow the vendor list provided in the tender. If any deviation is required, contractor shall obtain approval from OWNER/CONSULTANT before proceeding further.

LSTK Contractors shall submit the Project Procurement Procedure / Methodology and schedule that shall be followed during the project execution.

Scope of LSTK Contractors includes, but is not limited to, ordering, fulfilment of all import formalities, fabrication / purchase of equipment and materials, port clearance, packaging and transportation to site, stores management which includes preservation and storage of equipment and materials in uncovered storage / air- conditioned storage / open storage as per the requirement. Items requiring covered storage and air-conditioned storage are to be highlighted and necessary arrangements shall be made by the LSTK Contractors at their own cost.

The purchase group shall consist of adequate number of experienced and qualified Purchase Officers commensurate with the number of enquiries to be handled and the schedule for ordering. A procurement schedule shall be prepared and submitted to OWNER/CONSULTANT for approval. This approved schedule shall be followed for all procurement activities.

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Purchasing activities shall be coordinated by an experienced purchase coordinator who shall be responsible for:



- Coordinating with the engineering group regarding preparation of enquiry specifications, evaluation and clarifications on offers of vendors, technical discussions, negotiations with vendors, technical recommendations, preparation of Purchase Requisitions / order specifications to form part of Purchase order for selected vendors.
- Coordination for processing of amendments as required during execution of Project on account of additions / modifications as well as transit losses / damages.
- Before ordering, clearance for technical portion for critical equipment, rotating items, instrumentation and electrical items as indicated in technical details, would have to be taken from OWNER/CONSULTANT. LSTK contractor is required to furnish the selective TBAs to OWNER/CONSULTANT for review upon request.
- Preparation and issue of status reports on purchasing activities.
- Attending review meetings with OWNER/CONSULTANT on all purchase activities.

Before ordering, approval for technical specifications shall be taken from OWNER / CONSULTANT in respect of critical equipment comprising of Mechanical Static & Rotary Equipment's, Electrical & Instrumentation items. OWNER / CONSULTANT will review Technical Recommendations furnished by LSTK Contractors for critical equipment. Other equipment and materials can be ordered without referring to OWNER/CONSULTANT, as long as ordering is in accordance with the requirements of this Tender. Items ordered, irrespective of any approval by OWNER/CONSULTANT that do not confirm to the contractual requirements identified at any stage of the project, shall be rejected / modified by the LSTK Contractors. Cost & Time implication arising out of this activity shall be to the LSTK Contractors account. Wherever approval is to be taken, it would be necessary to submit details of technically acceptable offers.

Procurement of all the spares needed for Construction, Erection, Mechanical Completion, Pre-commissioning and Commissioning, as well as Mandatory spares, are included in the scope of supply of LSTK Contractors.

LSTK Contractors shall provide spares as specified elsewhere in the tender.

LSTK Contractors shall provide all necessary equipment, materials, and accessories like lubricants, chemicals etc. needed to cover first fill and commissioning requirements, plus the first six months of commercial operation of the plant at design capacity for all applicable equipment.

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LSTK Contractors shall provide to OWNER/CONSULTANT unpriced PO copies of all purchase orders that they will place for executing their LSTK package.

6.1 Inspection & Expediting

LSTK Contractors/ Third Party Inspection Agency (TPIA) to be appointed by LSTK Contractors from approved TPIA list, shall carry out Inspection & Expediting of all the Equipment /Materials /items to be supplied for the project, so as to ensure timely delivery of all the items / equipment meeting the specified quality criteria. Co-ordination for all this activities needs to be carried by LSTK Contractors. Approved list of TPIA is enclosed elsewhere in the Tender documents.



The Overall responsibility of inspection, expediting, deliveries, quality of all Equipment /Materials /items, timely availability at site for installation, documentation, and test reports etc. lies with LSTK Contractors. OWNER/CONSULTANT reserve the right to inspect any item as deemed necessary by them at any stage. In any case, the critical items, shall also be inspected by OWNER/CONSULTANT, apart for the TPIA.

Upon receipt of materials at site, the materials will be inspected as per approved ITP at site. Moreover, OWNER has the right to inspect any equipment or items, to any extent and at any time, even after the inspection is completed by CONSULTANT. LSTK Contractor will give the necessary support for this inspection and will not be entitled for any extra claims or charges or additional time on this account.

Expediting is one of the vital activities of successful and efficient procurement system which enables timely execution of the Project. Such expediting has to be carried out by deployment of expediting coordinators located at the Head Office of the LSTK Contractors, who would be assisted by expeditors located in various regional centres. To enable this function to be very effective and fruitful, Expediting Coordinators shall be nominated by LSTK Contractors.

Expediting Coordinators shall be located at the Head Office of the LSTK Contractors and will liaison with various departments such as Purchase, Projects, Engineering, and transportation etc. on one hand and regional inspection / expediting offices/TPIA and vendors on the other. The basic functions of such expediting coordinators would be:

- i. Maintain effective communication link between various departments of the LSTK Contractor including regional offices if any, third party inspection agency and vendors on whom the orders are placed.
- ii. Maintaining the current status of all the orders.
- iii. Analysing the order status in detail after identifying the critical order and initiation of suitable remedial measures in the event of delays.
- iv. Acting effectively to ensure final delivery of the items, within Contractual Delivery Date (CDD).
- v. Preparation of order close-out reports of each purchase order.

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- vi. Expediting coordinators shall be highly communicative and have sound technical knowledge; they must be highly analytical, alert, and quick in gathering up-to-date information of the various purchase orders.

The LSTK Contractors shall submit the Project Quality Assurance Plan and Quality Audit Schedule as a part of his Procurement Manual to OWNER/CONSULTANT for review & approval. The minimum requirement of Project QA/QC Plan to be followed for the project shall include:

- i. In-house inspection programmes.
- ii. Inspection Procedures consistent with mandatory codes.
- iii. Procedures for material identification and transportation.
- iv. Independent inspection of all critical equipment at vendors' works & issue of Inspection reports along with factory acceptance test reports to OWNER/CONSULTANT.
- v. Certification of non-destructive testing.
- vi. Audit program with schedule and audit of suppliers.

The minimum requirement of inspection QA Plan to be followed by LSTK Contractors for the project, has been specified elsewhere in the tender document.

7. CONSTRUCTION / ERECTION WORK

7.1 Tendering for Construction /Erection



LSTK Contractor shall properly organized tendering activities to ensure award of various Contracts in line with the Project Schedule.

The tendering group shall consist of sufficient number of contract engineers/officers having adequate professional experience and qualifications.

LSTK Contractors shall prepare a Tender schedule for carrying out different works such as Civil and Structural, Equipment Erection, Piping Erection, Electrical Erection, Instrumentation Erection, Insulation and Painting etc. All tendering activities shall be carried out in accordance with this approved tender schedule. The LSTK Contractor shall deploy a "Contracts Coordinator" for coordination of tendering activities.

The contracts coordinator shall be responsible for:

- i. Preparation of tender documents, issue of enquiry to approved contractors, techno-commercial evaluation of offers for award of contract will be carried out by LSTK Contractors.
- ii. Coordinating with the Resident Construction Manager during execution of the contracts regarding clarifications on Contract terms and conditions as required.

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- iii. Planning & organizing site infrastructure, tools / tackles & manpower from both LSTK Contractors & their approved Sub Contractors.
- iv. Preparation and issue of status reports on contracting activities.
- v. Attending review meeting with OWNER/CONSULTANT on all contracting activities.

7.2 Stores Management

Store Management scope lies with LSTK Contractors, who shall arrange for temporary warehouse and the stock yard for their supply of material. Security, watch & ward facilities at warehouse shall be the responsibility of the LSTK Contractors.

A proper materials management system shall be implemented by LSTK Contractors at the project site, under the guidance of an experienced Stores Manager.

LSTK Contractors shall handle all aspects of stores Management. LSTK Contractors shall also be responsible for verification, Inspection, proper & safe storage & handling of all project related materials.



7.3 Construction & Erection

LSTK Contractors have to carry out constructability study of their package, so as to prevent any issues during the construction / erection phase. This study has to be carried out after the first model review and before the start of erection work at site. Copy of this study has to be submitted to OWNER / CONSULTANT.

Scope of the LSTK Contractors covers construction, erection/ installation of the LSTK packages, as per P&IDs, Data Sheets, Construction Drawings, Standards, Specifications, Codes, Statutory and State regulations.

Supply of construction materials, labour, labour supervision, tools, tackles, consumable materials and accessories not specifically mentioned herein, but nevertheless necessary, as per the OWNER / CONSULTANT for construction, installation, testing and commissioning of the complete system, including cranes or any other material handling equipment, is also part of scope of LSTK Contractors.

Barricading the Battery Limit from adjacent areas for safety and all safety measure necessary to meet the goal of Zero LTI and to carry out the construction in a safe manner, is also in scope of LSTK Contractors.

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The LSTK Contractors shall deploy adequate manpower, having the necessary professional experience and qualifications, and deploy adequate construction resources that are required for the timely execution of the project.

LSTK contractor shall refer to document Construction management requirements included elsewhere in the Tender for details.

7.4 Pre-Commissioning /Start-up / Commissioning / Performance Guarantee Test Run

Scope of LSTK Contractors covers supply of all initial fill such as lubricants, seal oils, chemicals, consumables, spares, etc. required for start-up, pre-commissioning, commissioning and Guarantee Test Run of their LSTK Package. Detailed scope is mentioned elsewhere in the Tender.

LSTK Contractors shall be responsible for the Start-up, Commissioning & Performance Guarantee Test Run of each Unit of their LSTK Package. For the purpose to demonstrate that their Plant meets LSTK Contractor's Contractual Guarantees, the Start-up, Commissioning and Performance Guarantee Test Runs shall be carried out by the LSTK Contractors, under the technical direction of the Process Licensor/CONSULTANT/OWNER.



LSTK Contractors shall integrate a certain number of personnel trained in operations and maintenance into its team during the commissioning period. This integrated approach will help to provide a relatively seamless handover of the Plant and facilities to OWNER.

LSTK Contractors shall provide manpower, required tools & tackles and all other items not mentioned herein but necessary for Start-up, Commissioning & Performance Guarantee Test Run of the LSTK Package. Planning and organization of Pre- commissioning, Start-up, Commissioning & Performance Test Run shall be developed by LSTK contractors & shall be submitted to OWNER / CONSULTANT for Review at least two Months prior to start of these activities.



In addition, within the LSTK Contractors responsibilities for Commissioning and within the price of services, the LSTK Contractors shall be required to maintain watch and ward of and ensure the safety and integrity of the Plant including Off-sites and Utilities, until successful completion of Commissioning and issue of Commissioning and Performance Test Certificate for the Plant.

The detailed scope of Pre-commissioning, Start-up, Commissioning & Performance Test Run, is defined in detail elsewhere in the Tender.

8. QUALITY ASSURANCE PLAN

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- LSTK Contractors shall ensure that all stages of the work are controlled in accordance with a Quality system that complies with the applicable elements of ISO 9001 (latest edition).
- LSTK Contractors shall submit detailed Quality Assurance Plan along with Quality Audit Schedule which will be adopted for all stages / types of activities for review / approval by CONSULTANT / OWNER during Kick off Meeting.
- LSTK Contractors shall carry out the quality checks as per the requirements and guide lines of the Quality plan agreed during the execution of the work.
- LSTK Contractors shall forward to OWNER / CONSULTANT, for review, the plan describing the responsibility for various activities and technical interfaces, necessary resources required for effective quality checks.
- LSTK Contractors shall carryout periodic Quality Assurance Audits during engineering as well as construction phase of the Project. LSTK Contractors shall submit the schedule for such QA audit for information to OWNER/CONSULTANT. All audit reports and audit closure reports shall be submitted to OWNER/ CONSULTANT for information and review. LSTK Contractors shall carry out changes based on OWNER / CONSULTANT comments / recommendations. Further, OWNER / CONSULTANT shall participate in LSTK Contractors audits, whenever required.
- OWNER/CONSULTANT shall carry out QA & HSE audits (both Home office & Construction site) as and when required throughout the project duration. LSTK Contractors shall carry out changes based on OWNER /CONSULTANT comments / recommendations. Further, CONSULTANT / OWNER shall participate in LSTK Contractors audits, whenever required.
- LSTK Contractor should provide full co-operation to OWNER / CONSULTANT during all the audits by OWNER / CONSULTANT.
- Facilities at shops / site / engineering office for carrying out quality checks by OWNER / CONSULTANT shall be provided by the LSTK Contractors.
- LSTK contractor shall ensure that materials, including pipes and pipe fittings are offered to CONSULTANT for inspection at site as per approved ITP, for which, relevant inspection records are also maintained at site.
- The objective of the quality assurance scheme of the LSTK Contractors shall be to ensure conformity of equipment/material/site construction to various standards, specifications/drawings and technical requirements that are being mutually agreed between the LSTK Contractor and OWNER / CONSULTANT. Quality Assurance System should clearly indicate the organizational approach for quality control and quality assurance of the various equipment/construction activities and also provide a

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verifiable evidence of the LSTK Contractor having carried out all the activities laid down in the bid document and the procedure. Such conformity to quality level shall be ensured by controlling the quality level of purchased items at vendor's/sub-vendor's shop/site and shall cover from source surveillance to final inspection.



- Right to Inspect: OWNER/CONSULTANT or OWNER's representative and/or other representatives shall be entitled at all time to inspect, examine and test all management, design, development, materials, work and workmanship supplied by LSTK Contractor or for which LSTK Contractor is responsible during management, design and development and at any and all places where such management, design, development and/or work is carried on, provided such inspection, examination and testing shall, to extent possible, be carried out in conjunction with LSTK Contractor's similar activities and, if not, upon prior intimation to LSTK Contractor.

In furtherance of the foregoing, LSTK Contractor shall arrange for OWNER/CONSULTANT to have access to all the places where design and development are being carried out. Under no circumstances shall LSTK Contractor deny such access to OWNER/CONSULTANT or OWNER's representative.

LSTK contractor shall refer to document Construction QA/QC management requirement during construction included elsewhere in the Tender for details.

9. COMPLIANCE WITH CODES & STANDARDS AND STATUTORY REQUIREMENTS

- Statutory regulations as necessary will be adhered to during execution of the Contract for engineering, preparation of drawings / documents, Fabrication, Manufacturing, Purchased items, Construction, Erection, Pre-commissioning, Start-up & commissioning activities.
- During the entire project execution cycle, LSTK Contractors, shall comply to applicable statutory requirements, latest edition, of all relevant Indian statutory authorities such as, but not limited to –
 - I. Factories Act.
 - II. Tariff Advisory Committee Guidelines.
 - III. Liquid effluent discharge, as per Minimal National Standards for liquid effluents and air emissions conforming to Pollution Control Board Standards.
 - IV. Civil Aviation Rules.
 - V. Indian Boiler Regulation Act
 - VI. Central Electrical Authority (CEA) Regulations
 - VII. Director - General, Factory Advice Service and Labour Institute, Bombay
 - VIII. Department of Atomic Energy
 - IX. Requirement of Chief Controller of Explosives
 - X. Petroleum and Explosives Safety Organisation (PESO)
 - XI. Requirements of Town & Country Planning Dept.
 - XII. Requirements of other authorities concerned with the Project or with any license, permission, sanction, approval or no objection as required for the project.

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- XIII. Ministry of surface transport
- XIV. National Institute of Oceanology
- XV. Department of Water Resources (Respective State Law & Rules)
- XVI. Stipulations stated in Environmental clearance granted by Ministry of Environment and Forest, Govt. of India.
- XVII. Stipulations of Environmental authorities of the State where Project is being executed.
- XVIII. Costal Regulation zone clearance (CRZ)
- XIX. BOCW Act
- XX. Manufacture, Storage And Import Of Hazardous Chemical Rules (MSIHC)
- XXI. Other legislations relating to Environmental protection such as (but not limited to) :
 - a. Hazardous wastes (Management and Handling) Rules
 - b. Water (prevention and control of pollution) Act
 - c. Air (Prevention and Control of Pollution) Act.
 - d. Environment (Protection) Act.
 - e. Forest (Conservation) Act.



- Wherever applicable, LSTK Contractor shall obtain stability certificate for all building, technology structure etc.
- LSTK Contractors shall perform all design and engineering in accordance with the Engineering Standards and Specifications, International Codes and Standards, and National Codes and Standards, National and Local Rules and Regulations, as applicable,.

In cases of conflict between documents, the most stringent of the same shall be followed. LSTK Contractors shall provide its interpretation in writing of the most stringent requirement for OWNER/ CONSULTANT's approval.

In all such cases of conflict, OWNER/CONSULTANT's decision shall be binding and final.

Any deviations to the above, requires prior approval of OWNER/CONSULTANT. If standards or specifications are not available for specific applications, LSTK Contractors shall develop such standards and specifications, based on industry standards and practices, its own experience, and on the basis of fit for purpose. All new and revised Contract standards or specifications shall be submitted to OWNER /CONSULTANT for approval.



- Documents, as required, will be generated by LSTK Contractors and submitted to OWNER for getting the approval of relevant statutory authorities. Follow up and obtaining clearances shall be responsibility of OWNER. Apart from documentation, LSTK Contractor shall also provide to OWNER, necessary Technical support for getting such statutory approvals.

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- State regulations wherever applicable for different phases of the project, shall be adhered to by LSTK Contractors.
- Any changes / additions required to be made to meet the requirements of statutory authorities, shall be carried out by LSTK Contractors, without additional time & cost implication to OWNER/CONSULTANT. The inspection and acceptance of the work by statutory authorities, shall however not absolve LSTK Contractors from their responsibilities under this Contract.
- LSTK Contractors shall obtain and maintain any registrations, licenses (including import & export licenses) and permits (including immigration, temporary residence, work and exit permits) which are required by Indian or foreign laws or regulations, for the performance of the work and which are required to be in the name of LSTK Contractor, its employees, agents or subcontractors.

10. PROJECT MANAGEMENT

- The Project Management Services by LSTK Contractors shall include all phases of project management like Project Initiation, Planning, Implementation, Monitoring & Controlling and Closure of the Project, so as to achieve the goals set for the Project with respect to Scope, Cost and Time giving due attention towards Quality and Safety.
- The complete technical & commercial requirements, along with the Detailed Scope of Work and project time schedule, will form the basis for executing the LSTK Contract.
- The LSTK Contractors are required to organize their services in a systematic manner to ensure execution and completion of the Project as per the contractual schedule.
- The LSTK Contractors are required to submit methodology / procedure of Project Execution (Project Execution Plan) proposed for the project(s) together with the organizational set up proposed (Project Organisation Chart for HO & Site separately) and bio-data of Key-personnel for approval of OWNER/CONSULTANT. For the exact requirements of qualification & experience of key personnel, refer to relevant clause of SCC.
- Tender document, enumerates in detail the Information Technology (IT) procedures to be followed along with proposed Software requirements to be followed for the Project.
- In order to achieve uniformity in execution of various activities of the Project, CONSULTANT has developed Design Basis and Project Procedures / Methodologies to be adopted by the executing agency. LSTK Contractors are required to carry out engineering, procurement including supplies, tendering, inspection, construction, erection, planning, scheduling, monitoring, reviewing, reporting and Overall Project Management activities, in accordance with the job specifications / procedures that are specified in the tender.
- All activities to be performed/services to be rendered by LSTK Contractors shall be monitored by OWNER/ CONSULTANT and will be subject to periodic reviews by

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OWNER / CONSULTANT. The LSTK Contractors shall facilitate such reviews/ monitoring by OWNER / CONSULTANT

10.1 Project Organisation



- LSTK Contractors shall follow “Taskforce” methodology for enhanced, effective and efficient (internal and external) coordination with vendors, sub-contractors, CONSULTANT and OWNER.
- The project shall be managed with dedicated Team of Experienced Specialist Engineers from each Discipline by the LSTK Contractors. The personnel working on the project shall be working at a single place together, under the leadership of a Project Manager.
- LSTK Contractors shall appoint an Engineering Manager, who shall coordinate and control all design and engineering activities.
- The LSTK Contractors shall deploy adequate manpower, having the necessary professional experience and qualifications for the execution of the project.

10.2 Project Responsibility

All the technical, commercial & legal functions of the contract execution of the Project shall be under the responsibility & authority of the Project Manager of LSTK Contractors, who shall be accountable to OWNER / CONSULTANT for meeting all Contractual obligations of the Project. They shall have direct interaction with their counterparts of OWNER/ CONSULTANT, whenever required. The qualification & experience criteria of the key personnel to be deployed by the LSTK Contractors for the project execution, is mentioned elsewhere in the Tender document.

10.3 Project Planning

- LSTK Contractors shall prepare Detailed Project Schedule in Primavera Project Planner Enterprises –P6 (version 8.2.1). The Detailed Schedules for the Project shall be broken down so that they are related to Engineering, Procurement, Manufacturing & Deliveries, Site Construction/ Erection, Pre-commissioning, Start-up and Commissioning and which shall be submitted to OWNER/CONSULTANT for approval.
- The activities are to be planned such that they have measurable progress, so as to report progress of work, which is realistic and accurate. It should be possible to measure progress of activities, which are in progress at different stages.
- The detailed requirements of project planning have been defined elsewhere in the Tender document.

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10.4 Communication & Document Transfer

Basic guidelines are given below:

- All correspondence shall be in English language.
- All correspondences through email, letter or document transmittal form shall have a subject & reference number, which is serially numbered.
- For each issue/subject, separate communication will be used.
- Reference of previous communications / Transmittal reference / Document reference (either side) for the subject matter to be listed, to link all documents properly.
- Minutes of Meeting (MOM) shall be jointly prepared and will be signed by at least one representative of OWNER/CONSULTANT & LSTK Contractors, on the day of discussion itself. The MOM shall be factual statements and agreements and not verbatim reproduction of the proceedings; it shall be serially numbered.

10.5 Project Implementation Procedure



Project Manager of the LSTK Contractors shall conceptualize and evolve procedures applicable to the Project for Engineering, Procurement, Supplies, Construction, Erection, pre-commissioning, Start-up and Commissioning, which will indicate the inter-phase not only within its own scope/Task Force, but also among other LSTK Contractors, CONSULTANT, OWNER, Suppliers, Sub-contractors and other agencies working on the Project. The procedure shall include quality, time schedule, cost & safety aspects incorporated into it.

10.6 Project Control

Project Manager of LSTK Contractors shall ensure that well designed control measures are planned and implemented in order to achieve the required results for time schedule, progress, quality, safety and other contractual obligations to CONSULTANT / OWNER. The Project Control formats and contents shall be reviewed and approved by OWNER/CONSULTANT.

10.7 Project Review

The Project Review Meetings with OWNER/CONSULTANT shall be held during the phases of Engineering, Procurement / Supplies, Construction & Erection with respect to time schedule, quality & safety once in a month. LSTK Contractors shall present the status & constraints prior to the Review Meeting. The venue for such Meetings will be CONSULTANT-Mumbai office / OWNER office during Engineering phase and OWNER BGR site during Construction/Erection phase. The frequency of the project review meetings will be monthly or upon specific request from OWNER/CONSULTANT. Fortnightly meetings will also be conducted through Video Conference between OWNER / CONSULTANT / LSTK Contractors if required.

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10.8 Kick Off Meeting

Immediately after the award of order, a kick-off meeting will be held within 2 weeks to finalise and establish project execution Modalities and Procedures, Project Coordination Procedure, Project Execution Plan, Billing Milestones, Manpower & Tools that will be utilised by LSTK Contractors, commitments made by the LSTK Contractors and subsequent agreements reached between OWNER/CONSULTANT and LSTK Contractors during negotiation phase.

The kick-off meeting will be attended by key members of OWNER/CONSULTANT and LSTK Contractors. This meeting will address all critical project execution procedures between OWNER/CONSULTANT, the LSTK Contractors and other agencies.

Venue of KOM : CONSULTANT Mumbai Office

Participation : LSTK Contractor /OWNER / CONSULTANT

10.9 Engineering Reviews

Engineering Reviews shall be held with LSTK Contractor & CONSULTANT / OWNER for the following:

10.9.1 Interface meeting between LSTK Contractors / OWNER / CONSULTANT

Interface Meeting among LSTK Contractors / OWNER and CONSULTANT shall be held at CONSULTANT's Mumbai Office by OWNER/CONSULTANT, as and when required.

10.9.2 Engineering Review Meetings

OWNER/CONSULTANT shall hold design review meetings at CONSULTANT's Mumbai Office, as and when required during detailed engineering. The review meetings for activities such as HAZOP, SIL Studies, 3-D Model reviews, Risk Management Plan Review, Operation Implementation Plan Review, Safety Review and constructability etc. however will be held at LSTK Contractors Design Office or at site, as per requirement.

10.9.3 Engineering Document Reviews

OWNER / CONSULTANT shall review and approve critical documents of LSTK Contractors / Vendor's Document.



Venue : CONSULTANT, Mumbai office

10.10QA Audits (At Construction stages)

OWNER / CONSULTANT reserves right to conduct audits to check LSTK Contractor's Quality Assurance System.

Venue : NALCO Damanjodi site (during Construction/Erection phase)

Participation : OWNER / CONSULTANT

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10.11 Health, Safety and Environmental Procedure

Safety aspects are to be elaborated and implemented from engineering stage up to Construction, Erection and Commissioning phase. During engineering stage, LSTK Contractors shall ensure compliance to all statutory & regulatory, Health, Safety & Environmental norms. HAZOP study findings have to be implemented by LSTK contractors, without additional time & cost implication to OWNER/CONSULTANT.

All measures required for safe constructions are to be implemented and the schemes are to be approved by OWNER / CONSULTANT before commencement of works. Besides, all personnel employed on the project are to follow safety requirement of OWNER / CONSULTANT and state regulations as applicable from time to time. A List of safety implements/ equipment proposed to be used by LSTK Contractors, are to be indicated along with the bid.

Safety report generation for different situations as per rules and required by OWNER / CONSULTANT shall be adhered to.

Copy of Safety Procedures / Practices to be followed during construction is enclosed with the Tender. LSTK Contractors shall comply with the provisions of this document.

This document specifies broad guidelines on safe practices to be adhered to during construction activities. Before commencing any activity however, specific hazards and its effects should be assessed & necessary corrective / preventive action should be taken by the LSTK Contractor without any time & cost implication to OWNER / CONSULTANT. This document shall supplement the prevailing statutory requirements, which shall also be followed as applicable.

LSTK Contractor shall comply with the relevant elements of the National / International Standard for Environment Protection, as applicable to their scope of work.

LSTK Contractor shall also keep health care records of personnel deployed.

LSTK contractor shall refer to document Construction HSE management (6695-CMG-G00-CA-0003) at site included elsewhere in the Tender for further details.

10.12 Vendor List



All Equipment/ Materials / items required for the Project, are to be procured by LSTK Contractors only through vendors approved by OWNER / CONSULTANT.

Vendor lists for this Project has been enclosed elsewhere in this Tender. This list is also applicable for vendors/ their sub vendors of the LSTK Contractors.

For the items for which the list of approved vendors is not available, vendor(s) are to be proposed by LSTK Contractors and clearance is to be obtained from OWNER / CONSULTANT, before initiating procurement process.

10.13 Waste Disposal / Scrap etc

Waste / Scrap generated during construction activities, shall be disposed-off by LSTK contractors as per relevant clause in GCC & SCC.

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10.14 Surplus Construction Material

All surplus material shall be handed over to OWNER by LSTK contractors, without any cost implication to OWNER/CONSULTANT.



Procedure for handing over of Mandatory spares, Commissioning Spares / 1 year operation spares and surplus materials to OWNERs stores, will be provided at site, during project execution.

All the items shall be handed over to OWNER's stores, after meeting all the following requirements:

- LSTK Contractors shall implement SAP Coding System of OWNER for all items covering all material to be handed over like mandatory spares & surplus materials to OWNER's stores, utilising OWNER SAP coding system.
- All the activities related to shifting material to the designated locations for storing & erection shall be carried out by the LSTK Contractor. This is also applicable to free issued items by the OWNER.
- All the items shall be properly cleaned, tag marked, stencilled with agreed coding system, before handing over to OWNER.
- Wherever special preservation is required, as per Original Equipment Manufacturer (OEM), LSTK contractors shall preserve those items according to the requirement of OEM during storing at LSTK Contractor's store and to be handed over to OWNER with same preservation requirement in place. LSTK Contractors shall also submit the OEM's preservation procedure to the OWNER.
- All the materials to be handed over to OWNER shall be handed over with relevant test certificates and TPIA /CONSULTANT Inspection release notes and inspection clearance from OWNER.
- Rotor of the critical Rotary equipment shall be preserved vertically in a vertical metallic container completely sealed. The container shall be filled/ pressurised with nitrogen gas.
- For the case of Mandatory Spares, all the items shall be distinctly marked as "Mandatory Spares" in appropriate documents to make them distinguishable from commissioning spares and other spares. Action for procurement shall be taken accordingly.
- All other requirements of OWNER which are not specifically mentioned, but required to be carried out for proper & smooth handing over to OWNER's stores, shall be carried out by the LSTK Contractors, as per satisfaction of OWNER.

10.15 Project Cost Control and Monitoring

Project Cost Control and Monitoring activities for the Project are required to be performed by OWNER/CONSULTANT during execution of contract. LSTK Contractors are required to furnish relevant information on cost status, change orders, if any and master cash flow schedule and cash flow on weekly / monthly basis.

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LSTK Contractors to include a chapter of cost control in the Monthly Progress Report and shall highlight the cost, change order, accepted deviation(s) and cash flow status.

Cost status of the Contract shall be projected suitably in a tabular form with a break-up of costs under the heads of original contract value, approved change orders, pending change orders, pending deviation requests, current forecast, invoice to-date and payment to-date. Format in this regard shall be issued after the award of the contract.



LSTK Contractor shall undertake the following:

- Cost budgeting, expenditure profile and forecasting.
- Preparation of report highlighting planned expenditure profile vis-à-vis actual expenditure on an annual basis for budgetary control purposes of the OWNER.
- Preparation of cost status reports, including cash flow analysis on weekly / monthly basis. The report shall also include the status of commitments made during respective periods.
- Preparation of complete report of the project as per latest guidelines of Department of Public Enterprises (DPE), Govt. of India / OWNER
 - Final project cost variations from approved project cost estimates and justification for the same.
 - Delays in the completion schedule and reasons for the same.

10.16 Contract Closure

- During the Project Close out phase, LSTK Contractors shall ensure that all the sub-contracts entered into by them are duly closed.
- LSTK Contractors shall provide all “As Built Final Documentation” as per the requirement in Tender document.
- LSTK Contractors shall complete material reconciliation and handover all surplus materials to OWNER along with relevant Material Test Certificates (MT), Inspection Release Notes (IRN), after codification of all the items as per existing SAP system used by the OWNER.
- Payment against LSTK Contractor’s Final Bill shall be released upon the satisfactory completion of activities pertaining to closing of the contract.
- LSTK Contractors shall submit detailed Project Close-out Report to OWNER/CONSULTANT.
- LSTK Contractors shall prepare an exhaustive check-list for Contract Closure including detailed procedure for contract close-out and get it reviewed by CONSULTANT/OWNER before implementation.

11. CHANGE ORDER / DEVIATION PERMIT

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- If there is any alteration or any change in the scope of work or extra item and the LSTK Contractors or OWNER considers that the change requires revision in the contract price, the LSTK Contractor shall issue / submit the Change Order Proposal (COP) within 21 days of receiving written instruction of change from OWNER / CONSULTANT.
- The CONSULTANT shall check the COP and if the COP is compliant with the contract conditions and is reasonable, only then shall forward the proposal with recommendations to OWNER or shall inform the LSTK Contractor that the proposal is not compliant within 2 weeks of receipt of COP.
- The OWNER shall examine the COP and convey its in-principle approval or disapproval to CONSULTANT/LSTK Contractor within 3 weeks of receipt of COP from CONSULTANT.
- If approved in-principle by OWNER, the LSTK Contractor shall submit detailed COP with costing of the COP proposal, within 3 weeks to OWNER / CONSULTANT. The LSTK Contractor shall prepare and submit necessary document containing reason for change/deviation, estimated cost along with rate analysis and quotation/documentary support, sketches and drawings and impact on schedule.
- CONSULTANT shall review the same and recommend to the OWNER within 3 weeks of receipt of proposal.
- The OWNER shall scrutinize /negotiate the COP and issue Change Order on the LSTK Contractor's agreement, within 4 weeks after receiving CONSULTANT's recommendations.
- The LSTK Contractors will maintain Change Order and Deviation Permit registers that will form part of their monthly progress report. The registers will list all the change orders/deviation permits and indicate their approval, cancellation or rejection status. Formats in this regard shall be issued after the award of the contract.
- All waiver / deviations and queries after contract award shall be routed as below:
 - For design, engineering, equipment manufacture and supply:- through CONSULTANT Project Manager
 - For construction activities: - through CONSULTANT Site In charge (RCM) with a copy to CONSULTANT Project Manager.
- Format for Waiver & Deviation Form is enclosed elsewhere in the Tender.

12. DOCUMENTS & DRAWINGS

For requirements related to handling of documentation and drawings, refer to Vendor Documentation Requirements submitted elsewhere in the Tender.