



| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  Rev 00 Page 1 of 13 |

MANGALORE REFINERY & PETROCHEMICALS LTD.

(A subsidiary of Oil & Natural Gas Corpn. Ltd – ONGC)

Regd. Office: Kuthethoor P.O., Via: Katipalla, Mangalore-575030 (India)

Phone: 0091-824-2270400 Fax: 0091-824-2271239

E-PUBLIC Tender No.: 3200000481 Date: 16.01.2021

E-OPEN TENDER

**FOR LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER
SYSTEM AT MRPL, MANGALURU
AS PER TENDER SPECIFICATION.**



| | |
|---|------------------------------|
| Tender Download Start Date | 16.01.2021 |
| Tender Download End Date & Time | 08.02.2021; 15.00 Hrs |
| Pre-bid Meeting | 27.01.2021; 11:15Hrs |
| Bid Closing date & Time | 08.02.2021; 15.00 Hrs |
| Unpriced Bid Opening date & Time | 08.02.2021; 15.30 Hrs |

MRPL has discontinued publication of Tender Advertisements through newspapers or any other print media.

The complete Tender/Bidding document is available for view/download on <https://www.tenderwizard.com/MRPL>, MRPL website <http://www.mrpl.co.in>, tkIS India website www.thyssenkrupp-industrial-solutions-india.com, as well as on Central Public Procurement Portal (CPPP): www.eprocure.gov.in

Further replies to pre-bid queries, all updates, Corrigendum, Addendum, Amendments, Extension in last date of submission of bid, Clarifications etc., (if any) to the Tender/Bidding document will be hosted on above indicated websites only.



Bidders should regularly visit above indicated website to keep themselves updated.

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  Rev 00 Page 2 of 13 |

MASTER INDEX



SYNOPSIS OF ITB

| VOLUME NO. | DESCRIPTION |
|------------|---|
| 1 | COMMERCIAL |
| | NIT, ITB, GCC, SCC, Commercial Questionnaire, Schedule of Lump sum price |
| 2 | PROJECT MANAGEMENT, SCOPE OF SUPPLIES & SCOPE OF WORK |
| | Project Execution Plan, Project Planning, Scheduling and Monitoring system, IT requirements, Vendor List, Tie-in Dossier, Scope of Work and Supplies, Technical Questionnaire. |
| 3 | QA PLANS & CONSTRUCTION SPECIFICATIONS |
| | Project Inspection and Test Plan for Shop Inspection, Construction Management, Quality Requirements, HSE Manual, Specifications for Instrumentation Erection, Site Testing of Electrical Equipment and Installation. |
| 4 | FEED DOCUMENTS |
| | Design Basis, Process Description, Equipment List, PFDs, P&IDs, Process Datasheets, Technical Specifications, Project Specifications and Engineering Standards, HSE, Overall Plot Plans (Conceptual), Piping Specification, Fire Fighting, Line List, Load List, Single Line Diagrams, Overall Plant Cable Routing Plans, Substation Layouts, Process Control Design Philosophy, Conceptual Architectural Drawing, Reference drawings and Reports |
| 5 | LICENSOR DOCUMENTS |
| | BDEP Package |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  |
| | | | | Rev 02 |



VOLUME – I : COMMERCIAL

| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|--|--------------|--|---------|-------------|
| 1 | Notice Inviting Tender | | | | |
| | | | Notice Inviting Tender | 00 | 18 |
| 2 | Instructions to Bidders | | | | |
| | | | Instructions to Bidders | 00 | 86 |
| 3 | General Conditions of Contract (GCC) | | | | |
| | | | General Conditions of Contract (GCC) | 00 | 271 |
| 4 | Special Conditions of Contract (SCC) | | | | |
| | | | Special Conditions of Contract (SCC) | 00 | 673 |
| 5 | Price Part / Schedule of Lump Sum Price | | | | |
| | | | Preamble to Schedule of Lump sum Price | 00 | 5 |
| | | | Schedule of Lump sum Price | 00 | 21 |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  |
| | | | | Rev 02 Page 4 of 13 |



VOLUME – 2 : PROJECT MANAGEMENT, SCOPE OF SUPPLIES & SCOPE OF WORK

| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|--|-------------------------------|---|---------|-------------|
| 1 | Project Management & Project Planning, Scheduling and Monitoring System | | | | |
| | 1.1 | 6723-PMG-331-BD-0001 | Project Execution Plan for LSTK Contracts | 01 | 26 |
| | 1.2 | 6723-PSC-331-BD-0001 | Project Planning, Scheduling and Monitoring System Requirements | 00 | 67 |
| | 1.3 | 6723-ITM-331-AA-0001 | IT Requirements | 00 | 6 |
| 2 | Vendor List | | | | |
| | 2.1 | C1943402-00-WGS-AA00-LST-0011 | List of Mandatory / Recommended vendors | 00 | 2 |
| | 2.2 | - | Approved Vendor List for Civil | 00 | 3 |
| | 2.3 | - | Electrical services Vendor list | 00 | 6 |
| | 2.4 | - | Electrical supplies vendor list | 00 | 16 |
| | 2.5 | - | Instrumentation services Vendor list | 00 | 2 |
| | 2.6 | - | Instrumentation supplies vendor list | 00 | 32 |
| | 2.7 | - | Mech Services Vendor list | 00 | 16 |
| | 2.8 | - | Mech Supplies vendor list | 00 | 20 |
| | 2.9 | - | Vendor List - Inst Dept | 00 | 30 |
| 3 | Battery Limit | | | | |
| | 3.1 | 6723-PIP-331-MB-0003 | Tie-In Point Dossier | 00 | 17 |
| 4 | Scope of Work and Supplies | | | | |
| | 4.1 | 6723-CVC-331-CA-0005 | Contractor's Scope of Work - Civil | 00 | 14 |
| | 4.2 | 6723-CVC-331-CA-0006 | Contractor's Scope of Supplies - Civil | 00 | 7 |
| | 4.3 | 6723-ELT-331-CA-0001 | Contractor's Scope of Work & Scope of Supply – Electrical | 00 | 27 |
| | 4.4 | 6723-EQM-331-EC-0013 | Contractor's Scope of Work Supplies – Rotating Equipment | 00 | 11 |
| | 4.5 | 6723-EQS-331-EC-0012 | Contractor's Scope of Work and Supplies – Static Equipment | 00 | 7 |
| | 4.6 | 6723-INS-331-EC-0001 | Contractor's Scope of Work and Supply – Instrumentation Engineering | 00 | 19 |
| | 4.7 | 6723-PIP-331-CA-0002 | Contractor's Scope of Work and Supplies – Piping | 00 | 9 |
| | 4.8 | 6723-PMG-331-CA-0001 | Technical Questionnaire | 00 | 26 |
| | 4.9 | 6723-PMG-331-CA-0002 | Owner's Scope of Work and Supplies | 01 | 5 |
| | 4.10 | 6723-PRC-331-CA-0003 | Contractor's Scope of Work - Process | 01 | 33 |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  |
| | | | | Rev 02 |



VOLUME – 3 : QA PLANS & CONSTRUCTION SPECIFICATIONS

| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|--|---------------------------|---|---------|-------------|
| 1 | Inspection and Test Plan for Shop Inspection | | | | |
| | 1.1 | 6723-LEX-G00-EC-0001 | Project Inspection and Test Plan for Shop Inspection | 00 | 12 |
| | | | Annexures IITP (Indicative Inspection test plan) | | |
| | a) | 6723-LEX-G00-EC-0001-A101 | IITP- Pressure Vessels Heat Exchangers Columns Reactors Separators. Cyclones. Rev.0 | 00 | 8 |
| | b) | 6723-LEX-G00-EC-0001-A102 | IITP for Process & Utility Packages | 00 | 6 |
| | c) | 6723-LEX-G00-EC-0001-A201 | IITP for Seamless, ERW & EFW Pipes Ordered on Manufacturers | 00 | 4 |
| | d) | 6723-LEX-G00-EC-0001-A202 | IITP for Seamless, ERW & EFW Pipes Ordered on Traders | 00 | 4 |
| | e) | 6723-LEX-G00-EC-0001-A203 | IITP for Plate and Forged Flanges | 00 | 4 |
| | f) | 6723-LEX-G00-EC-0001-A204 | IITP for Welded, Seamless & Forged Fittings | 00 | 5 |
| | g) | 6723-LEX-G00-EC-0001-A205 | IITP for Fasteners | 00 | 4 |
| | h) | 6723-LEX-G00-EC-0001-A206 | IITP for Gaskets | 00 | 3 |
| | i) | 6723-LEX-G00-EC-0001-A207 | IITP for Ball valves- Soft (Resilient) Seated | 00 | 4 |
| | j) | 6723-LEX-G00-EC-0001-A208 | IITP for PFA Lined Ball & Plug Valves | 00 | 4 |
| | k) | 6723-LEX-G00-EC-0001-A209 | IITP for Rubber or PTFE-PFA Lined Butterfly & Diaphragm Valves | 00 | 4 |
| | l) | 6723-LEX-G00-EC-0001-A210 | IITP for Butterfly Valves -Soft Seated (Loose Sleeve) | 00 | 4 |
| | m) | 6723-LEX-G00-EC-0001-A211 | IITP for Rubber or PFA Lined Check Valves | 00 | 3 |
| | n) | 6723-LEX-G00-EC-0001-A212 | IITP for Cast -Forged Gate, Globe & Check Valves | 00 | 4 |
| | o) | 6723-LEX-G00-EC-0001-A213 | IITP for Plug Valves Soft (Resilient Seated) | 00 | 4 |
| 2 | Construction Specifications, Installation Standards, Quality Assurance Plans and HSE for Construction | | | | |
| | 2.1 | 6723-CMG-G00-EC-0001 | Construction Management Requirements | 00 | 20 |
| | 2.2 | 6723-CMG-G00-EC-0002 | Construction Quality Requirements | 00 | 14 |
| | 2.3 | 6723-CMG-G00-BG-0001 | Construction HSE Manual | 00 | 522 |
| | 2.4 | 6723-INS-331-EC-0015 | Technical Specification for Instrumentation Erection | 00 | 60 |
| | 2.5 | 6723-ELT-331-MA-0001 | Installation Standards-Power | 00 | 28 |
| | 2.6 | 6723-ELT-331-MA-0002 | Installation Standards-Earthing | 00 | 35 |
| | 2.7 | 6723-ELT-331-MA-0003 | Installation Standards-Lighting | 00 | 45 |
| | 2.8 | 6723-ELT-G00-QA-0001 | Site Testing of Electrical Equipment and Installation | 00 | 88 |



| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  |
| | | | | Rev 02 |

VOLUME – 4 : FEED DOCUMENTS



| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|----------------------|-------------------------------------|---|---------|-------------|
| 1 | DESIGN BASIS: | | | | |
| | 1.1 | | Design Basis Document | | |
| | 1.2 | EDB 0001 | Design Basis for Ejector System | 00 | 2 |
| | 1.3 | EDB 0003 | Design Basis for Electrical | 00 | 59 |
| | 1.4 | EDB 0005 | Design Basis for Instrumentation Rev 1 | 01 | 73 |
| | 1.5 | EDB 0006 | Design Basis for Piping | 00 | 50 |
| | 1.6 | EDB 0007 | Design Basis for Process New | 01 | 94 |
| | 1.7 | EDB 0008 | Design Basis for Rotating Equipment | 00 | 61 |
| | 1.8 | EDB 0009 | Design Basis for Safety Requirement | 00 | 41 |
| | 1.9 | EDB 0010 | Design Basis for Static Equipment | 00 | 79 |
| | 1.10 | EDB 0012 | Design Basis for Fire Protection System | 00 | 16 |
| | 1.11 | EDB 0013 | Project Spare Parts Philosophy Rev 1 | 01 | 12 |
| | 1.12 | EDB 0014 | Design Basis for Painting | 00 | 66 |
| | 1.13 | EDB 0015 | Design Basis for Information System | 00 | 10 |
| 2 | PROCESS: | | | | |
| | 2.1 | C1943402-00-WGS-AA00-LST-0002 | Equipment List | 03 | 8 |
| | 2.2 | C1943402-00-WGS-AA00-INF-0001 | Process Description | 02 | 19 |
| | 2.3 | C1943402-00-WGS-AA00-INF-0002 | Material Selection Diagram | 00 | 1 |
| | 2.4 | C1943402-00-WGS-AA00-INF-0003 | System / Control Description | 01 | 18 |
| | 2.5 | C1943402-00-WGS-AA00-LST-0004 | Chemical Summary | 01 | 2 |
| | 2.6 | C1943402-00-WGS-AA00-EDI-0002 | Process Flow Diagrams + HMB | 05 | 11 |
| | 2.7 | C1943402-00-WGS-AA00-PID-0001 to 11 | Piping & Instrumentation Diagrams | - | 11 |
| | 2.8 | C1943402-00-WGS-AA00-LST-0003 | Utility Consumption List | 01 | 2 |
| | 2.9 | - | Process Datasheets for Equipment | Various | Various |
| | 2.10 | - | Datasheets for Restriction Orifices | Various | Various |
| | 2.11 | C1943402-00-WGS-AA00-INF-0005 | Cause and Effect Diagram | 01 | 2 |
| | 2.12 | C1943402-00-WGS-AA00-LST-0010 | Alarm and Set point List | 02 | 3 |
| | 2.13 | C1943402-00-WGS-AA00-MAN-0001 | Supervisory Operating Manual | 01 | 29 |
| | 2.14 | C1943402-00-WGS-AA00-LST-0006 | Emission List | 01 | 2 |
| | 2.15 | Various | Safety Valve Datasheets | Various | Various |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  Rev 02 Page 7 of 13 |



| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|-------------------------|-------------------------------|--|---------|-------------|
| | 2.16 | C1943402-00-WGS-AA00-DSH-0018 | Material Safety Datasheet (MSDS) | 00 | 19 |
| | 2.17 | 6723-PRC-331-QB-0002 | HAZOP Study Procedure | 00 | 9 |
| | 2.18 | 6723-PRC-331-QB-0003 | SIL Classification Study Procedure | 00 | 7 |
| | 2.19 | 6723-PRC-331-EC-0001 | Waste Water Collection Concept | 00 | 6 |
| | 2.20 | 6723-PRC-331-QB-0006 | Safety Philosophy - Design | 00 | 11 |
| | 2.21 | 6723-PRC-331-DC-0001 | Mechanical Completion and Commissioning Guidelines | 00 | 61 |
| | 2.22 | - | Provision for Future Operating Cases | - | 2 |
| | 2.23 | - | Amended Underground Piping Connection | Various | Various |
| 3 | INSTRUMENTATION: | | | | |
| | 3.1 | 6723-INS-331-EC-0002 | Technical Specification for Augmentation of existing DCS and Safety System | 00 | 110 |
| | 3.2 | 6723-INS-331-EC-0003 | Inspection & Test Plans for Instrumentation | 00 | 52 |
| | 3.3 | 6723-INS-331-EC-0004 | Technical Specifications – Globe Control Valves | 00 | 25 |
| | 3.4 | 6723-INS-331-EC-0005 | Technical Specifications - Butterfly Control / On-Off Valves | 00 | 21 |
| | 3.5 | 6723-INS-331-EC-0006 | Technical Specifications – Ball / Plug / Eccentric Plug Type Control / On-Off Valves | 00 | 21 |
| | 3.6 | 6723-INS-331-EC-0008 | Specification of Flue Gas Analyser Package with Cabinet | 00 | 26 |
| | 3.7 | 6723-INS-331-EC-0009 | Technical Specifications – pH / Redox and Conductivity Analyzers | 00 | 13 |
| | 3.8 | 6723-INS-331-EC-0010 | Technical Specifications – Ultrasonic Flowmeters | 00 | 16 |
| | 3.9 | 6723-INS-331-EC-0011 | Technical Specifications – Thermal Mass Flowmeters | 00 | 14 |
| | 3.10 | 6723-INS-331-EC-0012 | Instrumentation Cables | 00 | 27 |
| | 3.11 | 6723-INS-331-EC-0013 | Instrument Datasheets | 00 | 73 |
| | 3.12 | 6723-INS-331-EC-0014 | Technical Specifications – Machine Monitoring System | 00 | 18 |
| | 3.13 | 6723-INS-331-LH-0001 | Proposed Control Room Layout | 00 | 2 |
| | 3.14 | 6723-INS-331-LH-0002 | Proposed cable routing_WSS Battery Limit INS Cables | 00 | 1 |
| | 3.15 | 6723-INS-331-MA-0001 | Process and Pneumatic Hook-up | 00 | 38 |
| | 3.16 | 6723-INS-331-MA-0002 | Typical Installation hookups | 00 | 87 |
| | 3.17 | 6723-INS-331-AB-0001 | Documents & Drawings Requiring OWNER / PMC Review (Instrumentation) | 00 | 4 |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  Rev 02 Page 8 of 13 |



| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|--------------------------|-------------------------------------|--|---------|-------------|
| 4 | Piping: | | | | |
| | 4.1 | - | Overall Plot Plan (Conceptual) | 01 | 1 |
| | 4.2 | 6723-LAY-331-LD-0001 (Sheet 1 of 2) | Equipment Layout PFCC Unit Flue Gas Wet Scrubber System Elevation View | 04 | 1 |
| | 4.3 | 6723-LAY-331-LD-0001 (Sheet 2 of 2) | Equipment Layout PFCC Unit Flue Gas Wet Scrubber System Elevation View | 04 | 1 |
| | 4.4 | 6723-PIP-331-EB-0001 | General Engineering Specifications for Layout and Above Ground Piping | 00 | 7 |
| | 4.5 | 6723-PIP-331-EB-0002 | General Engineering Specifications for Under Ground Piping | 00 | 18 |
| | 4.6 | 6993-331-16-47-0300-0 | Layout of Underground Services ISBL PFCC / PR UNIT | 00 | 1 |
| | 4.7 | 6723-PIP-331-EB-0003 | General Engineering Specification for Piping Flexibility | 00 | 43 |
| | 4.8 | 6723-PIP-331-EB-0004 | General Engineering Specification for 3 D Model | 00 | 8 |
| | 4.9 | 6723-HES-331-EC-0001 | Technical Specification & Scope of Work for Fire Protection System | 00 | 14 |
| | 4.10 | 6723-EQS-G00-EB-0021 | General Engineering Specifications for Lifting Devices | 00 | 4 |
| | 4.11 | 6723-HES-331-DA-0011 | Data Sheets for Fire Protection Equipment | 00 | 19 |
| | 4.12 | 6723-PIP-331-MB-0001 | Piping List | 00 | 4 |
| | 4.13 | 6723-PIP-331-MB-0002 | Tie-In List | 00 | 2 |
| | 4.14 | 6723-PIP-331-EC-0001 | Duct Specification for FEED Package | 00 | 19 |
| | 4.15 | 6723-PIP-331-AB-0001 | Documents & Drawings Requiring OWNER / PMC Review (Piping) | 00 | 7 |
| | 4.16 | - | PMS and related Documents | - | - |
| 5 | STATIC EQUIPMENT: | | | | |
| | 5.1 | 6723-EQS-331-EB-0001 | General Engineering Specifications for Pressure Vessels | 00 | 222 |
| | 5.2 | 6723-EQS-331-EB-0002 | General Engineering Specifications for Atmospheric Vessel | 00 | 258 |
| | 5.3 | 6723-EQS-331-EB-0003 | General Engineering Specifications for FRP Equipment | 00 | 148 |
| | 5.4 | 6723-EQS-331-EB-0004 | General Engineering Specifications for Heat Exchanger | 00 | 37 |
| | 5.5 | 6723-EQS-331-EB-0005 | General Engineering Specifications for Storage Tanks | 00 | 111 |
| | 5.6 | 6723-EQS-331-EB-0006 | ES-AD-11, Engineering Specification for Material Identification Programme in Manufacturer's Workshop | 00 | 9 |
| | 5.7 | 6723-EQS-331-EB-0007 | Technical Specification for Painting | 00 | 4 |
| | 5.8 | 6723-EQS-331-EB-0008 | Technical Specification for Thermal Insulation | 00 | 41 |

| | | | | |
|---|---|---|-------------|--|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  <div>Rev 02 Page 9 of 13</div> |



| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|----------------------------|----------------------|--|---------|-------------|
| | 5.9 | 6723-EQS-331-EB-0009 | Spares Philosophy for Static Equipment | 00 | 4 |
| | 5.10 | 6723-EQS-331-EC-0001 | Mechanical Data Sheet (MDS) for Disengaging Drum (DA-33101) and Stack (CB-33105) | 00 | 5 |
| | 5.11 | 6723-EQS-331-EC-0003 | Mechanical Data Sheet (MDS) for Caustic storage Tank (FB 33102) | 01 | 5 |
| | 5.12 | 6723-EQS-331-EC-0004 | Technical Specification for Clarifier Package | 00 | 4 |
| | 5.13 | 6723-EQS-331-EC-0005 | Technical Specification for Coagulant Dosing Tank | 00 | 5 |
| | 5.14 | 6723-EQS-331-EC-0006 | Technical Specification for Flocculant Preparation Tank | 00 | 5 |
| | 5.15 | 6723-EQS-331-EC-0007 | Technical Specification for Flocculant Dosing Tank | 00 | 5 |
| | 5.16 | 6723-EQS-331-EC-0008 | Technical Specification for Roll-Off Bins | 00 | 4 |
| | 5.17 | 6723-EQS-331-EC-0009 | Technical Specification for Effluent Tank | 00 | 5 |
| | 5.18 | 6723-EQS-331-EC-0010 | Mechanical Data Sheet (MDS) for Effluent Cooler (EA-33110) | 00 | 4 |
| | 5.19 | 6723-EQS-331-EC-0011 | Indicative Inspection and Test Plan for Static Equipment | 00 | 79 |
| 6 | ROTATING EQUIPMENT: | | | | |
| | 6.1 | 6723-EQM-331-EC-0001 | Technical Specification for Slurry Circulation Pump | 00 | 9 |
| | 6.2 | 6723-EQM-331-EC-0002 | Technical Specification for Caustic Dosing Pump | 00 | 3 |
| | 6.3 | 6723-EQM-331-EC-0003 | Technical Specification for Coagulant Dosing Pump | 00 | 3 |
| | 6.4 | 6723-EQM-331-EC-0004 | Technical Specification for Coagulant Transfer Pump | 00 | 3 |
| | 6.5 | 6723-EQM-331-EC-0005 | Technical Specification for Flocculant Transfer Pump | 00 | 9 |
| | 6.6 | 6723-EQM-331-EC-0006 | Technical Specification for Flocculant Dosing Pump | 00 | 3 |
| | 6.7 | 6723-EQM-331-EC-0007 | Technical Specification for Flocculant Dosing Tank Agitator | 00 | 3 |
| | 6.8 | 6723-EQM-331-EC-0008 | Technical Specification for Sump Pump | 00 | 9 |
| | 6.9 | 6723-EQM-331-EC-0009 | Technical Specification for Effluent Pump | 00 | 9 |
| | 6.10 | 6723-EQM-331-EC-0010 | Technical Specification for Flocculant Preparation Tank Agitator | 00 | 3 |
| | 6.11 | 6723-EQM-331-EB-0002 | Spare Philosophy Rotating Equipment | 00 | 7 |
| | 6.12 | 6723-EQM-331-EB-0004 | General Engineering Specifications for API Pumps | 00 | 16 |

| | | | | |
|---|---|---|-------------|--|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  Rev 02 Page 10 of 13 |



| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|--------------------|----------------------|--|---------|-------------|
| | 6.13 | 6723-EQM-331-EB-0005 | General Engineering Specifications for Positive Displacement Pumps – Controlled Volume | 00 | 11 |
| | 6.14 | 6723-EQM-331-EB-0007 | General Engineering Specifications for Agitator and Mixer | 00 | 20 |
| | 6.15 | 6723-EQM-331-EC-0011 | Indicative Inspection and Testing Plan for Rotating Equipment | 00 | 10 |
| 7 | ELECTRICAL: | | | | |
| | 7.1 | 6723-ELT-G00-EC-0001 | Electrical Consumer List | 00 | 4 |
| | 7.2 | 6723-ELT-G00-FA-0001 | Single Line Diagram Substation-37 (sh 1 of 2) | 00 | 1 |
| | 7.3 | 6723-ELT-G00-FA-0001 | Single Line Diagram Substation-37 (sh 2 of 2) | 00 | 1 |
| | 7.4 | 6723-ELT-G00-FA-0002 | Single Line Diagram Substation-37 (WSS MCC-37314) | 00 | 1 |
| | 7.5 | 6723-ELT-G00-LD-0001 | Conceptual Overall Cable Routing Plan | 00 | 1 |
| | 7.6 | 6723-ELT-G00-LH-0001 | Main Substation – Equipment Layout | | |
| | 7.7 | 6723-ELT-331-EC-0001 | Technical Specifications for High Voltage Switchgear Panels – Modification of existing switchgear (SWGR-37211) | 00 | 105 |
| | 7.8 | 6723-ELT-331-EC-0002 | Technical Specification for LV Switchgear Panels | 00 | 31 |
| | 7.9 | 6723-ELT-331-EC-0003 | Technical Specifications Variable Frequency Drives | 00 | 48 |
| | 7.10 | 6723-ELT-331-EC-0004 | Technical Specifications for Misc Switchgear Panel | 00 | 12 |
| | 7.11 | 6723-ELT-331-EC-0005 | Technical Specifications – High Voltage Cables | 00 | 12 |
| | 7.12 | 6723-ELT-331-EC-0006 | Technical Specifications – Low Voltage Cables | 00 | 11 |
| | 7.13 | 6723-ELT-331-EC-0007 | Technical Specifications Low Voltage Induction Motors | 00 | 7 |
| | 7.14 | 6723-ELT-331-EC-0008 | Technical Specifications High Voltage Induction Motors | 00 | 17 |
| | 7.15 | 6723-ELT-331-EC-0009 | Technical Specifications for G.I. Cable Trays and Accessories | 00 | 10 |
| | 7.16 | 6723-ELT-331-EC-0010 | Technical Specifications for Fire Alarm System | 00 | 11 |
| | 7.17 | 6723-ELT-331-EC-0011 | Technical Specifications for Industrial LED Lumanairies | 00 | 9 |
| | 7.18 | 6723-ELT-331-EC-0012 | Technical Specifications for Public Address System | 00 | 10 |
| | 7.19 | 6723-ELT-331-EC-0013 | Technical Specifications of Extension of Existing UPS ACDB (31-acdb-703) | 00 | 18 |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  |
| | | | | Rev 02 Page 11 of 13 |

| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|---------------|----------------------|---|---------|-------------|
| | 7.20 | 6723-ELT-331-EC-0014 | Technical Specifications for Low Voltage Switchgear Panels – Modification of existing Switchgear (SWGR-37302) | 00 | 125 |
| | 7.21 | 6723-ELT-331-PB-0001 | Spare Philosophy – Electrical | 00 | 8 |
| | 7.22 | 6723-ELT-331-AB-0001 | List of Drawings / documents for PMC / OWNER / Licensor approval / review / information (Electrical) | 00 | 5 |
| 8 | CIVIL: | | | | |
| | 8.1 | 6723-CVC-331-EC-0001 | General Requirements for Civil/Structural and Architectural works | 00 | 9 |
| | 8.2 | 6723-CVC-331-EC-0002 | Analysis of Structures | 00 | 10 |
| | 8.3 | 6723-CVC-331-EC-0003 | Criteria for Design | 00 | 18 |
| | 8.4 | 6723-CVC-331-EC-0004 | Requirements for Design Calculations and Drawings | 00 | 26 |
| | 8.5 | 6723-CVC-331-EC-0005 | General Engineering Specifications - Civil | 00 | 121 |
| | 8.6 | 6723-CVC-331-EC-0006 | Technical Specifications for Geotechnical Investigation | 00 | 136 |
| | 8.7 | 6723-CVC-331-EC-0007 | Technical Specifications for Topographic Survey | 00 | 14 |
| | 8.8 | 6723-CVC-331-EC-0008 | Technical Specifications Section-1 Earthwork | 00 | 9 |
| | 8.9 | 6723-CVC-331-EC-0009 | Technical Specifications Section-2 Concrete & Formwork | 00 | 29 |
| | 8.10 | 6723-CVC-331-EC-0010 | Technical Specifications Section-3 Masonry, Plaster, Pointing | 00 | 16 |
| | 8.11 | 6723-CVC-331-EC-0011 | Technical Specifications Section-4 Reinforcement | 00 | 6 |
| | 8.12 | 6723-CVC-331-EC-0012 | Technical Specifications Section-5 Flooring / Dado | 00 | 11 |
| | 8.13 | 6723-CVC-331-EC-0013 | Technical Specifications Section-8 Roofing & Cladding | 00 | 9 |
| | 8.14 | 6723-CVC-331-EC-0014 | Technical Specifications Section -9 Painting | 00 | 80 |
| | 8.15 | 6723-CVC-331-EC-0015 | Technical Specifications Section -12 Roads, Drains, Pits & Culverts | 00 | 29 |
| | 8.16 | 6723-CVC-331-EC-0016 | Technical Specifications Section -16 Piling Works | 00 | 31 |
| | 8.17 | 6723-CVC-331-EC-0017 | Technical Specifications Section -22 Fire- Proofing | 00 | 14 |
| | 8.18 | 6723-CVC-331-EC-0018 | Section-13 Technical Specifications Chemical Resistant Lining | 00 | 28 |
| | 8.19 | 6723-CVC-331-EC-0020 | Section-21 Technical Specifications Dismantling & Misc. Work | 00 | 9 |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  <div>Rev 02 Page 12 of 13</div> |

| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|-----------------|-----------------------|--|---------|-------------|
| | 8.20 | 6723-CVS-331-EC-0001 | Technical Specifications Section -7 Structural Steel Work | 00 | 20 |
| | 8.21 | 6723-CVC-331-EB-0001 | General & Specification Notes for RCC Works Sh 1 of 2 | 00 | 1 |
| | 8.22 | 6723-CVC-331-EB-0002 | General & Specification Notes for RCC Works Sh 2 of 2 | 00 | 1 |
| | 8.23 | 6723-CVC-331-EB-0003 | Typical Details of Surface Protection A.R. Lining | 00 | 1 |
| | 8.24 | 6723-CVS-331-EB-0001 | General and Specification Notes for Structural Steel Work | 00 | 1 |
| | 8.25 | 6723-CVS-331-EB-0002 | Typical Handrail Details | 00 | 1 |
| | 8.26 | 6723-CVS-331-EB-0003 | Standard Details of Vertical Ladder, Safety Cage & Safety Barrier | 00 | 1 |
| | 8.27 | 6723-CVS-331-EB-0004 | Standard Drawing Typical Details of Electroforged Steel Gratings | 00 | 1 |
| | 8.28 | PIN-LEP-CVS-1003 | Standard Details of Fire Proofing for Beams, columns, Bracings & Equipment Supports | 00 | 1 |
| | 8.29 | PIN-LEP-CVS-1006 | Standard Drawing Details of Anchor Bolts (Type A and B) Embedded in Concrete (grade of Concrete M30) | 00 | 1 |
| | 8.30 | 6993-331-16-47-0300-0 | Layout of Underground Services ISBL PFCC / PR UNIT | 00 | 1 |
| | 8.31 | 6723-CVC-331-AB-0001 | Documents & Drawings Requiring OWNER / PMC Review (CIVIL) | 00 | 5 |
| 9 | REPORTS: | | | | |
| | 9.1 | | EIL Geotechnical Investigation Report for PFCC Unit | - | 99 |

| | | | | |
|---|---|---|-------------|---|
| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID | |
|  | LSTK PACKAGE FOR PFCC UNIT FLUE GAS WET GAS SCRUBBER SYSTEM AT MRPL, MANGALURU | | |  <div>Rev 02 Page 13 of 13</div> |

VOLUME – 5 : LICENSOR DOCUMENTS

| Section No. | Part No. | Document No. | Description | Rev No. | No of Pages |
|-------------|------------------------------|--------------|-----------------------|---------|-------------|
| 1 | Licensor BDEP Package | | | | |
| | 1.1 | | Licensor BDEP Package | 02 | - |