

Material :02 NOS GUN BARREL TANKS Tender Enquiry No: PROC/LF/PT/17058/17 EVALUATION WILL BE CARRIED OUT ON FULL

Sr No	Description	Quantity	Make/Brand offered	Unit	Unit Price (PKR) Inclusive Of All Taxes Except GST	Unit Price (PKR) Inclusive of GST	Total Pr (PKR) Inclusive GST
1	GUN BARREL TANKS CAPACITY 6000 BBLS EACH, DETAIL AS PER ATTACHED TOR.	2		Number			

Special Note:- The prospective bidders also download the master set of Tender Document - The prospective bidders may keep in touch with OGDCL web site for downloading the clarifications/amendments (if any) issued by OGDCL. - DELIVERY & HANDING OVER TO OGDCL WITHIN 150 DAYS FROM LPO ISSUE DATE PAYMENT TERMS AS PER CLAUSE # 23 OF SCOPE OF WORK.

Discount (if any) shall only be entertained on Schedule of Requirement of Bidding Document (Financial Proposal). If the discount is mentioned elsewhere in the bid, the same shall not be entertained.

OIL & GAS DEVELOPMENT COMPANY LIMITED PROCUREMENT DEPARTMENT (LOCAL), ISLAMABAD SCHEDULE OF REQUIREMENT

Due Date:

Bid Bond Value : RS.1,200,000/-

Attachment(if any) : YES

ice Delivery deviation from Period Tender Spec. If Offered e of Any



1. <u>GENERAL</u>

This specification given hereunder describes for guideline purpose and covers the minimum requirement of design, construct, calibrate and commission the Gun Barrels Tanks at OGDCL Kunnar Fields as below mentioned. Field is situated in District Hyderabad and are 25-30 km of Hyderabad City.

Kunnar Field 2 no.

OGDCL intends to hire the services of an experienced and well reputed contractor for construction of gun barrels tank in these facilities. The scope of work generally includes the Design, Procurement of material, Construction, Calibration and Commissioning of the Gun Barrels Tanks. Successful contractor shall have to offer at least 01-year maintenance free guarantee of the installed systems and system's total working life of 25 years.

2. CONTRACTOR'S SCOPE (GENERAL)

The contractor shall be responsible for minimum but not limited to the following;

- 2.1. Based upon the local conditions, soil investigations etc, the contractor shall design the tank foundation, base, shell, roof, stairs, nozzles, internals etc. The design should be completed in respect of calculation, drawings, material identification, sheet thicknesses and all other accessories specifications.
- 2.2. Procurement of material for these gun barrels tanks.
- 2.3. Construction of tanks including civil construction, Fabrication & Installation jobs according to design, drawings, procedures etc.
- 2.4. Testing, commissioning and calibration of tanks with complete details & procedures etc.

3. DESIGN

The Gun Barrel Tank is primarily use for separating "<u>oil in water</u>" and "<u>water in oil</u>" emulsion by means of water wash before entering into the other stabilization and desalination facilities. Generally crude/water mixture/emulsion enters in the gun barrel at the bottom through conductor pipe (either mounted outside or inside of tank. The oil/water emulsion spreads throughout the tank evenly through spreader which is attached to the bottom of the boot/conductor pipe. After getting washed by water, the emulsion breaks into oil & water. The water outlet is provided at certain heights for holding an appropriate quantity of water in the tank.

The contractor shall prepare a proposal for tank design, detailed engineering design/drawings and Bill of Material for tank construction, its internal protection

and external protection. All these design/drawings documents should be submitted along with technical bid and should be according but not limited to the followings.

- 3.1. The tanks/gun barrels should be of vertical cylindrical type having the storage capacity of 6000 BBLs of Liquid. The proposed tanks/gun barrels size for the same capacity is 32'dia., 42' height.
- 3.2. The design of tanks should include Inlet, oil outlet, oil & water/sludge drains, man way, conductor pipe (flume), spreader, adjustable oil/water interface, gas equalizer, gas outlet etc.
- 3.3. The gun barrels/tanks should be fitted with necessary fire fighting installations as splash plates, water deluge lines etc.
- 3.4. The foundations of tank be designed in away to protect the tank bottom from corrosion. The soil in these areas is aggressive due to high water bed. The soil of the sites are marshy in nature and contractor has to consider this type of soil in his design.
- 3.5. The Tank foundation to be 4.5 feet (approx.) above NGL to match the levels with existing tank foundation of Kunnar Plant and foundations to be designed accordingly. Further the design of dyke wall also to be considered accordingly.
- 3.6. The construction material for tanks plates & Bottom should be A-283 Gr.-C / HR275 and for structural construction A-36 be used. Plate thicknesses (min) should be as under for design.
 - Bottom 10 mm.
 - Shell 7-10 mm. (1st course of shell plate should be of 10 mm)
 - Roof 5 mm.
- **Note:** If the bidder has not the design capability, he may hire the services of any reputed design/construction firm for preparation of design/drawings.

4. MATERIAL PROCUREMENT.

- 4.1. After final approval of the Detailed Engineering & Design from the company, the contractor will proceed for materials procurement and supply as per approved BOQ and data sheets.
- 4.2. In this regard bidder's responsibilities include procurement of material, transportation from manufacturer's site to the site store already established by the contractor.

- 4.3. The loading / un-loading of the material and shifting from site store to the site location shall be the responsibility of the contractor. OGDCL will not provide any sort of transportation / loading / un-loading facilities. If in case OGDCL provides such facility on contractor's request, that will be charges as per actual.
- 4.4. To determine the originality & authenticity of the material being used for this project, all material shall be 100% traceable and suitably marked for easy identification of manufacturer or supplier, grade, source, size and rating.
- 4.5. All foreign and local procured material shall be inspected by OGDCL engineer(s). OGDCL inspection engineer(s) shall have full right to accept / reject any material / equipment.
- 4.6. The defected/sub-standard/rejected material not conforming to the OGDCL requirements shall be replaced with the new one at bidder's account including transportation, handling demurrage etc.
- 4.7. The replaced material will be inspected once again and then be used by contractor after clearance from OGDCL professional.

5. CONSTRUCTION AND INSTALLATION.

- 5.1. The bidder should be thoroughly familiar with the specifications of all the civil & mechanical works and shall ensure that all works are being completed in accordance with good industrial practice, relevant specifications and standards.
- 5.2. Contractor shall be responsible for all Civil, Fabrication and Calibration jobs required for completing the project as per approved design.
- 5.3. The mechanical works include but not limited to followings:
 - Fabrication & welding of steel plates for tanks bottom, walls and roof
 - Fabrication and welding of tank structure (stairs, top fence etc).
 - Fabrication and welding of all tank internals.
 - Fabrication and welding of pipe and fitting for all required nozzles.
- 5.4. The civil jobs include:
 - Soil analysis for its compactness and load bearing capability.
 - Excavation for tank ring and dyke wall foundations.
 - Construction of Tank foundation and Dyke walls.
 - Sand filling and its compactness inside the tank foundation ring.
 - Earth filling between dyke wall & foundation (if required).
 - Brick soling/stone pitching of land between foundation and dyke wall.
 - Concreted pit for the removal/recovery of water/oil in the area in case of rain and oil spillage.
 - Stairs at appropriate location at dyke wall.

- 5.5. The contractor shall conduct welder's qualification test by any reputable 3rd party for this project according to ASME Section IX and API-650. Only the qualified welders will be allowed for welding jobs for this contract.
- 5.6. All the necessary tests should be conducted regularly during the construction phase to maintain the quality of construction works (civil & mechanical) like soil compactness, cement strength, welding radiography physical inspection, hardness and other related tests.
- 5.7. All the tanks and pipes should be painted according to good industrial practice and specifications. After sand blasting a layer of primer coat must be done on the tank followed by two coats of good quality Epoxy Industrial paint as per design specifications.
- 5.8. The bottom and internal walls of tanks should be painted to protect the internals against the corrosive effects of water.
- 5.9. The contractor has to take care of all the necessary safety measures for doing the fabrication, installation and electrical jobs in the potential hazardous areas of oil & gas handling facilities.
- 5.10. The contractor is responsible for living arrangement of its manpower at his own account. Further he is also responsible for ensuring and using all necessary machinery at site required for construction, fabrication, installation and material handling during the entire project schedule at his own account.
- 5.11. Company shall have right to inspect all equipment that shall be brought for work. Company has the right to reject any equipment it deems not fit for work. In that case contractor shall immediately remove and replace the equipment with no cost to the company.
- 5.12. If any damage occurred to any equipment due to miss handling, improper storage, wrong installation procedure etc. during the project, that damage shall have to be rectified by the contractor without any cost to OGDCL.
- 5.13. Contractor should take all safety measures before starting of each day job, including safety meeting, emergency response plan meeting necessary HC detection tests before and during the process of any hot job or electrical works where the possibility of spark generation.
- 5.14. A graduate Project Site Engineer must be deputed by the contractor as the Incharge of all fabrication and construction activities and communication/correspondence with OGDCL site/project Incharge. The said engineer must be supported by qualified supervisors for each job
- 5.15. Bidder is required to provide the project team details and organization to OGDCL with its technical and financial proposal. Any change in

organization and person of project team must be intimated to OGDCL for information/ approval as required

6. COATING & PAINTING

Before the final handover of the tanks, the contractor would ensure the application of internal coating and external painting as per guidelines mentioned below. The acceptable vendor for the painting are ICI only.

External Protective Coating.

For Shell and Fixed Roof

1. 1 coat of zinc rich epoxy primer at

2. 2 coat of iron oxide paint at per coat

50 microns dft 100 microns dft 50 microns dft

3. 1 coat of acrylic modified polyurethane at

Total dft 300 micron

Internal Protective Coating

Floor and first shell strake upto 2 meters height must be coated with FRP coating @ 3mm thickness while all the above roof & shell must be coated as per following

- i. One coat of red oxide 2 pack epoxy primer at 50 microns dft
- ii. Profile all discontinuities with an epoxy putty
- iii. Two coats of solvent free epoxy resin chopped strand mat coating.
- iv. One coat of solvent free epoxy and surfacing tissue
- v. One coat of solvent free epoxy sealer coat

Total dft 250 micron

7. TESTING & COMMISSIONING.

- 7.1. Bidder is responsible to carry out all tests during construction and post construction phase ensuring the integrity and performance of Gun Barrels Tanks. This should include:
 - i. Compactness test for soil & sand filling (inside and outside of foundation ring).
 - ii. Concrete compressive strength tests (cube tests of different ageing) field density reports of fill materials.
 - iii. Welder qualification test.
 - iv. Radiography of weld joints of tank as per API-650.
 - v. Radiography of weld joints of piping spools.
 - vi. Hydraulic and vacuum test of Gun-Barrel tank.

- 7.2. Prior to testing and commissioning, The Contractor Shall Submit Detailed Testing & Commissioning Procedures as per codes
- 7.3. The contractor is responsible for tank calibration after successful completion of all tests by himself or through a reputed contractor. The calibration should be as per API 650, API 2555 and API 2250 using physical measurement, strapping and optical reference methods. The calibration charts prepared by the calibration firm must be witnessed/attested by government authorities for authentication as per law.

8. <u>Scope of TPI/OGDCL Inspection:</u>

TPI/OGDCL shall carry out the inspection according to API 650 and API 653 latest editions. Any issues during construction shall be evaluated according to these standard even not mentioned in the below scope. In any case, API standards shall be followed.

- 8.1. Material Identification through mill test certificates or through laboratory testing or other means.
- 8.2. Review / Witnessing of Procedure's qualification record and welder's qualification tests.
- 8.3. Inspection regarding construction of ring wall foundation as per drawing and other related civil works.
- 8.4. Inspection of roof, shell and bottom plates materials as per specification given in agreement
- 8.5. Inspection of welding consumables and to check the quality and suitability.
- 8.6. Inspection of Steel Structure assembly and welding.
- 8.7. Inspection of Shell Peaking, Bending, Roundness & Plumpness.
- 8.8. Inspection of Nozzle Orientation.
- 8.9. Witnessing of DPT and Pneumatic Leak Test where necessary.
- 8.10. Inspection of quality of welding of bottom, shell and roof plates.
- 8.11. Witnessing of vacuum box testing of bottom weld joints
- 8.12. Review results of radiography of horizontal, vertical and T-Joints of tank.
- 8.13. Stage inspections/hold points to be decided according to the Quality
- 8.14. Inspection plan to be submitted by TPI.

- 8.15. Witnessing of Hydrostatic Testing.
- 8.16. Witnessing of Calibration of Tank.
- 8.17. Report of findings
- 8.18. Overall responsibility for the excellent workmanship guaranteed through the above inspections and continuous site supervision shall be carried out by third party inspection firm /OGDCL at site at OGDCL's cost.

Note:

All Inspection must be carried out by API-653 Certified Inspector. The contractor would facilitate and support the TPI/OGDCL engineers / inspectors during all the phases of the project.

9. INSPECTION, TESTING & COMMISSIONING.

- 9.1. Bidder is responsible to carry out all test during construction and post construction phase ensuring the integrity and performance of each Crude Oil Storage Tanks. This should include:
 - i. Material inspection jointly with Reps. of Contractor and OGDCL prior to commencement of construction work.
 - ii. Compactness test for soil & sand filling (inside and outside of foundation ring).
 - iii. Concrete compressive strength test (cube tests of different ageing) field density reports of fill materials.
 - iv. Welder qualification test.
 - v. Radiography of weld joints of tank as per API-650
 - vi. Radiography of weld joints of piping spools.
 - vii. Hydraulic and vacuum test of tank.
- 9.2. Prior to testing and commissioning. The Contractor Shall Submit Detailed Testing & Commissioning Procedures as per codes of the area to be tested.
- 9.3. Purchaser / Engineering Contractor shall receive from Contractor all information regarding various phases of fabrication work so that Engineer's inspection can establish the quality of workmanship at the required fabrication stages.
- 9.4. Inspection by Owner or his representative shall not relieve the Contractor of the responsibility to replace any inadequate material and to repair any poor workmanship found on site.
- 9.5. Any material or workmanship that does not meet the requirements of this engineering specification may be rejected.
- 9.6. Material Certificates of all material etc. proposed to use for the tank shall be witnessed.
- 9.7. Any defective material or works found after acceptance at the time of rolling, machining or during erection and testing of tank

shall be replaced without charge even if it has been accepted previously.

- 9.8. Welding procedure specification shall be submitted for approval, prior of welding procedure qualification.
- 9.9. Welding procedure qualification and welder qualification tests shall be carried out in the test facility to be approved.
- 9.10. Butt welds shall be full penetration and fusion. Quality of shell welded joints shall be evidenced by radiographic inspection, as specified in API-650.
- 9.11. Extent of Radiography shall be as specified in API-650. Purchaser / Engineering Contractor at any time reserve the right to have any joint radiograph. All welds which are unacceptable shall be repaired and retested through radiograph at contractors expenses.
- 9.12. All radiographic reports along with the films shall be submitted for approval.
- 9.13. Fillet welds inspection shall be visual. In case that visual inspection of Purchaser's / Engineering Contractor's inspector reveals poor welds, acceptance or rejection shall depends on sectioning of these welds as per API-650
- 9.14. All tests be witnessed and approved by Engineer.
- 9.15. Surface preparation for painting shall have to be approved prior to the application of paint.
- 9.16. Inspection of fabrication and erection work shall not relieve the manufacturer of the responsibility to replace any inadequate material and to repair any poor workmanship found on site.

9.17. Tank Shell Testing

- After erection of the whole tank, all attachments and fixtures used for erection shall be removed and prior to connection to eternal piping the shell shall be tested by water filling.
- The tank shall be filled upto 2" (50 mm) above the top angle.
- All connections shall be blanked off.
- Filling rate shall not exceed 45m³ / hour upto top shell lower edge. From top shell lower edge upwards filling rate shall not exceed to 30m³ / hours.
- The telltale holes shall be used to pneumatically test attachment welds on reinforcing pads. The telltale holes shall be plugged after hydro test with non-hardening sealant or grease.

9.18. Tank Roof Testing

After the tank is finished, the welds of the roof shall be tested by an inner pressure which shall not exceed roof plate weight or by vacuum chamber applied on weld outer surface. Welding seams shall be lubricated with soap solution flax oil or other liquid suitable to tested **leakage**.

- 9.19. The contractor is responsible for tank calibration after successful completion of all tests by himself or through a reputed contractor. The calibration should be as per API 650, API 2555 and PI 2250 using physical measurement, strapping and optical reference methods. The calibration charts prepared by the calibration firm must be witnessed / attested by government authorities for authentication as per law. Calibration charts must be submitted to OGDCL after approval.
- 9.20. All material required (Like water pneumatic air etc.) for the testing would be arranged by the contractor at its own cost. It is not OGDCL responsibility.

9.21. INSPECTIONS/QUALITY PLAN.

<u>Activity</u>	Purchaser/TPI Inspection
Preproduction Meeting	Н
Design Approval for tank	Н
Design Approval CP System	Н
Material Procurement	R
Material Procurement for CP System	R
Heat Treatment Certificates	R
Mill Test Reports	R
Material Inspection for Tank	Н
Material Inspection for CP System	Н
Welding Procedure & Welder Qualification	Н
Fabrication	Μ
Radiographic Testing	Μ
Welding Repairs	Μ
Hydrostatic Testing	Н
Commissioning of CP System	Н
Painting and Coating	Μ

Note:

- H Hold point, inspection or testing shall not proceed without the presence of the purchaser's representative.
- M Monitor point, notification to the purchaser's representative of impending inspection or test activity is required.
- R Review documentation, presentation of the specified.

10. COMPANY EXPERIENCE CRITERIA.

The contractor who intends for participate in this project must have 5 years of fabrication and installation experience. Further the contractor should submit a list of recent projects of similar nature carried out by him with brief scope of work, cost and completion duration along the technical portion of the bid. Contractor must have at least 3 equivalent capacity (6,000 BBLs) or higher capacity tanks construction on his credit otherwise his bid shall not be considered for further evaluation.

11. MARKING.

- 11.1 All plates, reinforcements, access steel structures, etc. shall be marked as specification in the detailed engineering design.
- 11.2 Marking shall be stamped in an easily visible place, using a striking dye, after protective coating application (if specified).
- 11.3 Tank identification tag with capacity, service, dimension, treatment, and year of manufacturing with Contrcator complete address to be affixed permanently.

12. WORK SCHEDULE & REPORTS.

After the award of contractor, a detailed kick-off meeting to discuss the reporting channels and work schedule for timely completion of the project would be held in the OGDCL head office. OGDCL engineers would perform material inspection at the contractor's site; before mobilization for the material of construction, and contractor would intimate its schedule accordingly.

13. PROGRESS REPORTS.

The contractor shall prepare and submit to the company a monthly progress report detailing all actions that have occurred in the preceding month and actions anticipated in the coming month, the detail should be included but not limited to;

- Work in progress in shape executive summary.
- Work completed during the month.
- Problem areas.

- Proposal remedial actions associated with shortfalls/problems areas.
- Outstanding matters
- All monthly reports will be submitted on or before 5th of every month with API Inspector signature as well.

14. FINAL INSPECTION & COMMISSIONING.

OGDLC would undertake its routine site monitoring for the progress and reserves the right to carry out the mutually agreed inspection. Moreover, calibration of tanks; as per API certification requirement; is included in the contractor's scope of work.

15. EXPERIENCE

The contractor who intends for participate in this project must have 7 years of fabrication and installation experience. Further the contractor should submit a list of recent projects of similar nature carried out by him with brief scope of work, cost and completion duration along the technical portion of the bid, otherwise his bid shall not be considered for further evaluation.

Bidder should have experience of the construction of at least three number of equivalent 6000 barrels or more tanks in its name.

16. HIRRING OF SERVICES

In case Contractor hires the services of any activity for the project like designing, installation, fabrication, inspection etc. from other company. He must propose at least 03 Nos. of reputed companies at the time of submission of bids having at least 07 years relative experience. After approval of the bid no change regarding replacement of the sub-contractor can be made OGDCL would finally nominate one of the proposed sub-contractor.

17. ADDITIONAL / EXTRA WORK (S)

Company shall have the right to ask contractor for any work(s), which was not previously included in contractor's scope of work. However the company shall be liable to pay for the extra work provided that the propos approval has been taken prior to the commencement of work. BOQ of extra work shall be applied.

18. <u>REPAIRS.</u>

All welding defects shall be brought to the Purchaser's / Engineering Contractor's knowledge and approval shall be obtained before repairing them.

All remedies must get approval of the Purchaser / Engineering Contract.

19. PEAKING.

Using a horizontal mould to radius of 1m long peaking in any area of inside shell surface shall not exceed 12.7mm.

20. BANDING.

With a vertical sweep board 1m long, banding shall not exceed 12.7m. Measurements for tank shall would be performed before hydraulic test.

21. <u>BOX-UP</u>

After testing and calibration, all tanks shall be emptied and water disposed of as per instruction of Purchaser / Engineering Contractor. Tanks shall be thoroughly cleaned internally and boxed-up, including mounting, fitting, fixing and bolting of all tank fittings and accessories provided by Purchaser such a valves, level gauge, etc. The cost of this work shall be considered included in the Contractor's rates for fabrication of tanks.

22. DELIVERY OF TANKS.

Contractor is responsible to complete the tank in all aspects and handover to OGDCL in 150 days' time from that date of issuance of purchase order.

23. PAYMENT SCHEDULE.

Following is the payment schedule against tank:

- 10% Mobilization Advance against bank guarantee.
- 10% payment upon satisfactory completion of Ring Wall Foundation, installation of Anode Bed of CP System and sand filling as per drawings.
- 30% payment after procurement of material (tanks plates and structure, nozzles etc.) and its successful inspection at site by OGDCL.
- 20% payment after completion of fabrication works (i.e bottom, roof, shell, stairs, completion of nozzle works etc.) and successful inspection at site by OGDCL engineer.
- 30% payment after handing over the tank upon completion of job.

Scope of work for above-ground storage tank bottom's CP Systems.

Independent and stand-alone Cathodic Protection System will be installed to protect tank bottom from external corrosion with following minimum but not limited requirements.

1. <u>Eligibility Criteria OF CONTRACTOR.</u>

- i. The contractor should have proven experience 7-10 years of CP System's design, installation and commissioning including storage tanks.
- ii. Should have an established team on it's pay-role consisting of local, experienced, certified and qualified man-power for CP System's installation and commissioning services.. The installation & Commissioning engineer / supervisor should be;
 - a. 5-7 Years proven track record of similar job experience.
 - b. Preferably with engineering degree or atleast DAE.
 - c. NACE CP Level II or equivalent I-Corr Membership, relevant API or other recognized Equivalent professional certification.
 - d. Pakistani National (Foreign national(s) who require security clearance shall be discouraged)
- iii. Design engineer (Local or Non-Local) should be;
 - a. Well experienced not less than 10 years and have hands on experience of designing CP Systems for tanks.
 - b. Have Engineering Degree in relevant field.
 - c. Have NACE CP Level III certification or equivalent I-Corr Membership or other recognized Equivalent professional certification
 - d. Contractor must be well aware of and follow relevant national regulations and international codes and standards specifically NACE / API relevant to above-ground storage tank's CP Systems.

2. <u>Pre-design surveys and Tests.</u>

The CP Contractor will have to carry out minimum following tests before design of CP Systems for tank bottoms.

- i. Soil resistivity tests.
- ii. Soil chemical tests specially for determining SRBs activity.
- iii. Any other test(s) which are deemed to be necessary for designing / installation of CP Systems under NACE / API codes guidelines.
- iv. Local corrosion history and already installed CP System's history.

3. Detail engineering and design.

After above tests / surveys, data and history collection, CP contractor will prepare detail engineering and design and will finalize BOQ. Following is to be done in this regard;

- i. An impressed current cathodic protection system based with T/R Unit as power of electrical source is to be designed for an approx. life of 20 years. Power rating of TR unit shall be calculated accordingly for mentioned life + 25% additional power to cater other requirements.
- ii. Only ANODE FLEX or Equivalent anodes shall be used. No grid or other system shall be allowed.
- iii. The design will ensure to have required potential for all tank bottoms for the design life of the system.
- iv. The protective criteria shall be minimum –ve 0.85 1.25 volts potential when measured with structure to soil potential as beneath the tank bottom and at periphery.
- v. Design philosophy, basis of design and design calculations will be provided.
- vi. Locations of all installations such as anodes, T/R unit, AJBs, CCBs, cable route etc shall be shown clearly in the design report.
- vii. Complete and detailed BOQ showing item's name, quantity required, detailed specifications, rating, local or foreign etc will also be prepared and made part of design report.
- viii. When draft report is prepared and submitted for review, the CP contractor shall arrange presentation of the engineering and design work to OGDCL by their lead design engineer explaining all aspects of design & BOQ. The design shall be finalized only after that presentation.

4. <u>Material procurement.</u>

After finalization of the detailed engineering and design work and approval from OGDCL, contractor will proceed for material procurement with minimum following requirements.

a. <u>General Requirements.</u>

- i. The specs, ratings, quantity of each item / equipment for installation purpose shall be determined by the CP contractor according to final engineering and design.
- ii. All procurement shall be responsibility of contractor.

- iii. Inspection of all main equipment such as T/Rs, Anodes, cables, surge diverters, AJBs, CCBs etc by OGDCL or Third Party inspection companies will be carried out.
- iv. All CP material shall be inspected by company engineer(s) in presence of contractor's representative on receipt at site for verification of specs, make, model, rating etc as per BOQ before installation. The defected / sub-standard material not conforming to the BOQ requirements / specifications / requirement, shall be replaced / changed at contractor's cost.
- v. All material shall be 100% traceable and suitably marked for easy identification of manufacturer or supplier showing grade, source, size, rating etc with proper tagging.

b. <u>Transformer Rectifiers (T/R Unit)</u>

- i. Preferably be Oil-Cooled and compliant to Hazardous area location Class-I, Zone-II. Such conforming information shall be clearly displayed in operating and maintenance manual or TR unit as well as on name plate.
- ii. Having proper power rating as per BOQ.
- iii. Manufacturer / contractor shall provide full operational guarantee of 2 years. In case of failure/ malfunctioning it should be repaired / replaced by the contractor at its own risk and cost.
- iv. Should be floor mounted, weatherproof, dustproof, corrosion resistive sheet preferably 316 SS material casing.
- v. Appropriately rated armored type power supply cable from nearest available electrical DB to the transformer-rectifier and AC circuit breaker shall be contractor's responsibility. Power supply may be AC 180-240 VAC, 50 Hz. T/R should be able to cater these ratings. T/R should have constant potential & constant amperes type.
- vi. The rectifier shall have continuous reading, flush-mounted DC Voltmeter, Ammeter and preferably pipe-to-soil reading meter for measuring the input / output voltage and current. Meters shall be accurate within 5% of full-scale values and shall be linear from zero to full-scale value.
- vii. The T/R Units shall have multi-channel provision for current distribution.

c. Junction Box(es), Test Post Box(es), Current Distribution Box(es)

- i. All sort of boxes such as Anode Cable Junction boxes (AJBs), Positive Junction Boxes (PJBs), Current Control Boxes, test post boxes etc (whatever the case & requirement may be as per BOQ), shall be made of robust 16 gauge stainless steel plate, or cast aluminum alloy or equivalent, and provided for termination of +ve and -ve main cable.
- ii. The anode junction box / current control box must have capacity to cater / accommodate all the individual connections of all the anodes / structures of the system plus half of the installed anodes as spare for future connections.

d. <u>Anodes</u>

- i. The anode (only anode flex or equivalent similar type polymeric anodes) shall be designed to provide adequate CP current to 100 % of the tank bottom's protective current density specified for a minimum of 20 years period + 50% extra.
- ii. The anodes shall be designed to provide uniform current distribution. The number of anodes shall be determined by the total current requirement of the CP system(s) and the criteria of over-under protection.

e. Monitoring Facilities / Test Stations.

i. Monitoring facilities shall be designed to ensure effective indication of the level of the Cathodic Protection at different locations around tank bottom.

f. <u>Cabling</u>

- i. The cable connections shall be made preferably by mechanical means, thermite welding could be permitted keeping in view the safety matters at site premises.
- ii. Mechanical connection shall be made above ground only using cable lugs, nuts and serrated washers.
- iii. All ground electrical connections to the protected structure shall be fully encapsulated.
- iv. All cables shall be sized such that no excessive voltage drops occur which reduce the capacity of the system. All cables shall be insulated and sheathed to withstand the prevailing site condition. Drains cables and anode feeder cables shall be armored.

- v. All cables shall be buried in soft sand at a depth of at least 0.5 meters, provided with cable protection tiles and warning tape as considered suitable for the area.
- vi. Cables tags shall identify all the cables where they come above ground.
- vii. The CP cables shall be HMWPE or XLPE type with the minimum cross-section as below:

a.	Test lead and bonding	:	10 mm ²
b.	Positive circuit anode-rectifier	:	35-50 mm ²
C.	AC Power cable	:	70 mm

- viii. The supply and lying of all above-mentioned cables shall be the responsibility of contractor.
- ix. Standard cable color code shall be used for various purposes of cable connections.

g. <u>Monolithic Blocks.</u>

- i. Procurement and installation of monolithic blocks on all in-let and outlet flanges for electrical isolation of tanks from other structures will be responsibility of CP contractor.
- ii. Isolation kits instead of monolithic blocks will not be acceptable.

5. INSTALLATION / TESTING / COMMISSIONING.

- i. Installation, testing and commissioning shall be carried out under guidance and requirements of NACE and other relevant codes & standards and local regulations.
- ii. All T/R units and Anode Junction boxes / current control boxes shall be based on suitably designed solid concrete blocks.
- iii. A standard shade with appropriate material shall be made to protect T/R unit(s) control boxes, anode junction boxes.
- iv. When installation and commissioning of the CP system are completed in all respects, it will only be handed over to company after successful completion of trouble-free operation with complete polarization as per NACE standards.
- v. Final commissioning report and as built drawings will be prepared and submitted by the contractor.

6. <u>Warranty / Guaranty.</u>

i. The contractor have to provide one year trouble free performance / operational guaranty (after handing over the system to the company) of the installed system.

- ii. The contractor has also to provide / assure after sale service guaranty in terms of technical expertise whenever needed during warranty period.
- iii. In case during performance / operational guaranty period, any fault is found in the system that will be rectified / replaced / repaired by the contractor immediately at no cost to OGDCL.

7. <u>Applicable Codes & Standards.</u>

- i. The contractor shall have to follow all applicable international codes / standards (especially following listed NACE, API or equivalent BSI codes) and local regulations and practice in vogue to complete the job.
 - a. NACE RP 01 0169 / 2002.
 - b. NACE RP 01 99.
 - c. NACE RP 05 72.
 - d. NACE RP 02 86.
 - e. API RP 651.
 - f. BS 7361.
- ii. It will be contractor's responsibility to be fully aware of the requirement of the applicable codes and standards.

Data Sheet to be filled by Bidder

Sr #			CONTRACTOR
	DESCRIPTION	PARAMETER	to Comply
1	CENEDAL	Section 1, compliance	
2	Compliance to SOW (i e Design	Tequiled	
2	construction and testing etc.) the Sections 2	As per quidelines	
	to Section 21	mentioned.	
3	Compliance to Experience Criteria	5 Years, Section 9	
4		Client's certificates	
	Experience certificates of the Company (at	required with dates, tank	
	least three references required, for the	capacity and clients	
	technical suitability). Clients guaranteed	letters for completion of	
E	certificates in the company's name.	projects.	
5	Number of equivalent 6,000 barrels of more	required	
	in its name and at least three tanks of 6 000	required.	
	barrels or more capacity to be on the		
	contractor's credit for gualification.		
6	Organogram of Company and Organogram		
	of proposed team for site execution.		
7	Delivery period, any bidder/contractor	150 days	
	offering additional time that exceeds from		
	given delivery period, would be asked to match this timeline for further evaluation		
8	Any deviation to this specification each		
Ŭ	deviation to be marked by section wise		
	description (if any) from 1 to 22.		
9	Provision of PEC registration certificate as	Valid PEC certificate to be	
	proof of work experience in mechanical	attached for applicable	
	construction for C5 catagory or above	category	
	whichever is applicable.		
10	Provision of necessary experience showing	Experience with client	
10	competency for projects above PKR 50	references, email, and	
	Million.	telephone numbers to be	
		provided	
11	Payment schedule as per Section 23	Compliance	
	CP System of Tan	ks Bottom	
		Bidder to provide the	
		name of company with	
12	Compliance of Eligibility criteria of CP	enough documentary	
	contractor	proof of experience in the	
		sorvice order LOL etc.	
1			

13	Pre- design Test for CP system	Bidder to mention clearly in the technical bid all the tests to be carried out. Also Name(s) of the survey team member(s) along with his/their relevant survey experience.	
14	Detailed Engineering design of CP System recommendation/SOW compliance.	Bidder to provide clearly Name(s) / alternate of the design engineer(s) along with proof of relevant experience & certification.	
15	Compliance to relevant sections of Material Specifications of CP System	Compliance of Section-4 of relevant section.	
16	Compliance of installation & commissioning sections of CP System	Compliance of section-5 of relevant section.	
17	Warranty/Guaranty of CP System	Compliance of section-6 of relevant section.	

TO BE FILLED IN COMPLETELY BY THE BIDDER / CONTRACTOR.