

**EXHIBIT I
SCOPE OF WORK**

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1. INTRODUCTION:

- 1.1** Petrolines for Crude Oil Company, hereinafter referred to as PETCO, operates a 1505.566 km long, 28 inch diameter crude oil pipeline in Sudan with a capacity of 320,000 BPD. The pipeline originates from Heglig crude gathering station and terminated at Bashayer Marine Terminal at Port Sudan.
- 1.2** Cathodic Protection (CP) System along the pipeline has been constructed to protect the pipeline from corrosion with total number of 24 cathodic protection stations. These stations are located at approximately 70 to 80 km span. Most of these CP Stations are located at remote areas. There also more than thousand numbers of Test Posts.
- 1.3** The Cathodic Protection (CP) systems act as a second defense of pipeline in case of coating deterioration.
- 1.4** PETCO is intending to construct one Cathodic protection station at remote area at the midpoint of KP-1159+55 to KP-1219+27 (between CP16 & CP17 near KP1195) to enhance Cathodic protection level.

2. OVERALL SCOPE OF WORK:

- 2.1** This scope of work includes, but is not limited to Provision of one CP Stations which shall include the following:
 - 2.1.1 Detailed engineering.
 - 2.1.2 Procurement of material, supply to Site, including inspection, expediting, coordination, acceptance, forwarding, payment of legal fees, payment of customs duty, customs clearance of equipment.
 - 2.1.3 Construction and Installation
 - 2.1.4 Testing, pre-commissioning and Commissioning.
 - 2.1.5 Planning and Scheduling.
 - 2.1.6 Reports to PETCO
- 2.2** The CP station includes solar power system, shallow anode and drain Point Test post.
- 2.3** Solar power system includes batteries, solar panels, charge controller, DC-DC Converter, Junction Boxes, connection cables and earthing system.
- 2.4** The CP and Solar power systems shall be accommodated in a prefab room with concrete footings foundation...
- 2.5** Bidder shall construct the prefab CP room and fence for the CP room and solar panels array.

- 2.6 Bidder shall construct Ground Bed (Shallow Bed CP system).
- 2.7 Bidder shall submit the detailed engineering documents to PETCO for approval.
- 2.8 Bidder to do the installation of whole CP system and provide all required installation materials
- 2.9 To carry out all required functional tests.
- 2.10 Provide system commissioning and onsite training for related persons including maintenance and operation training.

3. BIDDER'S SCOPE OF WORK

- 3.1 Bidder shall be responsible for the execution of detailed engineering, procurement, Installation, testing, pre-commissioning and commissioning of the project of Provision of one new CP Station.
- 3.2 Work include but not necessarily limited to Provision of procurement, delivery, installation, inspection and testing, pre-commissioning, commissioning ,as-built drawing ,documentation and warranty.
- 3.3 The provision of the system shall be according to design documents as stipulated in appendixes as follows:
 - 3.3.1 CP station specification and International; standard references as mentioned in Appendix A.
 - 3.3.2 Bill of materials according to appendix B.
 - 3.3.3 Material data sheets are according to appendix C.
 - 3.3.4 Technical specifications for DC-DC convertor unit is according to appendix D.
 - 3.3.5 Photovoltaic Power System Design and Data Sheet according to appendix E
 - 3.3.6 The anode system resistivity shall be at most 2 Ohm.
 - 3.3.7 All above specification and design data have been developed based on **High silicon Anode** type, Bidder shall design an equivalent system based on **MMO (Mixed Metal Oxide) Anode** type.
 - 3.3.8
 - 3.3.9 Bidder shall provide all services work required, including preparation, specifications, data sheets, details, reports, calculations and construction.
 - 3.3.10 The Materials Procurements, installation and commissioning shall be in accordance with the specifications, standards and codes which are part of this Contract and the applicable Sudan Government Authority Rules, Regulations and laws.
- 3.4 Bidder shall provide final documentation including As- built drawings, data sheets, Operation and maintenance manuals and all equipment manufacturers' documents.

- 3.5** Bidder shall prepare all equipment, tools and consumable materials required to execute the project.
- 3.6** Commissioning the systems including functional and performance tests to verify intended specified design has been achieved.
- 3.7** Bidder shall engineering, supply materials, manpower and equipments to construct the CP room building with dimensions of 4.00x6.00 meter separated in to two compartments 4.0x3.0 each by partition wall.
- 3.8** CP room shall be provided with two heavy duty doors and two windows and each compartment shall be equipped with vent duct.
- 3.9** Bidder shall supply materials manpower to conduct building foundation as per site condition if required minor modification. , the bottom of foundation is on undisturbed soil.
- 3.10** The contractor shall supply material manpower to conduct the foundation excavate not less than 1.50m deep for the footings foundation and apply back filling and compaction 95% proctor using selected material in the layers not more the 0.20 m each as per specifications .
- 3.11** Bidder shall supply material and apply vapour barrier polyethylene sheet 500 microns above the well compacted soil, then applying the lean concrete grade 20 not more than 0.10m thickness.
- 3.12** Bidder shall supply material and manpower to build block wall around the footings foundation if required.
- 3.13** Bidder shall supply material, man power and equipment to apply foundation formwork and cast in RCC for all foundation footings, short column, beams and slab. As per specification and standard.
- 3.14** All concrete below floor slab shall be coated with water proofing membrane.
- 3.15** All reinforcement concrete is (Fcu. = 25 N/mm FY = 250 N/mm).
- 3.16** Bidder shall supply material, manpower and equipment to construct Foundation (footings, columns& beams) steel work are R16, All links R 8 @ 180 C/C. dimensioned it can be modified according to site condition and soil resistivity and obtain the approval.
- 3.17 Concrete slab:**
The contractor shall supply material, manpower and equipment to carry out and follow the specification, all reinforcement concrete slab thickness not less than (13cm) steel work is Alt .bars R12@200c/c, Alt bars R12&R16@125 c/c both ways. All reinforcement concrete is (Fcu. = 25 N/mm FY = 250 N/mm).
- 3.18 Prefabricated gladding walls and roofing:**

- 3.18.1 The contractor shall supply and install pre-fabricated building with reinforcement steel beams doors and windows the walls and roof cladding is pre painted corrugated galvanized steel sheets. Exterior and interior cladding is 0.7mm thickness.
- 3.18.2 The roof galvanized sheet is used for roofing system has slight slope to facilitate drainage,
- 3.18.3 Roof thickness to be 100 mm.
- 3.18.4 The main frame is antirust protected and two layers industrial painted heavy duty steel frame are used, lower chassis and column and beam are specially bended steel profile, wall height shall be not less than 2.90 m, 100 mm thickness steel profile shall be used in the comers'
- 3.18.5 The contractor shall supply material, equipment's and man power to apply roof sealant , or any appropriate type of water proofing subjected to PETCO approval to prevent water seepage
- 3.18.6 The contractor shall supply material manpower to install earthling for the constructed building recommended.
- 3.18.7 Flooring system ceramic tiles shall be used for floor covering.

3.19 CP room fence:

- 3.19.1 The contractor shall engineering design, supply material manpower and equipment to construct Chain-link fabric boundary fence with dimension of 12x12meter (48ML) with 3 lines barbed wires and main gate not less than 2.5m according to the specification.
- 3.19.2 • All metal components, including fence fabric, posts, top rails, couplings, extension arms, truss aluminium coated steel or iron conforming to standard ASTM specifications for commercial Grade coated ferrous products. Steel posts, top rails and truss pipes shall be equal to ASTM Grade 120, Schedule 40 materials. Referenced dimensions for pipe shall apply to the nominal
- 3.19.3 Double swing gates shall be of same height as fence and faced with fabric. Frame shall be made with galvanized 50 mm pipe. End pieces shall extend vertically to provide support for barbed wire. Corner braces shall be 90 degree or tee type slip-on fittings with gussets and drilled in two places on each extension for fastening to pipe with 10 mm through bolts.
- 3.19.4 Each gate shall have a 12 mm diameter galvanized steel truss rod with turnbuckle extending diagonally from upper hinged corner to lower center corner.

3.20 Factory Acceptance Test (FAT);

- 3.20.1 Bidder shall carry out Factory Acceptance Test (FAT) for the new CP system before delivery in presence of PETCO representative.

3.20.2 Prepare FAT procedure and submitted to PECO for approval.

3.20.3 To submit FAT report after successful test.

3.21 Warranty:

3.21.1 Warranty period is twelve (12) month, effective from performance acceptance of the system.

3.21.2 Warranty covers labours and all system, electronic parts, software based on repair/replacement.

3.21.3 Warranty included travel and accommodation expenses for On-Site repair.

4. BIDDER'S OBLIGATION:

In addition to the main Bidder's Scope of Work described above, shall also carry out the following for the Work:

4.1 Preparation and submission of all Engineering, Procurement, Construction, Testing, Quality Control documentation for PETCO review and comment.

4.2 Preparation, submission for approval and implementation of Quality Assurance plan suitable to ensure compliance with Contract specifications, and other inspection requirement.

4.3 Confirmation of the adequacy of the specifications and design information by means of detailed review in accordance with the requirements of this Scope of Work

4.4 Contractor shall comply with PETCO safety regulations. And provide safety items (hard hats, safety boots, hand gloves, eye goggles, etc.) for Contractor's workers

4.5 The Contractor shall provide all materials (inclusive water, gravel and other materials), equipment's and manpower to carry out the scope of works as stated above. The Contractor shall conduct all the required testing procedure per construction requirements.

4.6 The contractor shall provide site office and camp. For his personnel equipped with electricity and water and with the requirements.

4.7 The contractor shall provide his personnel with the required vehicles to transport them to and fro the work site

4.8 The contractor shall be responsible to obtain any required permission or approval from the local authorities

- 4.9 Prior to submission his bid documents the Bidder shall strongly advised to visit the site at his own cost to familiarized himself with the site condition.
- 4.10 The contractor Project Manager shall attend the weekly progress meeting to present the weekly progress report to the meeting
- 4.11 Contractor shall be responsible for ensuring that Contractor's Personnel are fully aware of and abide by all the terms and conditions of this Contract.
- 4.12 Procurement services and supply to Site, including inspection, expediting, coordination, acceptance, forwarding, payment of legal fees, payment of customs duty, customs clearance of equipment.
- 4.13 Preparation of project execution schedule. This schedule shall be based on detailed breakdown of the Contract Scope of Work.
- 4.14 Implementing a system of progress reporting by which PETCO remains regularly informed of the status of the Work.
- 4.15 Avoid damaging the any of existing facility during project activities. If any damage happened then the Contractor shall repair.
- 4.16 Clean-up Site and surrounding areas after completion of Work.
- 4.17 Provision of all final documentation, "As-Built" drawings, test reports, certificates, operation and maintenance manuals.

5. PETCO'S OBLIGATION:

- 5.1 Provide access to the Worksite
- 5.2 Provide Work permission

- END OF EXHIBIT I -