

# ***ENERGY INFRASTRUCTURES LTD***

## ***ASHDOD MARINE LINK OFF-SHORE PIPELINES***

***Project No.***

***165900***

***Project Specification No.***

***165900-PR-SP-001***

### ***SPECIFICATION FOR VOC TREATMENT SYSTEM PURCHASE***

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## **1. BACKGROUND**

- 1.1. Energy Infrastructures (PEI) is the Israeli national infrastructure company dealing with the storage and transport of petroleum products.
- 1.2. PEI intends to construct a new facility connecting existing ship loading/unloading off-shore petroleum products transfer pipes with the existing on-shore piping.
- 1.3. The new on-shore piping connecting facility will be equipped with fiscal flow measurement, corresponding valving, pigging, drainage, and Volatile Organic Compounds (VOC) treatment systems.
- 1.4. The designed new VOC treatment system shall be of a Thermal/Incineration type and shall answer to the Best Available Technology (BAT) in the application area.
- 1.5. The Vendor shall propose his BAT among Thermal Oxidizer (TO), and Vapor Combustion Unit (VCU) technologies (those that are available to him) with a clear statement of the proposed technology advantage.
- 1.6. A **budget proposal** is required.

## **2. GENERAL**

- 2.1. This specification covers the design, fabrication, and supply of the new VOC treatment system.
- 2.2. A new Liquefied Petroleum Gas (LPG) storage facility (which is not a part of the Scope Of Work (SOW) of this project) will provide the required fuel gas for the system.
- 2.3. The VOC treatment system is fed by the vapor displaced as a result of the ship filling by the light distillates, like naphtha and gasoline (petrol). The feed composition shall be estimated and proposed by the vendor based on his previous experience. The vendor shall clearly indicate the sources of the proposed vapor composition.
- 2.4. The equipment shall be designed for outdoor operation in a harsh industrial environment.
- 2.5. The documents/specifications/standards listed in these technical requirements including all appendices and attached documents are considered an integral part of the contract requirements.

## **3. PROCESS DATA**

- 3.1. The frequency of the ship loading is four (4) – five (5) ships during one month.
- 3.2. The amount of the petroleum product transferred to the ship is 45,000 m<sup>3</sup>.
- 3.3. The maximal (peak) pumping rate is 1,200 m<sup>3</sup>/hr.
- 3.4. The vapors return line consists of two segments:  
The off-shore one, 16", SCH. 40, length 1,400 m.  
The on-shore one, 14" SCH. 40, length 500 m.

- 3.5. The VOC treatment facilities shall guarantee:  
Total Of Carbons (TOC) concentration: < 1 ppm.
- 3.6. The only available utility on the site is Electricity and Compressed Air, no Cooling Water, no Lube Oil, and no Seal Oil central distribution systems are available on the site.
- 3.7. The LPG (see Appendix D for its specification) is considered as the fuel gas for the new VOC treatment system. Its storage and supply design are outside of the VOC treatment Vendor SOW.
- 3.8. The vendor will estimate Instrument and Service air consumption in order to purchase a new air compressor.

#### **4. SCOPE OF SUPPLY**

- 4.1. This document defines the minimum requirements for the design, fabrication, and supply of a complete VOC treatment system.
- 4.2. The exhaust stack shall be self-supported and equipped with necessary nozzles for air emissions monitoring both continuously (Continuous Emission Monitoring – CEM system) and periodically manually by the local Environment Protection Agency - EPA representatives. The required permanent access to these nozzles (serving platforms) shall be provided and shall meet the local regulation requirements.
- 4.3. All materials shall be properly boxed in wood crates.
- 4.4. Internal tests for blowers with the release of certificates.
- 4.5. Instrumentation and Control:
  - 4.5.1. All instrumentation as required by the process.
  - 4.5.2. All required control documentation.
  - 4.5.3. Each motor electrical phase should be protected by two (2) PT100 sensors, three (3) phases – six (6) PT100 sensors.
  - 4.5.4. One (1) PT100 sensor for each motor bearing.
  - 4.5.5. One (1) PT100 sensor for each blower bearing.
  - 4.5.6. One (1) PT100 sensor for the blower casing.
- 4.6. Special tools (if required) are necessary for the installation, maintenance, and overhaul of each complete unit, including any required maintenance lifting equipment.
- 4.7. Spare parts for commissioning & start-up.
- 4.8. Contract documentation:
  - 4.8.1. Completed data sheets for all mechanical equipment items, motors, and instruments.

- 4.8.2. Mill test certificates including chemical and physical properties of castings and forging materials, as per code requirements.
- 4.8.3. Certified General Arrangement, foundation loading, and cross-sectional drawings for all supplied components. The drawings shall include all parts of the needed units, as well as all necessary dimensions required for piping design, civil engineering, and erection.
- 4.8.4. ITP (Inspection and Testing Plan) according to section 6 of this specification. This ITP provides substantially all review, witness, and hold points as defined in the section mentioned above.
- 4.8.5. Maximum allowable forces and moments on all nozzles of all equipment shall be clearly indicated in the vendor's drawings.
- 4.8.6. Equipment Installation, Operation, and Maintenance Manuals. The manuals shall include a list of special tools for equipment maintenance and maintenance instructions including how to use the tools. The manuals shall also include field test procedures.
- 4.8.7. A list of deviations from this specification and its appendices (see appendix "C").

## **5. DESIGN AND TECHNICAL REQUIREMENTS**

- 5.1. The system shall be designed by the vendor according to the process conditions (paragraph 3) and site conditions (Appendix "A").
- 5.2. All motors shall be designed for hazardous area classification of Zone 2 (Class I Div. II), and the treatment system shall be equipped with a Zone 0 blower.
- 5.3. All motors shall be suitable for Variable Frequency Drives (VFDs).
- 5.4. All steel fittings and flanges shall be designed in accordance with ASME B31.3 and B16.5 standards. Bolt holes on flanges shall straddle main centerlines.
- 5.5. All connections for vents and drains (that are not piped up) shall be provided with a removable sealed plug.
- 5.6. Nozzles:
  - 5.6.1. The VOC treatment system manufacturer shall specify on each equipment nozzle the forces and moments required for bolting the piping to the equipment nozzles as well as the bolting sequence required.  
  
The VOC treatment system manufacturer shall specify where hot bolting is required, the hot bolting forces and moments, and the sequence of hot bolting as well.
- 5.7. Where applicable, all equipment shall be designed in accordance with the Seismic Design Requirements as shown in Appendix "B".

5.8. All components shall be painted with proper protective paint in accordance with the vendor's standards. The protective paint shall be suitable for the site conditions (Appendix "A").

5.9. Materials of construction

5.9.1. The material of construction shall be designed to comply with the data shown in paragraph 3.

5.9.2. The selected material shall conform with API class S-6. The material of construction will be confirmed by the vendor.

5.10. Codes and standards

5.10.1. The design, fabrication, installation, inspection, and testing of the equipment shall be in accordance with the following codes and standards, including all addenda in effect at the time of proposal date. The list includes, without being limited to, the following:

- American Petroleum Institute (API) 676
- American National Standards Institute (ANSI)
- American Society of Mechanical Engineering (ASME)
- American Society for Testing on Material (ASTM)
- American Welding Society (AWS)
- Steel Structures Painting Council (SSPC)

Other codes, equivalent to the above list may be used, provided that the Vendor states the equivalence and approves the proposed code by the client in writing.

5.10.2. Where applicable, material and fabrication of piping sections will be in accordance with the ASME, AWS, and ANSI codes as applicable.

5.10.3. The vendor shall be responsible for compliance with any other effective local laws or codes. The vendor shall inform EI if any requirement of this specification or its attachments conflicts with them for EI resolution in writing.

5.10.4. All codes and standards mentioned in this document shall be considered at the latest revision in force at the date of proposal and must include all corrections, revisions, and additions published until the above date.

5.10.5. The vendor is solely responsible for requesting any EI document called for herein which EI may have unintentionally omitted from the distributed request package.

5.11. All drawings, documentation, etc., should be in English or Hebrew and in a metric unit system except for nominal piping dimensions that shall be in inches.

- 5.12. Primary handling of all engineering information will be by e-mail, with CD and paper backup.

## **6. QUALITY INSPECTION & TESTING**

- 6.1. This specification is not intended to enforce any departure from the Vendor's standards of design, fabrication, or construction. It is intended to indicate the degree of reliability, safety, and economy required for the proposed installation. Nothing in this specification is to be interpreted as relieving the Vendor of his normal responsibility for the design, construction, and mechanical performance of the equipment furnished.
- 6.2. Vendor shall submit the following documents before fabrication begins:
- 6.2.1. Vendor quality assurance manual and quality control program.
- 6.2.2. List of inspections and tests during fabrication and erection.
- 6.3. Fabrication will meet the tolerance of the codes.
- 6.4. Certification as to the source of material, the conformity with code, and the chemical and physical properties shall be furnished by the supplier. Material shall be new and of prime quality, free of damage from corrosion, handling, or storage conditions.
- 6.5. The supplied equipment will be mechanically tested by the manufacturer. Inspection and testing shall be applied per code requirements for radiography, hydrostatic testing, pressure testing, etc. All before equipment dispatch.
- 6.6. NDT – non-destructive testing (including radiography) shall be carried out per code requirements at the vendor's expense.
- 6.7. Before dispatch all machined surfaces shall be wrapped with watertight moldable waxed cloth or equivalent. All openings will be plugged and covered to prevent transportation and storage damage.
- 6.8. The purchaser or his nominated inspector (3<sup>rd</sup> party) will have the right to visit the manufacturer shop during fabrication for inspection and expedite the quality assurance process, material approval, welding procedures, tests witnessing, etc. The vendor shall allow free access to any facility where work is being done in relation to this spec. **including premises of subcontractors** to the purchaser or the inspector nominated on his behalf and give the inspector any assistance required.
- 6.9. The purchaser's 3<sup>rd</sup> party inspector shall check and approve the material of construction before the beginning of fabrication.
- 6.10. All inspections are to be carried out and documented by a qualified inspector. Inspection records and documents should be issued to the client according to the manufacturing progress plan.

## **7. GUARANTEE**

- 7.1. **Process guarantee**



7.2. The vendor shall guarantee to meet the requirements shown in section 3 of this specification and will comply with all Standards and Codes.

7.3. **Mechanical guarantee**

The vendor shall provide a mechanical guarantee (materials, design, and workmanship) for all equipment and components parts supplied by him for a period of 2 years after being placed in service or 30 months from shipment.

**8. CERTIFICATES**

8.1. Manufacturer's certificates for compliance with the specification showing details of all tests performed shall be submitted to the purchaser.

8.2. A copy of the above-mentioned certificates to be made available to the purchaser inspector or directly to the purchaser, where there is not an appointed inspector, for final approval prior to shipment. Three other approved copies shall accompany the other documents transmitted to the purchaser.

**9. SHIPPING REQUIREMENTS**

9.1. All flange connections shall be closed with gasketed wood or preferably metal covers. A minimum of four (4) bolts shall be used.

9.2. All field connections shall be labeled with suitable metal tags. The nomenclature or designation should agree with that shown on the outline drawing for ease of field piping.

**10. QUOTATION**

The Proposal shall be valid for 90 days at least and shall include, but not be limited to:

- 10.1. Technical description of equipment, including materials of construction.
- 10.2. General dimensions installed weight of equipment and shipping weights.
- 10.3. Clear details of any exceptions or clarifications to this document – the vendor MUST complete, sign, and submit the attached form in Appendix "C".
- 10.4. Completed datasheets.
- 10.5. Expected Utility consumption: electricity, LPG, compressed air.
- 10.6. Preliminary Process Flow Diagram (PFD).
- 10.7. Preliminary Process data, including vapor composition, thermal loads, flows, temperatures, pressures, and turn-down ratio.



- 10.8. Preliminary Piping & Instruments Diagrams (P&IDs).
- 10.9. All drawings, documentation, etc., should be in English and in a metric unit system.
- 10.10. FOB (major port) price, including seaworthy packing.
- 10.11. CIF Ashdod port price, including seaworthy packing – separate price (optional).
- 10.12. Price for construction supervision and participation in the startup of the unit.
- 10.13. List of recommended spare parts for five (5) years of operation with itemized prices (separate price).
- 10.14. List of recommended spare parts for commissioning and start-up.
- 10.15. Preliminary Project Schedule including at least expected date for issue of:
  - 10.15.1. General Arrangement & Foundation Loading Drawing.
  - 10.15.2. Fabrication Schedule & Quality Control Plan including ITP.
  - 10.15.3. Expected arrival of main materials for fabrication.
  - 10.15.4. Expected fabrication time and delivery to the vendor for major parts.
  - 10.15.5. Mechanical testing.
  - 10.15.6. Ready for shipment.
  - 10.15.7. Ex-works delivery.
  - 10.15.8. Best delivery time.
  - 10.15.9. Terms of Payment.
- 10.16. Reference list of similar projects carried out in the last 5 years.
- 10.17. Vendor to clearly indicate in his proposal:
  - 10.17.1. Geographic location where major materials will be fabricated and sourced.
  - 10.17.2. Method of assuring required quality in the fabricated/assembled product based on the fabrication/assembly location.
  - 10.17.3. Names and locations of major sub-suppliers are considered as the major elements of the systems.
  - 10.17.4. Please note that "Global Sourcing" will not be considered an acceptable response to the above requests.
  - 10.17.5. Proposals submitted without detailed spare parts quotations will not be considered.

10.18. All documents and drawings shall be sent as PDF files.

10.19. Drawings will be separated from other documents.

#### **Appendix "A" – SITE CONDITIONS**

- Facilities are located at Ashdod, Israel, 500 m away from the seaside.
- Elevation: 24 meters above sea level.
- Ambient temperatures: Maximum 45°C, Minimum 5°C.
- Ambient bulb temperature:
  - Wet bulb temperature: 26°C.
  - Dry bulb temperature: 32.6°C.
- Relative humidity: Maximum 95%, Minimum 25%
- Wind loading: according to EN 1991-1-4, Actions on structures (part 1),  
General Actions (wind action).  
Wind speed: up to 120 Km/h.

#### **Appendix "B" – SEISMIC DESIGN REQUIREMENTS**

See attached file: "165900-PR-SP-002\_P0 – VOC Treatment system Appendix B - Seismic Design Requirements.pdf"

#### **Appendix "C" – DEVIATION FORM**

See attached file: "165900-PR-SP-003\_P0 – VOC Treatment system Appendix C - Deviation Form.doc"

#### **Appendix "D" – LPG specification**

See attached file: "165900-PR-SP-004\_P0 - VOC Treatment system Appendix D – LPG\_specification.pdf"

#### **Appendix "E" – ITP**

See attached file: "165900-PR-SP-005\_P0 VOC treatment ITP - Appendix E.xls"

#### **Appendix "F" – VDDR**

See attached file: "165900-PR-SP-006\_P0 VOC treatment VDDR - Appendix F.xlsx"

#### **Appendix "G" – Quality Control Dossier**

See attached file: "165900-PR-SP-007\_P0 Quality Control Dossier Requirements - Appendix G.doc"