

Chapter 1

Scope of Work

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Section 1

General Consideration

1 SECTION1: GENERAL CONSIDERATION

1.1 General

“Work” shall mean all services performed, items supplied, or work done by or on account of MAPNA GROUP or his Subcontractors to fulfill Contractor’s obligations under this Contract.

The scope of supply is completely described in this chapter. Only MAPNA GROUP Scope of work which listed here in this chapter or referenced from this chapter will be in MAPNA GROUP responsibility. Any hints on equipment, numbers of components etc. given in other chapters/parts/volumes are not binding even if the wording suggests something different; however, the scope of work of MAPNA GROUP is on EPC basis in substation consists of 230 kV Air Insulated Substation.

This project consists of design, civil work, supply or manufacturing, factory testing, packing, supply of necessary insurance policies, transportation, custom clearance, inland transportation, offloading, supervision over storage, erection, test and pre commissioning of all equipment, commissioning of all scope of works and necessary guarantees of the Khatun Abad Gas Power Plant 230kV substation project.

Single line diagram for the substation of this supply document is shown on the attached drawing.

"Priority of Contract": The order of priority within this contract shall be according to the sequence of its numbering mentioned as below:

- 1- Clarification & Deviation List (Chapter 2 of MAPNA Technical Proposal)
- 2- Scope of Work (Chapter 1 of MAPNA Technical Proposal)
- 3- Technical Schedules (Chapter 3 of MAPNA Technical Proposal)
- 4- Technical Specification/ Documents

1.2 Location

This project is regarded to NICIDEC. which is located Khatun Abad city of Kerman province in Iran.

Section 2

Scope of Work

2 SECTION 2: SCOPE OF WORK

Scope of work of this project includes establishment of substation as follows:

2.1 Electrical and Instrumentation scope of work

2.1.1 230kV Air Insulated Substation

Air Insulated Substation 230kV, 50kA, 1Sec with 1.5 circuit breaker configuration with one complete bay and three incomplete bays (Totally 9 circuit breakers) consisting of one incoming feeder from gas power plant, four OHL outgoing feeders and two incomings space and two OHL outgoing space for extension of substation according to the SLD).

The substation will include all indoor and outdoor equipment for the specified bays and feeders as following:

- Bus bars (3150A, 50kA-1Sec.)
- High voltage equipment including circuit breakers, disconnectors/ earthing switches, current transformers, capacitive voltage transformers, line trap, buswork equipment and lightning arresters with counter (as per SLD)
- Substation Control and monitoring System (SAS system) with protocol of IEC61850 (as per SLD)
- Synchronizing, control, protection, measuring and metering system
- Commercial energy metering system (1 set for each incoming/outgoing feeders)
- WAMS system according to IGMC instruction consist of one panel without PMU & PDC relay, cable connections between substation protection panels and WAMS panel based on WAMS required signals.
- Outdoor and indoor lighting system
- Interconnection between various equipment's, interconnection and interface between power plant & substation
- MV, LV Power and control cables
- Coaxial cable and accessories
- Fiber optic cable, network cables for protection & automation system and accessories (only inside of substation)
- Cable trays, conduits, cabling and wiring the equipment
- Grounding system

- Lightning protection system
- Event and Fault recording systems (included in protection relays & DCS system)
- 110 VDC battery and battery chargers in substation (Two sets Lead Acid battery, Two sets battery charger 8 Hours)
- 48 VDC battery and battery chargers in substation (Two sets Lead Acid battery, Two sets battery charger, 12 Hours)
- 48 VDC battery and battery chargers in power plant (Two sets Lead Acid battery, Two sets battery charger, 12 Hours)
- Main 110V LVDC panels in substation
- 48V LVDC panels in substation
- 110VDC distribution panels for each BCR
- Main LVAC panels in substation
- AC distribution panels for each BCR
- Auxiliary transformer $6.6 \pm 2 \times 2.5\%$ / 0.42kV, 315kVA oil immersed type (2 set)
- Standby emergency diesel generator 100kVA (1 set)
- Manual firefighting system (CO2 and portable dry chemical extinguishers) for substation buildings
- All of the interface cables between power plant and substation
- Junction boxes, terminal boxes, marshalling kiosks and all facilities for the establishment of substation
- Overhead conductors and gantries from gas power plant main transformer to 230kV substation (with all connection and fitting accessories)
- Outgoing gantry for outgoing feeders with all connection and fitting accessories.

2.1.2 Instrument and control

Control equipment comprises equipment for indication, registration, signaling, protective functions and apparatus for manual and automatic control and regulation.

The function of a control system is to collect all the information for the operations personnel to supervise the operating conditions of the substation and whenever necessary to initiate changes to operating conditions.

The substation will be equipped with operating and acknowledgement system for all circuit breakers (CB) and disconnecting switches (DS, ES)

Main equipment and functions of control system, instrumentation and tele protection system will be consisted of:

- 4 links of single channel Power Line Carrier & TPS
- Fire detection system for all buildings in the scope of work
- SCADA in power plant & substation system includes:
 - Supply Cables and Cabling from GTG unit SCADA marshaling racks to RTU
 - Supply & installing of RTU, HVI, CGR & PDH panels
 - Hardware and software configuration of RTU, CGR & PDH panels
 - Supplying and installing equipment includes serial to fiber optic media converters, two ODF/OCDF panels, 24 Core single mode cable and other cables for sending SCADA signals of 230KV Substation feeders data by means of serial (IEC60870-5-101 protocol) connection to powerplant RTU
 - Supply and installation of CGR and SFP modules and their cabling for sending data from powerplant and substation to three SCC dispatching center by means of IEC60870-5-104 protocol. Also, two VOIP DTS telephones for voice communication to SCC.
 - Supply and installation of PDH and serial to fiber optic media converters and their cabling for sending data from powerplant and substation to AOC dispatching center by means of IEC60870-5-101 protocol.
 - Supply of two conventional DTS telephones and their cabling to PDH for hot-line voice communication with SCC & AOC dispatching centers.
 - Supply and implementation of 24 Core fiber optic cable and joint box on gantry for sending data and voice of powerplant and substation to SCC and AOC centers.

2.2 Civil Work

The civil works included in the contract shall consist of the design, supply of material and full construction works.

The extent of the civil works consists of the following items (all items will be done only for equipment in scope of supply):

- Foundations for 230kV AIS outdoor equipment
- Steel structure of gantries & outdoor equipment
- Central control building (CCR)
- Bay control rooms (4 BCRs)
- Diesel room
- Cable trench between gas power plant and substation for interface cables.
- Internal Cable Trenches
- Fence for Substation area
- Access road from the nearest adjacent road to the substation
- Internal Roads, Drainage System, Graveling
- Lighting Pole
- Mobilization & demobilization

2.3 Mechanical Work

2.3.1 Heating, ventilation and air conditioning

- Air conditioning (split unit) will be foreseen for CCR & BCRs (with cooling/heating system)
- Electrical Heater (if necessary)

2.3.2 Fire Fighting

- Portable Dry chemical and/or CO₂ Extinguishers inside the CCR & BCRs

2.4 Supply of Spare parts, Tools, Miscellaneous

- Operation & Maintenance tools according to MAPNA proposed list in schedule E
- Spare parts according to MAPNA proposed list in schedule E

2.5 Engineering and Design Services

- Basic and detailed engineering required for MAPNA GROUP supplied equipment
- Prepare and deliver drawing schedules
- Detailed civil engineering work
- Submitting electronic files of submittals including:
 - For information / for approval documents according to the Manufacturer practice
 - Erection and assembly/disassembly procedures and manuals
 - Operation and maintenance manuals
 - As built drawings
 - Equipment classification and labeling

Notes:

- Only manual will be submitted in both electronic (CD) and hard copies
- Electronic files of documents and transmittal letters will be transmitted in Web base platform by EDMS

2.6 Packing, Transportation, Offloading at Site

MAPNA GROUP Scope includes transportation of all equipment, material, special tools, measuring equipment subject of the contract to the warehouse at the substation site.

2.7 Warehousing and preservation

Included in the scope is to store and preserve the equipment and materials supplied under this contract, at site, with due observation of the recommendations of the suppliers/ manufacturers.

2.8 Installation Work

Included in the scope is installation of the equipment and systems supplied under this contract.

2.9 Test and Commissioning

The standard workshop inspection and testing, site testing, commissioning, performance testing and equipment as per manufacturer standard practice, and delivery of the test certificates

Performance test shall be performed based on the manufacturer instruction and procedure; commissioning will be carried on as per Manufacturer instruction manuals.

2.10 Project Management

- Home and site project management
- Scheduling for document supplied
- Scheduling for equipment supplied
- Monitoring of the entire activities within scope
- Delivery of monthly status reports
- Coordination of activities

2.11 Training

Training according to MAPNA proposed list in schedule E

Section 3

The Owner Scope of Work

SECTION3: THE OWNER SCOPE OF WORK

- Helping the Contractor in obtaining permits, licenses and approvals from state or local authorities (such as work permits and visas for foreign staff and importation of the substation equipment and goods)
- Purchase or lease of site area
- Area free for storage of the substation equipment and site mobilization
- 380/220V electrical powers for construction period to be provided by the Owner in the site boundary
- Excavation in rock (if required)
- Fiber optic cable & pilot cable outside of substation

Section 4

Terminal Points

SECTION 4: TERMINAL POINT

A) Electrical

- 230kV overhead line feeder gantries to grid
- Terminals of electrical powers for construction period to be provided by the Owner in the site boundary

B) Instrumentation & Control

- Terminals of fiber optic joint box on the outgoing gantry for connecting SCADA system fiber optic cable to OPGW.

Section 5

Exclusions from the Scope of Work

SECTION 5: EXCLUSIONS FROM THE SCOPE OF WORK

A) General

- All items not explicitly listed under scope of work are excluded from MAPNA GROUP scope at this stage.

B) Civil

The following items, if required, will be done as extra work:

- Flood control system and studies (is done for power plant area including substation)

C) Mechanical

- Any other mechanical system except mentioned systems in this proposal (such as air compressor and pipeline for air, irrigation water, water storage or pumping & etc.)

Section 6

Attachments

SECTION 6: ATTACHMENTS

- A) HV Single Line Diagram**
- B) 230KV Substation Layout**
- C) Control & Protection Single Line Diagram**
- D) Substation Automation System Overview**
- E) LVAC Single Line Diagram**
- F) 110VDC Single Line Diagram**
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