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SOUTH REFINERIES COMPANY IS RENOUNCING THE ISSUANCE OF HEREUNDER REQUISITION . ACCORDINGLY WHOSOEVER WOULD LIKE TO PARTICIPATE AND OFFER SHOULD ATTEND SRC / HEADQUARTER LOCATED IN BASRAH/ SHUAIBA.

GAINING TENDER SPECIFICATIONS FOR AN AMOUNT MENTIONED AGAINST EACH TENDER CASH IN ADVANCE IT IS NON REFUNDABLE WHATEVER REASONS AND WHO WINS THE TENDER SHALL PAY THE COSTS OF LAST ANNOUNCEMENT.THE WELL KNOWN INTERNATIONAL COMPANIES WHICH HAVE NO BRANCH OR REPRESENTATIVE IN IRAQ CAN PARTICIPATE AND SEND THEIR OFFERS THROUGH DHL OR FEDEX OR ANY OTHER WAY WITHIN TIME DECIDED WITHOUT ATTACHING THE BILL OF PURCHASING BIDDING DOCUMENTS.THE ENTRY POINT FOR ALL MATERIALS SHOULD BE KHOR ALZUBAIR PORT AND/OR BASRAH INTERNATIONAL AIRPORT .

CLOSING DATE WILL BE UNTIL THE END OF OFFICIAL WORKING HOURS OF TUESDAY 18 / 3 / 2014.

ITEM	REQ NO	DESCRIPTION	PRICE
1-	32 /2012/E	Cooling Tower Electrical Substation	\$ 100

Please, see attached conditions

FOR/ DIRECTOR GENERAL

Akeel SH Ahmed

20/2/2014

REQ. No. 32/2012/E

Cooling Towers Electrical Substation

1. Descriptions:

- a. Supply and install complete MV 3.3KV switchgear cubicles which specification shown in 2.1 and details listed in 3.1.
- b. Supply and install LV 0.4KV Motor Control Center (MCC) which specification shown in 2.2 and details listed in 3.2.
- c. Supply and install power automation system which specification and details shown in 2.3 and information listed in 3.6.
- d. Supply and install power factor correction unit which specification shown in 2.4 and details listed in 3.2.
- e. Supply and install DC rectifier which specification shown in 2.5 and details listed in 3.5.
- f. Supply and install power transformers which specification shown in 2.6 and details listed in 3.3.
- g. Supply and install Auxiliary Switch Board (ASB) which specification shown in 2.7 and details listed in 3.4.
- h. Supply and install air-condition system which specification shown in 2.8 and details listed in 3.7.
- i. Design, supply and build complete substation which specification shown in 2.9.
- j. Supply spare part list according to item 5.

2. General Specification:

2.1 MV switchgear Specification:

- a. Metal clad air insulated switchgear.
- b. Air insulated circuit breaker, Vacuum interrupter, motorized charged and drawable type C.B.
- c. Service voltage 3.3KV, 50Hz, 3Ph.
- d. Breaking capacity 25KA/3sec minimum.
- e. Copper bus bar rated 2000A.
- f. Control voltage 110VDC.
- g. Charging motor voltage 110VDC.
- h. Anti condensate heater and motor's space heater: 220VAC.
- i. Protection degree: IP3X.
- j. Protection relay should be multifunction microprocessor based with MIMIC LCD monitoring for parameters and events, flush mounted with local PC's communication port to pre-set all parameters, power supply 110VDC, In:5A for protection, Vn:110V, 50Hz for under voltage protection relays with ON\OFF and L\R button with Profibus communication protocol.

- k. Motor feeders must have secondary CT ratio of 1A to be connected to LCB that suggested in (v) below.
- l. Digital 3Ph voltage measuring devices must install for each bus-bar sides and incomers additional to protection relays.
- m. Inter lock between incoming feeders and bus-ties by selector switch placed in bus tie cubical for auto/manual transfer loading including phase sequence protection between the two incoming feeders and bus-tie.
- n. Transformers feeders must include all required protection (alarm and trip) for transformer (i.e. oil level, oil temperatureetc) and differential protection relay.
- o. All multifunction Protection devices for feeders of incomers, bus tie, transformers and motors have to connect to PLC by hot redundant Profibus network for full controlling, full monitoring and full administrating.
- p. Feeders of incomers, bus tie, transformers and motors have to be full controlled, full monitored and full protection by multifunction Protection devices, automation system and HMI, motors have to be limited control just in test position.
- q. Feeders of incomers, transformers and bus-tie must include external ON\OFF selector switches connect to digital input of protection relay located on the door of LV compartment additional to key pad of protection relay.
- r. Motors feeders must include ON\OFF and L\R selector switches connect to digital input of protection relay additional to key pad of protection relay.
- s. Voltage transformers for incoming feeders and bus bars 3300/110V.
- t. Two trip contacts have to be added to control circuit of each motor feeder as spare to use by external trip.
- u. Two contacts have to be added in series with closing control circuit of each motor feeder as spare to use by external closing conditions and normally have to be shorted by removable wire.
- v. Capability to connect LCB (consists of two gang pushbutton (start\stop) with ampere-meter In: 1A) directs to motor feeder by hard control cables additional to automation control.
- w. Cable entry from bottom of the cubicles.
- x. All software and programs have to be original and licensed on CD or DVD for each type of multifunction Protection devices with connection cables and adapters in two copies.
- y. Approval Meeting: The basic and detailed designs will be approved before manufacturing in Manufacturer Company for three engineers for two week for all items.

2.2 Motor Control Center (MCC) Specification:

- a. Metal clad MCC.
- b. Service voltage 400V, 50Hz, 3ph + Neutral.
- c. Breaking capacity: 40 KA/3sec minimum.

- d. Copper bus bar rated: 2500A.
- e. Control voltage: 24VDC by 24VDC rectifier.
- f. Anti condensate heater and motor's space heater: 220VAC.
- g. Protection degree: IP3X
- h. Incoming feeders and Bus-tie: Drawable type, 4 poles C.B, multifunction microprocessor protection device with LCD for setting and monitoring, control voltage 24 VDC, motorized charging 24 VDC with Profibus communication protocol.
- i. Inter lock between incoming feeders and bus-tie by selector switch placed in bus tie cubical for auto/manual transfer loading including phase sequence protection between the two incoming feeders and bus-tie.
- j. Motors starters: Three position drawable type (Connected, Test and Disconnected). These starters contain (Motor MCCB, Contactor, LV multifunction microprocessor motor protection device with CTs, MCB for control voltage and controlling(ON\OFF\Reset\Local\Remote) & signaling(On\Off\Fault\Local\Remote) unit with measuring LCD (V, I, P, E, P.F, events, faults....etc) connects to protection device(split or built in) with Profibus communication protocol.
- k. Motor starters must have secondary CT ratio of 1A to be connected to LCB that suggested in (t) below.
- l. Outgoing feeder more than 800A: Drawable types, 3 poles C.B, motorized charging 24 VDC, multifunction microprocessor protection device with LCD for setting and monitoring and have to connect to PLC.
- m. All multifunction Protection devices for feeders, P.F, bus tie and motors' starters have to be flush mounted with local PC's communication port to pre-set all parameters
- n. All multifunction Protection devices for feeders, P.F, bus tie and motors' starters have to connect to PLC by hot redundant Profibus network for full controlling, full monitoring and full administrating.
- o. Feeders, P.F, bus tie and motors starters have to be full control, full monitor and full protection by multifunction Protection devices additional to automation system and HMI, motors have to be limited control just in test position.
- p. Two trip contacts have to be added to trip control circuit of each motor starter as spare to use by external trip.
- q. Two contacts have to be added in series with closing control circuit of each motor starter as spare to use by external closing conditions.
- r. Outgoing MCCB 400A and 160A: 4 poles plug in C.B, Manual Operation, analog amper-meter has to be fixed in the door and has to be connect to PLC.
- s. Interlock between transformer feeder in 3.3KV switchgear and the feeder in MCC.

- t. Capability to connect LCB (consists of two gang pushbutton (start\stop) with ampere-meter In: 1A) directs to motor starter by hard control cables additional to automation control.
- u. Outgoing motor feeders cables entry from the bottom of MCC.
- v. All software and program have to be original and licensed on CD or DVD for each type of multifunction Protection devices with connection cables and adapters in two copies.
- w. MCC system design has to be approved in approval meeting.
- x. Motor operation method:
 - 1. Motor less than 4KW: DOL
 - 2. Motor more than or equal 4KW: Soft starter.
 - 3. All 3.3KV motors: DOL

2.3 Power Automation System Specification:

Supply power automation system to full controlling, full monitoring and full administrating of Substation The automation system has to be fixed in separate panel located in substation. This system consists of the following units:

- a. Local PLC Unit.
- b. Human Machine Interface (HMI).
- c. Administrator PC stations (Admin PC).
- d. Remote Input\Output (RIO).
- e. Local control box (LCB).

2.3.1 Local PLC Unit

- a. The PLC units and its accessories must be fixed in the separate panel.
- b. MV switchgears, MCC, DC rectifier and RIOs have to be connected with local PLC unit by separate hot redundant Profibus networks for each.
- c. PLC system must be full controlled, full monitored and full administrated on motor starters, incoming feeders, outgoing feeders, bus ties, power factors, DC rectifiers and others by Profibus network.
- d. Power supply is 24 VDC by 24VDC rectifier.
- e. Control voltage is 24VDC for discrete and analog I/O modules by 24VDC rectifier.
- f. Hot redundant PLC system (two PLCs) (One in duty and the other in hot standby)
- g. Each PLC has to contain hot redundant power supplies and hot redundant processors.
- h. Safety barrier for all discrete input signals.
- i. All software and program have to be original and licensed on CD or DVD for PLC with connection cables and adapters in two copies.
- j. PLC system design has to be approved in approval meeting.
- k. All out door Profibus cables must be armored and oil resistance.

- l. Separate redundant Profibus communication cards for (area1,2,3,4,5,6, and substation)
- m. All out door Profi-bus cables have to lay in high pressure PVC pipes with necessary manhole and accessories in the ground.

2.3.2 Human Machine Interface (HMI)

- a. Power supply is 24 VDC by 24VDC rectifier
- b. Specification: PC panel HMI, touch screen Back-lit color 17", external keypad and mouse connection, pc connection with Windows XP OS.
- c. 3D unlimited licensed animation SCADA system has to be installed with multi level password protection.
- d. SCADA system must be full controlled, full monitored and full administrated on substation (motor's starters, motor feeder, incoming feeders, bus-ties, power factor, outgoing feeders and others equipments).
- e. It must show the following:
 1. Multi pages 3D animation block diagram for substation (Advance).
 2. Multi pages animation single line diagram for substation (Advance).
 3. Connection diagram of substation and all electrical wiring diagrams (just for help).
 4. Multifunction protection device setting (change and monitor).
 5. Feeder of incomers, bus-ties, transformers and motor starters status.
 6. Fault and events record.
 7. Fault type.
 8. No. of starting and its time.
 9. Full history records.
 10. Feeders, motors, DC rectifiers and P.Fs status.
 11. Measuring and record of (voltage, current, frequency, P.F and power...etc) for each motor starter, bus-tie, incomer & outgoing feeders and etc....
 12. Alarm message (fault, normal current)
 14. Operation time.
 15. Reset the trip.
 16. Overall animation single line diagram for substation
- f. HMI has to be connected to PLCs by hot redundant Ethernet network.
- g. Fixed in the front door of PLC Panel and located in the same substation.
- h. Supply and install laser printer to print required information.
- i. HMI system design has to be approved in approval meeting.
- j. All software and program (ladder\SCADA) have to be original and licensed on CD or DVD for software with connection cables and adapters in two copies.

2.3.3 Administrator PC stations (Admin PC).

- a. Admin PC has to be connected with local PLC unit by wireless Ethernet network (point to point) (approx. faraway 1200m) with towers.

- b. Admin PC must be full controlled, full monitored and full administrator on the substation by administrator engineer.
- c. Power supply is 220 VAC by UPS (UPS have to be supplied).
- d. Minimum required specification: desktop Industrial PC, Two LCD 29", multi CPU 2GHz, multi HDD 300GB, mouse, keypad, DVD with Windows XP OS.
- e. 3D unlimited licensed animation SCADA system has to be installed.
- f. SCADA system must be full controlled and full monitored on substation.
- g. Admin PC located in monitoring room in our department.
- h. Supply and install laser printer to print required information.
- i. Admin PC system design has to be approved in approval meeting.
- j. All software and program (ladder\SCADA) have to be original and licensed on CD or DVD for software with connection cables and adapters in two copies.

2.3.4 Remote Input\Output (RIO).

- a. RIO 1,4 consists of discrete input module (DI)(on\off\ex-trip\ready to on(NC)\emergency\local\remote) and Discrete output module(DO) (on\off\trip\emergency stop\local\remote) .
- b. RIO 2,3,5,6 consists of discrete input module (DI) (on\off\ex-trip\ready to on (NC)\emergency) and analog output module (AO) for LCD ampere meter.
- c. Power supply is 24 VDC with 2-poles MCB, supplied from 24VDC rectifier.
- d. RIO has to be connected with local PLC unit by hot redundant Profibus networks (separate hot redundant Profibus network for each RIO).
- e. Each RIO must be fixed in stainless steel 316 box, weather proof IP 55, stainless steel stand included with weather proof panel cooling system.
- f. All DI, DO, AO and communication cards must be wiring to terminal connection fixed in the bottom of the box of RIO.
- g. The box must have three cable holes for each motor additional to communication and power supply cables. Glands must be included.
- h. Safety barrier for all discrete input signals.
- i. Each RIO has to be installed in distance 250m of the substation.
- j. Profibus cables must be include and have to be armored

2.3.5 Local Control Box (LCB).

- a. LCB consists of two gang pushbutton (start\stop) with 1NO+1NC for each gang, emergency push button and LCD ampere-meter. LCB has two cable holes. Glands must be included.
- b. located in the Site near the motor.
- c. Quantities of LCBs are the same quantity of MV motor feeder and LV motor starters additional to spares.

- d. Each motor in the site have one LCB. This LCB must be stainless steel 316 housing, weather proof IP 55.
- e. Rated of ampere-meter of LCB must be specified according to analoge input of RIO.
- f. LCBs have to connect to RIO by hard armored control cables. Control cable must be included.
- g. LCB system design has to be approved in approval meeting.

2.4 Power factor correction (P.F) for LV MCC

Supply complete power factor correction unit (capacitor banks) with the following specification:

- a. Microprocessor based power factor correction controller and connect to local PLC by hot redundant Profibus.
- b. Power factor correction range up to 0.99
- c. Auto-Manual control.
- d. Main drawable circuit breaker and fused switches for capacitance banks.
- e. P.F system design has to be approved in approval meeting.

2.5 DC battery charger rectifier

- a. Complete with set of Ni-Cad batteries
- b. Input supply: 3ph, 380V, 50Hz
- c. Output supply: 110VDC for item (3.5.1), 24 VDC for item (3.5.2)
- d. MCB 2-poles for output supply (Qty: 16).
- e. Microprocessor based DC battery charger controller with flush mounted with local PC's communication port to pre-set all parameters and has to be connected to local PLC by hot redundant Profibus.
- f. DC system design has to be approved in approval meeting.
- g. All software and program have to be original and licensed on CD or DVD for software with connection cables and adapters in two copies

2.6 Power transformers

The offer must contain the delivery of power transformers which Specifications below:

- a. Oil immersed power transformer.
- b. Primary voltage: $3300\text{ V} \pm 5\%$, 3ph @ full load.
- c. Secondary voltage: 380V, 3phase + Neutral.
- d. Connection: Δ / Y
- e. Vector group: DYN 11
- f. Cooling type: ONAN
- g. Ambient temperature: 55 C° , temp. rising 85 C° , insulation class A.
- h. Installation: outdoor installation with sun protection shield.
- i. Tap changer: 5 steps off-load tap changer.
- j. Protection and control equipments:
 - 1. Buchholz relay (alarm and trip)

- 2. Pressure relief device (trip)
- 3. Oil level indicator protection (alarm and trip)
- 4. Dehydrating breather
- 5. Oil thermometer protection (alarm and trip)
- k. Temperature measuring indications must be fixed on transformer for temperature measuring of winding and oil.
- l. Transformer system design has to be approved in approval meeting.

2.7 LV (400V) Auxiliary Switch Board (ASB) specification

- a. Metal clad MCC.
- b. Service voltage 400V, 50Hz, 3ph + Neutral.
- c. Breaking capacity 31.5 KA/1sec minimum.
- d. Copper bus bar rated 1200A.
- e. Control voltage 24VDC by 24VDC rectifier.
- f. Anti condensate heater 220VAC.
- g. Protection degree: IP3X
- h. Incoming feeder: Drawable type, 4 poles C.B, multifunction microprocessor protection device with LCD for setting and monitoring, control voltage 24 VDC, motorized charging 24 VDC.
- i. Multifunction Protection devices for feeders, bus tie have to be flush mounted with local PC's communication port to pre-set all parameters
- j. Cable entry from bottom of the ASB.
- k. All outgoing connection has to be a terminal connection fixed in the bottom of the ASB.
- l. Distribution MCCB 4 poles, 3phase+N, 380V, 50Hz.
- m. Distribution MCCB 2 poles, 1phase+N, 220V, 50Hz
- n. ASB design has to be approved in approval meeting.

2.8 Air-condition system specification

- a. Ducted type air-cooled single packaged.
- b. Cooling capacity 10 TR.
- c. Ambient temperature 50°C.
- d. Substation temperature required 18 °C.
- e. Power Supply 380V, 3ph, 50Hz.
- f. Friendly Ozone refrigerant (recommended R134a).
- g. Multi compressors with independent refrigerant circuit per compressor.
- h. Heating System included with thermostat control.
- i. Safety control included high\low pressure, digital thermostat control and sequence & phase failure.
- j. High EER(Energy Efficiency Ratio).
- k. Warranty One year.
- l. 22 gauge galvanized steel sheet\insulation for indoor ducts and galvanized steel sheet\insulation\ galvanized steel sheet for outdoor ducts.
- m. flexible connections between ducts and cooler.

- n. All parameters have to send to SCADA system.
- o. H₂S detection sensors work with ventilation system and interlocked with air-conditions system.
- p. Industrials ventilation systems have to be installing for substation and basement.
- r. Split unit for engineer and operator rooms.

2.9 Civil work of substation specification

- a. Complete design of all civil work (substation, transformers locations and cable tranches).
- b. Concrete columns, beams and its foundation for structure of substations and transformers location.
- c. The substation, basement and transformers locations have to be over ground level.
- d. The cable tranches have to be underground level.
- e. The basement has to be at least 2.5m with concrete floor, walls, heavy duty large door (at least 2.5x2.25 m), heavy duty emergency door (at least 1.2x2.25 m) and complete cable trays and ladder structures.
- f. The substation hall have to be at least 4m with concrete floor, granite tiles, walls, heavy duty large door (at least 2.5x2.75 m), heavy duty emergency door (at least 1.2x2.75 m), heavy duty windows along one side and industrial secondary roof with all necessary others materials.
- g. The ceiling of substation has to be concrete, anti-water processing materials and concrete tiles with all necessary others materials.
- h. Concrete ladder with concrete free space in front of each doors of substation with removable hand rail around them.
- i. The substation has to have operators room, monitor room, bathroom and kitchen.
- j. The locations of transformers have to be concrete foundation, concrete walls, heavy duty doors, concrete tranches for cables and sun shield protection.
- k. Cable tranches (1.2x1.2m) have to be concrete floor and concrete wall , removable concrete cover, colored concrete pouring, anti-water processing materials with complete trays and ladder structures, first tranches from the substation to the basement of old cooling towers and the second tranches from the substation to the basement of QMT7 substation. The total length is 220m.
- l. all finishing of civil work, electrical work , lighting , grounding , fire alarm system, fire extinguisher have to be designed and installed.
- m. Soil inspection and replacing if required.
- n. Batteries room has to be designed and installed with ventilation.
- o. Wake way has to be designed and installed around the substation.

3. Substation Details:

3. 1 MV 3.3KV switchgear

MV switchgear consists of (26) cubicles must be labeled and designed as indicated below (left to right):

A.	Cubical 1:	R.O feeder (1), 1000KW, C.B rated 1000A.
B.	Cubical 2:	Motor feeder (M4101JC), 500KW, C.B rated 1000A.
C.	Cubical 3:	Motor feeder (M4101J), 530KW, C.B rated 1000A.
D.	Cubical 4:	Motor feeder (Spare), 530KW, C.B rated 1000A.
E.	Cubical 5:	Transformer feeder (T1), 1600KVA, C.B rated 1000A.
F.	Cubical 6:	Incoming feeder No.1 (From QMT1), 1250A.
G.	Cubical 7:	Bus tie with auto/man. transfer loading control.
H.	Cubical 8:	Incoming feeder No.2 (From QMT1), 1250A.
I.	Cubical 9:	Transformer feeder (T2), 1600KVA, C.B rated 1000A.
J.	Cubical 10:	Motor feeder (M4101JA), 530KW, C.B rated 1000A.
K.	Cubical 11:	Motor feeder (Spare), 530KW, C.B rated 1000A.
L.	Cubical 12:	R.O feeder (2), 1000KW, C.B rated 1000A.
M.	Cubical 13:	Gen Incoming feeder Gen1, 1600A
N.	Cubical 14:	Bus tie with manual transfer loading control only.
O.	Cubical 15:	Motor feeder (spare), 540KW, C.B rated 1000A.
P.	Cubical 16:	Motor feeder (M2215J), 540KW, C.B rated 1000A.
Q.	Cubical 17:	Motor feeder (M2204), 170KW, C.B rated 1000A.
R.	Cubical 18:	Transformer feeder (T3), 1600KVA, C.B rated 1000A.
S.	Cubical 19:	Incoming feeder No.3 (From S.S3313), 1250A.
T.	Cubical 20:	Bus tie with auto/man. transfer loading control.
U.	Cubical 21:	Incoming feeder No.4 (From S.S3313), 1250A.
V.	Cubical 22:	Transformer feeder (T4), 1600KVA, C.B rated 1000A.
W.	Cubical 23:	Motor feeder (M2225), 172KW, C.B rated 1000A.
X.	Cubical 24:	Motor feeder (M2205), 160KW, C.B rated 1000A.
Y.	Cubical 25:	Motor feeder (spare), 172KW, C.B rated 1000A.
Z.	Cubical 26:	Motor feeder (spare), 540KW, C.B rated 1000A.

3. 2 Motor Control Center (MCC)

1. Motor control center (MCC 1) consists of (14) cubicles must be labeled and designed as indicated below:

A.	Cubical 1:	Power factor correction 1		
B.	Cubical 2:	2214J, 2.2 KW 2223J, 18 KW 2203LC, 45 KW	2203J, 35 KW 2218J, 10.5 KW 2212J, 0.37 KW	2203LE, 45 KW Spare, 2.2 KW Spare, 0.37 KW
C.	Cubical 3:	2203LA, 45 KW 2211J, 2.2 KW 2210J, 0.37 KW	2217J, 28.5 KW 2213J, 0.37 KW 2209J, 0.37 KW	2201JA, 28.5 KW 2208J, 7.5 KW Spare, 28.5 KW
D.	Cubical 4:	Spare, 45 KW	Spare, 45 KW	Spare, 35 KW

		Spare, 10.5 KW Spare, 0.55 KW	Spare, 2.2 KW Spare, 7.5 KW	
E.	Cubical 5:	Outgoing feeder 800A,Qty:2 MCCB 400A, Qty:4		
F.	Cubical 6:	Incoming feeder No.1 (From cubical 18,Tr.3), 2500A		
G.	Cubical 7:	Bus Tie 2500A		MCCB 160, Qty: 4
H.	Cubical 8:	Incoming feeder No.2 (From cubical 22,Tr.4), 2500A		
I.	Cubical 9:	Outgoing feeder 800A,Qty:2 MCCB 400A, Qty:4		
J.	Cubical 10:	2214JA, 2.2KW 2212JA,0.37KW 2203LB, 45 KW	Spare, 2.2 KW 2209JA,0.37KW 2211F, 2.2 KW	2213JA,0.37KW 2203LD, 45 KW Spare, 45 KW
K.	Cubical 11:	Spare, 45 KW Spare, 10.5 KW Spare, 0.37 KW	Spare, 45 KW Spare, 2.2 KW Spare, 7.5 KW	Spare, 0.55KW Spare, 35 KW 2208FB,0.55KW
L.	Cubical 12:	2203LF, 45 KW 2203JA, 35KW 2210JA,0.55KW	2201JC,28.5KW Spare, 7.5 KW 2217JA,28.5KW	Spare, 0.55 KW 2218JA,0.55KW 2211JA, 2.2 KW
M.	Cubical 13:	2208FA, 7.5KW 2203JB, 35 KW Spare, 35 KW	2207FB,0.55KW 2210F, 0.55KW 2201JB,28.5KW	2207FA,0.55KW Spare, 28.5 KW 2208JA,0.55KW
N.	Cubical 14:	Power factor correction 2		

2. Motor control center (MCC 2) consists of (13) cubicles must be labeled and designed as indicated below:

A.	Cubical 1:	Power factor correction 1		
B.	Cubical 2:	4105JB, 132KW	Spare, 90KW	
C.	Cubical 3:	Spare, 132KW	M**1, 90KW	4107J, 55KW
D.	Cubical 4:	4105J, 132KW	Spare, 55KW	
E.	Cubical 5:	Outgoing feeder 800A,Qty:2		MCCB 400A, Qty:4
F.	Cubical 6:	Incoming feeder No.1 (From cubical 5,Tr.1), 2500A		
G.	Cubical 7:	Bus Tie 2500A		MCCB 160, Qty: 4
H.	Cubical 8:	Incoming feeder No.2 (From cubical 9,Tr.2), 2500A		
I.	Cubical 9:	Outgoing feeder 800A,Qty:2		MCCB 400A, Qty:4
J.	Cubical 10:	4105JA, 132KW	Spare, 55KW	
K.	Cubical 11:	Spare, 132KW	M**2, 90KW	4107JA, 55KW
L.	Cubical 12:	4105JC, 132KW	Spare, 132KW	
M.	Cubical 13:	Power factor correction 2		

3. 3 Power Transformer 1600 KVA

Qty: Four

3.4 Auxiliary Switch Board (ASB)

1. ASB panel consists of (1) cubicles must be labeled and designed as indicated below:

A.	Cubical 1:	Incoming feeder 800A Outgoing feeders 4 poles : 100 A, QTY 6 Outgoing feeders 4 poles : 63 A, QTY 10 Outgoing feeders 4 poles : 50 A, QTY 6
B.	Cubical 2:	Outgoing feeders 4 poles : 100 A, QTY 4 Outgoing feeders 4 poles : 63 A, QTY 10 Outgoing feeders 4 poles : 50 A, QTY 4 Outgoing feeders 2 poles : 50 A, QTY 10 Outgoing feeders 2 poles : 40 A, QTY 10 Outgoing feeders 2 poles : 32 A, QTY 10

2. ASB panel consists of (2) cubicles must be labeled and designed as indicated below:

A.	Cubical 1:	Incoming feeder 800A Outgoing feeders 4 poles : 100 A, QTY 6 Outgoing feeders 4 poles : 63 A, QTY 10 Outgoing feeders 4 poles : 50 A, QTY 6
B.	Cubical 2:	Outgoing feeders 4 poles : 100 A, QTY 4 Outgoing feeders 4 poles : 63 A, QTY 10 Outgoing feeders 4 poles : 50 A, QTY 4 Outgoing feeders 2 poles : 50 A, QTY 10 Outgoing feeders 2 poles : 40 A, QTY 10 Outgoing feeders 2 poles : 32 A, QTY 10

3.5 DC rectifier

3.5.1 Complete DC rectifier 110VDC. Qty: 1.

3.5.2 Complete DC rectifier 24VDC. Qty: 1.

3.6 Motors distribution on RIOs

a.	RIO1	Control Room 1	3.3KV motors listed in Cubicals 15-26 and all motors in MCC2 with all spares.
b.	RIO2	Area1	All motors rated 45KW with all spares rated 45KW.
c.	RIO3	Area2	All motors listed in RIO1 except motor in RIO2.
d.	RIO4	Control Room 2	3.3KV motors listed Cubicals 1-12 and all motors in MCC1 with all spares.
e.	RIO5	Area3	All motors rated 132KW with all spares rated 132KW.
f.	RIO6	Area4	All motors listed in RIO4 except motor in RIO5.

3.7 Air-condition System

- Four package air cooling for substation.
- Four ventilation for substation.
- Two ventilation for basement and one for battery room.
- Two split unit for each room (operator and engineer rooms).

4. Accessories:

4.1 Omicron's Multifunctional Primary Test System Qty: Two
Omicron's multifunctional primary test system CPC100 complete enhanced package VE000621 with licensed advance software for PC control, monitor and report additional to complete current booster up to 2000A(VEHZ0630) with all accessories include bags.

4.2 Omicron's CT Analyzer (VE000652) Qty: Two

4.3 Omicron's Testing Solution Qty: Two
Omicron's testing solution for protection and measuring systems CMC356 with CMControl-6 (VE002820) additional to universal software packages for new hardware with soft bag for CMC356.

4.4 Laptop computer for configuration Qty: Three
Sony or HP Computer with min. requirements: CPU CORE 2DUE 1600 MHz , 1GB RAM , 320GB HDD, 17" display , DVD R/W, All original software and All other Accessories or better.

4.5 Motor Vibration Tester Qty: Three
Complete Solution Fluke 810 Motor Vibration Tester with all accessories, viewer application software, PC connection cable and self-paced training DVD.

4.6 Industrial Thermal Imagers Qty: Three
Complete package Fluke Industrial Thermal Imagers Ti32 with all accessories, hard carrying case, smart-view software, PC connection cable and training DVD

5. Spare parts: Spare parts must be included with the offer:

Item	Specification	Qty.
1.	3.3KV incoming C.B feeder	4
2.	3.3KV transformer C.B feeder	2
3.	3.3KV motor C.B feeder	5
4.	3.3KV Incomer protection device	4
5.	3.3KV Transformer protection device	2
6.	3.3KV Motor protection device	5
7.	MCC incoming C.B with protection device	3
8.	MCC 800A outgoing feeder with protection device	4
9.	MCC 400A outgoing feeder	4
10.	Power factor correction C.B feeder	2
11.	Local Control Box (LCB)	20

Item	Specification	Qty.
12.	MCC motor protection device	20
13.	MCC feeder protection device	2
14.	ASB incomer C.B	4
15.	Power supply of PLC	6
16.	Processor of PLC	6
17.	Discrete input module	6
18.	Discrete Output module	6
19.	Analog Input module	6
20.	Analog output module	6
21.	Profibus communication card	6
22.	Platform for PLC	4
23.	HMI	1
24.	Profibus Cable	3000m
25.	Motor starter's C.B, contactor, MCB,...etc and other components of substation (at least one).	20%

6. Approval of systems

In case of commitment and before starting the manufacturing of equipments, the following items must be approved:

- a. substation design, electrical diagram and drawing.
- b. PLC, HMI and SCADA system and software.
- c. Automation design, diagram, connection and software.
- d. Ladder program.
- e. Site's motor control and current monitoring connection and diagram.
- f. Training course schedule.
- g. Spare parts lists.

7. Training Course

The offer must contain a training course for our staff for maintenance of the substation and other systems for four persons in made countries for two weeks at least, with all the expenses except the pocket money and hotels.

8. Manufacturer:

Manufacturer Brand of Equipments: SIEMENS, ABB, SCHIENDER and GE

Manufacturer Country: USA, Canada, West Europe and Japan.

Manufacture of Air Conductions and Ventilations: West Europe

9. Useful Information:

- The distance between the motors in the sites and its RIOs is between 40m.
- The distance between the RIOs in the sites and PLC is between 250m.

Note: In case of commitment, the contractor has to provide us the following:

1. The offer must include all required installation, maintenance and operation catalogs.
2. All electrical diagrams, documents have to be included in English in three hard copies (A3) and soft copies (PDF and AWG format) after approval.

- t. Capability to connect LCB (consists of two gang pushbutton (start/stop) with ampere-meter In: 1A) directs to motor starter by hard control cables additional to automation control.
- u. Outgoing motor feeders cables entry from the bottom of MCC.
- v. All software and program have to be original and licensed on CD or DVD for each type of multifunction Protection devices with connection cables and adapters in two copies.
- w. MCC system design has to be approved in approval meeting.
- x. Motor operation method:
 - 1. Motor less than 4KW: DOL
 - 2. Motor more than or equal 4KW: Soft starter.
 - 3. All 3.3KV motors: DOL

2.3 Power Automation System Specification:

Supply power automation system to full controlling, full monitoring and full administrating of Substation The automation system has to be fixed in separate panel located in substation. This system consists of the following units:

- a. Local PLC Unit.
- b. Human Machine Interface (HMI).
- c. Administrator PC stations (Admin PC).
- d. Remote Input\Output (RIO).
- e. Local control box (LCB).

2.3.1 Local PLC Unit

- a. The PLC units and its accessories must be fixed in the separate panel.
- b. MV switchgears, MCC, DC rectifier and RIOs have to be connected with local PLC unit by separate hot redundant Profibus networks for each.
- c. PLC system must be full controlled, full monitored and full administrated on motor starters, incoming feeders, outgoing feeders, bus ties, power factors, DC rectifiers and others by Profibus network.
- d. Power supply is 24 VDC by 24VDC rectifier.
- e. Control voltage is 24VDC for discrete and analog I/O modules by 24VDC rectifier.
- f. Hot redundant PLC system (two PLCs) (One in duty and the other in hot standby)
- g. Each PLC has to contain hot redundant power supplies and hot redundant processors.
- h. Safety barrier for all discrete input signals.
- i. All software and program have to be original and licensed on CD or DVD for PLC with connection cables and adapters in two copies.
- j. PLC system design has to be approved in approval meeting.
- k. All out door Profibus cables must be armored and oil resistance.

- l. Separate redundant Profibus communication cards for (areal,2,3,4,5,6, and substation)
- m. All out door Profi-bus cables have to lay in high pressure PVC pipes with necessary manhole and accessories in the ground.

2.3.2 Human Machine Interface (HMI)

- a. Power supply is 24 VDC by 24VDC rectifier
- b. Specification: PC panel HMI, touch screen Back-lit color 17", external keypad and mouse connection, pc connection with Windows XP OS.
- c. 3D unlimited licensed animation SCADA system has to be installed with multi level password protection.
- d. SCADA system must be full controlled, full monitored and full administrated on substation (motor's starters, motor feeder, incoming feeders, bus-ties, power factor, outgoing feeders and others equipments).
- e. It must show the following:

1. Multi pages 3D animation block diagram for substation (Advance).
 2. Multi pages animation single line diagram for substation (Advance).
 3. Connection diagram of substation and all electrical wiring diagrams (just for help).
 4. Multifunction protection device setting (change and monitor).
 5. Feeder of incomers, bus-ties, transformers and motor starters status.
 6. Fault and events record.
 7. Fault type.
 8. No. of starting and its time.
 9. Full history records.
 10. Feeders, motors, DC rectifiers and P.Fs status.
 11. Measuring and record of (voltage, current, frequency, P.F and power...etc) for each motor starter, bus-tie, incomer & outgoing feeders and etc....
 12. Alarm message (fault, normal current)
 14. Operation time.
 15. Reset the trip.
 16. Overall animation single line diagram for substation
- f. HMI has to be connected to PLCs by hot redundant Ethernet network.
- g. Fixed in the front door of PLC Panel and located in the same substation.
- h. Supply and install laser printer to print required information.
- i. HMI system design has to be approved in approval meeting.
- j. All software and program (ladder\SCADA) have to be original and licensed on CD or DVD for software with connection cables and adapters in two copies.

2.3.3 Administrator PC stations (Admin PC).

- a. Admin PC has to be connected with local PLC unit by wireless Ethernet network (point to point) (approx. faraway 1200m) with towers.