

1C13 One (1) lot of flexible conductors for bus and jumper, insulators, fittings including all necessary clamps and connectors required for completing 145kV busbar and switchgear connection as specified in the technical specifications and bid drawings.

1C14 One (1) lot of steel structures for gantry and equipment supports required for completing 145kV busbar and switchgear as specified in the technical specifications and bid drawings.

1D 36kV AIS Switches and Connection

1D1 36kV Switches and Connection for Auxiliary Transformers

1D1.1 Deleted

1D1.2 Two (2) sets of 36kV, 800A, 31.5 kA/1 sec, 50Hz, 170kVp BIL, single vertical break, post type, motor operated disconnectors with dropout fuse.

36kV Switches & connection for Incomer/ LV side of 132/33 kV Transformer

1D2

1D2.1 Two (2) sets of 36kV, 2500A, 31.5kA/1 sec, 50Hz, 170kVp BIL, SF6/vacuum circuit breakers with spring-stored energy operating mechanism

1D2.2 Two (2) sets of 36kV, 2500A, 31.5kA/1 sec, 50Hz, 170kVp BIL, single vertical break, post type, motor operated disconnectors.

1D2.3 Two (2) sets of 36kV, 2500A, 31.5kA/1 sec, 50Hz, 170kVp BIL, single vertical break, post type, motor operated disconnectors with motor-operated earthing switch.

1D2.4 Twelve (12) nos. of single-phase, 2-core, $33/\sqrt{3}$ / $110/\sqrt{3}$ / $110/\sqrt{3}$ kV/V/V, 3P/0.2, 20-50/10-20VA 36kV, 31.5kA/1 sec, 50Hz, 170kVp BIL, inductive type voltage transformers.
[Actual Burden shall be finalized at execution time based on sizing calculation. Accuracy & VA shall have to be defined for all ratio]

1D2.5 Six (6) nos. of 30kV rated voltage, 10kA nominal discharge current, 50Hz, Heavy duty station class, single phase surge arresters.

145kV, 40kA/1sec single phase, 4-core, current transformer with cores as follows:

- 3000-1500/1A, class 0.2S, 15VA for measuring, BCU
- 3000-1500/1A, class PX, for Busbar Differential Protection
- 3000-1500/1A, class PX, for Busbar Differential Protection
- 3000-1500/1A, class 5P20, 30-60VA for Protection

[Actual Burden shall be finalized at execution time based on sizing calculation. Accuracy & VA shall have to be defined for all ratio]

2C11 Eighteen (18) nos. of single-phase, 3-core, $132/\sqrt{3}$ / $110/\sqrt{3}$ / $110/\sqrt{3}$ / $110/\sqrt{3}$ kV/V/V/V, 3P/3P/0.2, 20-50/20-50/10-20 VA 145kV, 40kA/1sec, 50Hz, 650kVp BIL, inductive type voltage transformers.

[Actual Burden shall be finalized at execution time based on sizing calculation. Accuracy & VA shall have to be defined for all ratio]

2C12 Twelve (12) nos. of 120kV rated voltage, 102kV(rms) continuous operating voltage at 50⁰c, 10kA nominal discharge current, 50Hz, Heavy duty station class, gapless metal oxide type, single phase surge arresters.

2C13 One (1) lot of flexible conductors for bus and jumper, insulators, fittings including all necessary clamps and connectors required for completing 145kV busbar and switchgear connection as specified in the technical specifications and bid drawings.

2C14 One (1) lot of steel structures for gantry and equipment supports required for completing 145kV busbar and switchgear as specified in the technical specifications and bid drawings.

2D 36kV AIS Switches and Connection

2D1 36kV Switches and Connection for Auxiliary Transformers

2D1.1 Deleted

2D1.2 Two (2) sets of 36kV, 800A, 31.5 kA/1 sec, 50Hz, 170kVp BIL, single vertical break, post type, motor operated disconnectors with dropout switch.

2D2 36kV Switches & connection for Incomer/ LV side of 132/33 kV Transformer

The equipment to be supplied, installed and commissioned is shown in bid drawings are comprising of :-

- 1F1 Control, Protection & Monitoring including BCU for two (2) sets of overhead line circuits bays.
- 1F2 Control, Protection & Monitoring including BCU for two (2) sets of 132/33 kV power transformer circuits.
- 1F3 Complete Control, Protection & Monitoring including BCU for bus coupler circuit.
- 1F4 Complete Busbar protection for 132kV system
- 1F5 Complete Independent standalone Digital Fault and Disturbance recorder (DFDR) with PMU functionality to monitor 132kV bays and 33kV incomer bays. Engineering workstation shall be supplied. DFDR should be integrated with central client station. The Engineering workstation PCs shall have minimum configuration of core i7(latest generation), 16GB RAM, 1TB SSD with RAID1, and 27' display.
- 1F6 Complete Tariff metering panel to accommodate programmable & recordable digital 3-phase, 4-wire import and export MWh and MVARh meters (accuracy class 0.2) for each 132 kV line and transformer feeder. For each feeder one meter shall be supplied including one set software and communication cord. Substation Automation System shall include the metering for all the bays. Tariff Metering is to be supplied from Europe, Canada, USA or Japan make. Printed catalogue, operation and service manual are to be provided.
- 1F7 Two (2) sets of SAS System including Operator Workstations and related software with all licenses (shall be perpetual and sufficient for all future bays), Necessary Ethernet switches and GPS for the SAS system, 55 inch LED Monitor, Color Laser Printers, Common alarm unit with hooter/buzzer, BCU for all common signals of the substation.

Additional 05 (five) No.'s of BCU for controlling 05 (five) No's of 33kV Load Shed Feeders shall be supplied. All five BCUs with required I/O shall be placed in one panel tested with SAS, NLDC . One (1) set of Engineering Workstation and all engineering software with licenses (shall not be time bound) shall be supplied. Two nos. 3KVA Inverter (as shown in LVAC and DCDB drawing) for the SAS system shall be included in the scope. The Engineering/Workstation PCs shall have minimum configuration of core i7(latest generation), clock speed of 3.4 GHz,16GB RAM, 1TB SSD with RAID1, and 27' displays. -

- 1F8 Two (2) sets of Complete RTCC systems including transformer tap changer control, fan control & AVR as per 4.15(N) of section 4 in volume 2 of 3.

36kV Circuit

- 1F9 Deleted

- 1F10 Two (2) sets of Control, Protection & Monitoring including BCU for two 33kV circuits connected to the LV side of 132/33kV Power transformers. 33 kV DS with dropout fuse for Auxiliary Transformer shall be added in the control panel including mimic.

- 1F11 Complete Tariff metering panel to accommodate programmable & recordable digital 3-phase, 4-wire import and export MWh and MVarh meters (accuracy class 0.2) for each 33 kV line and transformer feeder. For each feeder one meter shall be supplied including one set software and communication cord. Space provision for another meter shall be kept in metering panel. Substation Automation System shall include the metering for all the bays. Tariff Metering is to be supplied from Europe, Canada, USA or Japan make. Printed catalogue, operation and service manual are to be provided.

1G Multicore Cables

- 1G1 One (1) lot complete set of multicore low voltage XLPE insulated power and control cables (IEC 60502) shall be supplied, installed, landed, terminated and have individual cores identified to be used for connection of all equipment supplied under the Contract. The overall substation cable routing and core schedules shall also be provided. Necessary Sizing calculation shall have to be submitted for approval during the execution stage. The Bidder may use a fully computerized system for rating, and routing of cables,

1H Earthing and Lightning Protection

- 1H1 One (1) lot of design, supply and installation of earthing system for outdoor switchyard equipment & Control Room with necessary connectors and clamps, with design to suit the work under this contract arrangement. Calculation and GPR shall have to be shown using software like CYMGRD.

class 0.2) for each 132 kV line and transformer feeder. For each feeder one meter shall be supplied including one set software and communication cord. Substation Automation System shall include the metering for all the bays. Tariff Metering is to be supplied from Europe, Canada, USA or Japan make. Printed catalogue, operation and service manual are to be provided.

2F7 Two (2) sets of SAS System including Operator Workstations and related software with all licenses (shall be perpetual and sufficient for all future bays), Necessary Ethernet switches and GPS for the SAS system, 55 inch LED Monitor, Color Laser Printers, Common alarm unit with hooter/buzzer, BCU for all common signals of the substation.

Additional 05 (five) No.'s of BCU for controlling 05 (five) No's of 33kV Load Shed Feeders shall be supplied. All five BCUs with required I/O shall be placed in one panel tested with SAS, NLDC . One (1) set of Engineering Workstation and all engineering software with licenses (shall not be time bound) shall be supplied. Two nos. 3KVA Inverter (as shown in LVAC and DCDB drawing) for the SAS system shall be included in the scope. The Engineering/Workstation PCs shall have minimum configuration of core i7(latest generation), clock speed of 3.4 GHz,16GB RAM, 1TB SSD with RAID1, and 27' displays.

2F8 Two (2) sets of Complete RTCC systems including transformer tap changer control, fan control & AVR as per 4.15(N) of section 4 in volume 2 of 3.

36kV Circuit

2F9 Deleted

2F10 Two (2) sets of Control, Protection & Monitoring including BCU for two 33kV circuits connected LV side of 132/33kV Power transformers. Additionally auxiliary transformer and associated bays shall be incorporated in Control and protection panel.

2F11 Complete Tariff metering panel to accommodate programmable & recordable digital 3-phase, 4-wire import and export MWh and MVarh meters (accuracy class 0.2) for each 33 kV line and transformer feeder. For each feeder one meter shall be supplied including one set software and communication cord. Space provision for another meter shall be kept in metering panel. Substation Automation System shall include the metering for all the bays. Tariff Metering is to be supplied from Europe, Canada, USA or Japan make. Printed catalogue, operation and service manual are to be provided.

2G Multicore Cables

3J1 One (1) lot of extension of LVAC switchboard for substation services to be supplied, installed and commissioned, to provide the 415/240V supplies to all equipment being supplied under this turnkey Bid.

All AC status excluding control & protection (AC voltage status for each bus including coupling breaker on/off status, fail with alarm, status of AC MCB/MCCB at SPR with fail alarm etc.) shall be incorporated in the substation automation system.

3J2 One (1) lot of Power Factor Correction Plant. PFI plant shall be designed as per attached drawing and capacity of PFI plant shall be not less than 2X20KVAR.

(KVAR=2X16% of each Aux Transformer Capacity or KVAR=2X60% of connected load in each 415V bus including future load)

3K Civil Works, Building and Foundation

3K1 One (1) lot of complete design, supply and construction of all civil items required for the outdoor works for two new bays suitable for switchyard gantry & equipment foundations, cable trenches, surfacing, drainage, gravel laying etc.

3K2 Testing of pile Foundation, Compression & uplift on random basis.

3L Lighting, Small Power, Air Conditioning and Ventilation

3L1 Deleted

3L2 One (1) lot of complete set of design, supply, installation and commissioning of equipment to provide lighting (flood light; sodium/mercury) for security,

All DC status excluding (DC voltage status for each bus including coupling breaker on/off status, fail with alarm, status of DC MCB/MCCB at SPR with fail alarm etc.) control & protection shall be incorporated in the substation automation system.

- 4I2 One (1) lot of extension of 48V DC distribution panels & others. The DC distribution board shall be with overall spare switches for future use.
All DC status excluding (DC voltage status for each bus including coupling breaker on/off status, fail with alarm, status of DC MCB/MCCB at SPR with fail alarm etc.) control & protection shall be incorporated in the substation automation system.

4J LVAC Distribution

- 4J1 One (1) lot of extension of LVAC switchboard for substation services to be supplied, installed and commissioned, to provide the 415/240V supplies to all equipment being supplied under this turnkey Bid.

All AC status excluding control & protection (AC voltage status for each bus including coupling breaker on/off status, fail with alarm, status of AC MCB/MCCB at SPR with fail alarm etc.) shall be incorporated in the substation automation system.

4J2 One (1) lot of Power Factor Correction Plant. PFI plant shall be designed as per attached drawing and capacity of PFI plant shall be not less than 2X20KVAR.

(KVAR=2X16% of each Aux Transformer Capacity or KVAR=2X60% of connected load in each 415V bus including future load)

4K Civil Works, Building and Foundation

- 4K1 One (1) lot of complete design, supply and construction of all civil items required for the outdoor works for two new bays suitable for switchyard gantry & equipment foundations, cable trenches, surfacing, drainage, gravel laying etc.
- 4K2 Testing of pile Foundation, Compression & uplift on random basis.

4L Lighting, Small Power, Air Conditioning and Ventilation

4L1 Deleted

4L2 Deleted

4M Fibre Optic Multiplexer Equipment for Communication and Protection

4M1 The equipment to be supplied, installed and commissioned shall be as shown on bid drawing.

Extension of existing/ upgradation of Indoor Fibre Optic Multiplexer Equipment (if alternate proposal other than existing multiplexer, bidder shall include one set of 48V battery and charger)

4M2 One (1) lot of Underground optical fibre cables (48 cores) from terminal box gantry structure at each 32kV double circuit transmission line termination point to MDF/ODF (Main/Optical distribution Frame) to be installed in the control room. The Contract includes supply and installation of MDF/ODF and pigtail cables with adequate length.

4N SCADA system for Telecontrol and Telemetry

4N1 One (1) lot of complete design, supply, delivery, installation, testing & commissioning of hardware and software to provide the telecontrol & telemetry facilities required at the existing National Load Despatch Center (NLDC) at Rampura and backup National Load Despatch Center (BNLDC) at Siddirganj for integration of two new 132KV line bay in Bhandaria grid substation.

All required electrical signals (as per signal list provided by SCADA Division) shall be integrated to RTU and transmitted to the NLDC through the RTU / Gateway of the substation. All HV breakers, motorized disconnectors etc. shall