# SCHEDULE A-B- 132KV GIS

# Summary & Main System Parameters

| Site and substation condition | 400/132/33 kV AAWDCP (MAIN SS) substation |
|---|---|
| | New SS |
| Substation type | GIS |
| Site Altitude (m a.s.l.) | ≤1000 |
| Minimum ambient temperature (°C) | -10 |
| Design temperature | |
| Outdoor | 50 (°C) |
| Indoor | 40 (°C) |
| Highest average daily temperature (°C) | 38 |
| Relative humidity (%) | 4÷100 |
| The climate –day | Dry & Hot |
| The climate – night | Cold |
| Pollution level | Heavy airborne contamination |
| Insulator creepage distance (mm/kV) | 38 |
| Wind velocity (m/s) | 50 |
| Ice loading, radial thickness (mm) | 10 |
| Isoceraunic level (days/annum) | 15 |
| Average annual rainfall (cm) | cca. 23 |
| Seismic Conditions | Zone 2B |
| Solar radiation (W/m2) | 1150 |
| Short circuit rating | |
| 400 kV switchgear | 40 / 1 sec. |
| 132 kV switchgear | 40 / 3 sec. |
| 33 kV switchgear | 31.5 / 3 sec. |
| 11 KV side | 40 kA / 1 sec. |
| BUSBAR current rating (A) | |
| 400 kV switchgear | 3150 |
| 132 kV switchgear | 3150 |
| 33 kV switchgear | 2500 |
| 11 KV side | 3150 |

- All outdoor equipment must be suitable for live washing.
- The insulator outdoor creepage distance should be based on 420 kV for 400 kV, 145kV for 132kV, 36kV for 33kV and 12kV for 11 kV.

**SUMMARY OF DEFINITE WORK**
**A/B – AAWDCP 400/132/33KV SUBSTATION--**

| SECTION FOR PURPOSE OF PAYMENT AND TAKING OVER | SECTION A/B | |
|---|---|---|
| APPROXIMATE LOCATION OF SUBSTATION | AQABA (GOVERNORATE) – AAWDCP | |
| RATED VOLTAGE / HIGHEST VOLTAGE | 132 KV / 145KV | 33 KV / 36KV |
| NORMAL CURRENT RATING OF BUSBARS | 3150A | 2500A |
| TYPE OF SWITCHING ARRANGEMENT | GIS, DOUBLE BUSBAR | AIS, SINGLE BUSBAR 33KV SWITCHGEAR |
| NUMBER OF OHL / FEEDER CIRCUITS | 4 | AS SLD |
| NUMBER OF TRANSFORMER CIRCUITS | 7 | AS SLD |
| NUMBER OF INTERBUS TRANSFORMER CIRCUITS | 3 | AS SLD |
| NUMBER OF BUS SECTION CIRCUITS | 1 | AS SLD |
| NUMBER OF BUS COUPLER CIRCUITS | 1 | - |
| NUMBER OF CAPACITOR CIRCUITS | - | AS SLD (INDOOR) |
| RATING OF TRANSFORMER BAY | 2500 A | 2500 A |
| RATING OF OHTL / FEEDER BAY | 2500 A | 1250 A |
| RATING OF CAPCITOR BAY | - | 1250 A |
| RATING OF BS / BC BAY | 3150 A | 2500 A |
| SHORT CIRCUIT CURRENT | 40KA/3SEC. | 31.5KA/3SEC. |
| REQUIRED COMPLETION DATE | AS SPECIFIED IN SCHEDULE B OF THE TENDER | |

- All outdoor equipment must be suitable for live washing.
- The insulator outdoor creepage distance should be based on 420 kV for 400 kV, 145kV for 132kV, 36kV for 33kV and 12kV for 11 kV

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| **B1** | **132 kV Gas Insulated Switchgear (GIS) Equipment** | **132 kV GIS for indoor installation, with double busbar system, for 145 kV (275/650 kV) rated voltage, for 3150 A rated current and for 40 kA rated short-time (3 s) withstand current, all-in accordance with IEC 62271-203, comprising of the following bays:** | |
| B1.1 | 132 kV GIS OHL Feeder Bay | 132 kV GIS Feeder Bay with the following equipment: | 4 sets |
| | | Three-pole GIS 132 kV Circuit Breaker (CB), for 2500 A rated current and for 40 kA/3 s rated breaking current, with suitable operating mechanism for all three poles (three-pole operation), one (1) closing & two (2) tripping coils and all auxiliary equipment, all in accordance with IEC 62271-100. | 1 set |
| | | Three-pole GIS 132 kV Busbar Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, all in accordance with IEC 62271-102. | 2 sets |
| | | Three-pole, maintenance earthing switch, power operated, located between the busbar selector disconnectors and the circuit breaker all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole GIS 132 kV Line Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, complete with power operated maintenance earth switch on circuit breaker side of disconnector, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole, high-speed, power operated, fault making earthing switch, on line side of disconnector all in accordance with IEC 62271-102. | 1 set |
| | | Single-phase, ring type GIS Current Transformer (CT), of 2500 A rated current all in accordance with IEC 61869-1&2, with five (5) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 1600/800/1 A, accuracy class PX for differential protection with distance features, fault location and fault recorder equipment,<br>– II Core: Rated transformation ratio: 1600/800/1 A, accuracy class 5P20, minimum rated output of | 3 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | 15 VA for directional over-current protection, directional earth fault protection, sensitive earth fault protection and CB failure protection,<br>– III Core: Rated transformation ratio: 1600/800/1 A, accuracy class 0.5, minimum rated output of 10 VA for Energy Meter,<br>– IV Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Main protection,<br>– V Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Check protection. | |
| | | Single phase 3150 A Busbars arranged as duplicate 3 phase Busbar units for main and reserve Busbars | 1 set |
| | | Three phase set of cable termination unit<br>The 132 kV cables shall be terminated using plug-in type terminations. The GIS shall incorporate the insulator cones from the selected cable plug-in system such that the cable terminations can be plugged-in without degassing the GIS.<br>**NOTE:**<br>**Details of GIS cable terminations, 132kV cables and GIS cable termination unit (type, cross section, number of cables per phase, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided according to the Contractors Design.** | 1 set |
| | | Local control cubicle completed with mimic diagram, control switches for power operated switches & position indication for manually operated switches, Ammeter with reversible scale (0-800A, 0-1600A), Voltmeter scale 0-150kV with selector switch, Local/Remote selector switch and alarm annunciator for alarms with accept, cancel and lamp test, including all those necessary for the safety and efficient operation of the switchgear. In addition to all necessary cabling and wiring from switchgear and local control cabinet (Bay controller unit is acceptable) | 1 set |
| | | Structural support steelwork, access ladders, access ways and platforms to provide easy and permanent access to all operative components | 1 set |
| | | Monitoring equipment and gauges for SF6 gas and circuit breaker operating system (scaled & colored). | 1 set |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Facility for primary injection testing of current transformers | 1set |
| | | Complete set of maintenance and safety earthing devices associated with the switchgear circuit breaker isolators ……etc. | 1 set |
| B1.2 | 132 kV GIS Transformer Bay 132/33 KV<br>80 MVA | 132 kV GIS for 132/33KV Transformers Bay with the following equipment: | 4 sets |
| | | Three-pole GIS 132 kV Circuit Breaker (CB), for 2500 A rated current and for 40 kA/3 s rated breaking current, with suitable operating mechanism for all three poles (three-pole operation), one (1) closing & two (2) tripping coils and all auxiliary equipment, all in accordance with IEC 62271-100. | 1 set |
| | | Three-pole GIS 132 kV Busbar Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, all in accordance with IEC 62271-102. | 2 sets |
| | | Three-pole, maintenance earthing switch, power operated, located between the busbar selector disconnectors and the circuit breaker, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole GIS 132 kV transformer Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, complete with power operated maintenance earth switch on circuit breaker side of disconnector, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole, high-speed, power operated, fault making earthing switch, to be interlocked with the 33KV circuit breaker and earth switch. all in accordance with IEC 62271-102. | 1 set |
| | | Single-phase, ring type GIS Current Transformer (CT), of 2500 A rated current all in accordance with IEC 61869-1&2, with five (5) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 400/200/1, accuracy class PX for transformer differential protection and HV REF protection,<br>– II Core: Rated transformation ratio: 400/200/1 A, accuracy class 5P20, minimum rated output of | 3 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | 15 VA for over-current protection, earth fault protection, CB failure protection and fault recorder equipment,<br>– III Core: Rated transformation ratio: 400/200/1 A, accuracy class 0.5, minimum rated output of 10 VA for Energy Meter,<br>– IV Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Main protection,<br>– V Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Check protection. | |
| | | GIS Single-pole, metal-oxide, gapless type 132 kV Surge Arrester (SA), with surge counter, and with pressure relief capacity of 63kA, all in accordance with IEC 60099-4<br>**Note:** The characteristics of surge arresters shall be determined according to the Contractors calculations (insulation coordination with the equipment which needs to protect, for normal and transient operating conditions. | 3 sets |
| | | Single phase 3150 A Busbars arranged as duplicate 3 phase Busbar units for main and reserve Busbars | 1 set |
| | | Three phases set of cable termination unit<br>The 132 kV cables shall be terminated using plug-in type terminations. The GIS shall incorporate the insulator cones from the selected cable plug-in system such that the cable terminations can be plugged-in without degassing the GIS.<br>**NOTE:**<br>**Details of GIS cable terminations, 132kV cables and GIS cable termination unit (type, cross section, number of cables per phase, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided according to the Contractors Design.** | 1 set |
| | | Local control cubicle completed with mimic diagram, control switches for power operated switches & position indication for manually operated switches, Ammeter with reversible scale (0-200A, 0-400A), Voltmeter scale 0-150kV with selector switch, Local/Remote selector switch and alarm annunciator for alarms with accept, cancel and lamp test, including all those necessary for the safety and efficient operation of the | 1 set |

| A/B AAWDCP 400/132/33kv substation | | | |
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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | switchgear. In addition to all necessary cabling and wiring from switchgear and local control cabinet (Bay controller unit is acceptable). | |
| | | Structural support steelwork, access ladders, access ways and platforms to provide easy and permanent access to all operative components. | 1 set |
| | | Monitoring equipment and gauges for SF6 gas and circuit breaker operating system (scaled & colored). | 1 set |
| | | Facility for primary injection testing of current transformers | 1 set |
| | | Complete set of maintenance and safety earthing devices associated with the switchgear circuit breaker isolators ……etc. | 1 set |
| B1.3 | 132 kV GIS Transformer Bay 132/33 KV<br>63 MVA | 132 kV GIS for 132/33KV Transformers Bay with the following equipment: | 3sets |
| | | Three-pole GIS 132 kV Circuit Breaker (CB), for 2500 A rated current and for 40 kA/3 s rated breaking current, with suitable operating mechanism for all three poles (three-pole operation), one (1) closing & two (2) tripping coils and all auxiliary equipment, all in accordance with IEC 62271-100. | 1 set |
| | | Three-pole GIS 132 kV Busbar Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, all in accordance with IEC 62271-102. | 2 sets |
| | | Three-pole, maintenance earthing switch, power operated, located between the busbar selector disconnectors and the circuit breaker, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole GIS 132 kV transformer Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, complete with power operated maintenance earth switch on circuit breaker side of disconnector, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole, high-speed, power operated, fault making earthing switch, to be interlocked with the 33KV circuit | 1 set |

| A/B AAWDCP 400/132/33kv substation | | | |
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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | breaker and earth switch. all in accordance with IEC 62271-102. | |
| | | Single-phase, ring type GIS Current Transformer (CT), of 2500 A rated current all in accordance with IEC 61869-1&2, with five (5) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 300/150/1, accuracy class PX for transformer differential protection and HV REF protection,<br>– II Core: Rated transformation ratio: 300/150/1 A, accuracy class 5P20, minimum rated output of 15 VA for over-current protection, earth fault protection, CB failure protection and fault recorder equipment,<br>– III Core: Rated transformation ratio: 300/150/1 A, accuracy class 0.5, minimum rated output of 10 VA for Instrumentations.<br>– IV Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Main protection,<br>– V Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Check protection. | 3 sets |
| | | GIS Single-pole, metal-oxide, gapless type 132 kV Surge Arrester (SA), with surge counter, and with pressure relief capacity of 63kA, all in accordance with IEC 60099-4<br>**Note:** The characteristics of surge arresters shall be determined according to the Contractors calculations (insulation coordination with the equipment which needs to protect, for normal and transient operating conditions). | 3 sets |
| | | Single phase 3150 A Busbars arranged as duplicate 3 phase Busbar units for main and reserve Busbars | 1 set |
| | | Three phases set of cable termination unit<br>The 132 kV cables shall be terminated using plug-in type terminations. The GIS shall incorporate the insulator cones from the selected cable plug-in system such that the cable terminations can be plugged-in without degassing the GIS.<br>**NOTE:**<br>**Details of GIS cable terminations, 132kV cables and GIS cable termination unit (type, cross section, number of cables per phase, limits of supply, etc.) shall be coordinated, and all** | 1 set |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | **necessary equipment & material provided according to the Contractors Design.** | |
| | | Local control cubicle completed with mimic diagram, control switches for power operated switches & position indication for manually operated switches, Ammeter with reversible scale (0-150, 0-300A), Voltmeter scale 0-150kV with selector switch, Local/Remote selector switch and alarm annunciator for alarms with accept, cancel and lamp test, including all those necessary for the safety and efficient operation of the switchgear. In addition to all necessary cabling and wiring from switchgear and local control cabinet (Bay controller unit is acceptable). | 1 set |
| | | Structural support steelwork, access ladders, access ways and platforms to provide easy and permanent access to all operative components. | 1 set |
| | | Monitoring equipment and gauges for SF6 gas and circuit breaker operating system (scaled & colored). | 1 set |
| | | Facility for primary injection testing of current transformers | 1 set |
| | | Complete set of maintenance and safety earthing devices associated with the switchgear circuit breaker isolators ……etc. | 1 set |
| B1.4 | 132 kV GIS interbus Transformer Bay 400/132/33 KV<br>400 MVA | 132 kV GIS for 400/132/33 KV Transformers Bay with the following equipment: | 3 sets |
| | | Three-pole GIS 132 kV Circuit Breaker (CB), for 2500 A rated current and for 40 kA/3 s rated breaking current, with suitable operating mechanism for all three poles (three-pole operation), one (1) closing & two (2) tripping coils and all auxiliary equipment, all in accordance with IEC 62271-100. | 1 set |
| | | Three-pole GIS 132 kV Busbar Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, all in accordance with IEC 62271-102. | 2 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Three-pole, maintenance earthing switch, power operated, located between the busbar selector disconnectors and the circuit breaker, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole GIS 132 kV transformer Disconnector (DS), for 2500 A rated current and for 40 kA/3 s rated withstand current, with motor operating mechanism and all auxiliary equipment, complete with power operated maintenance earth switch on circuit breaker side of disconnector, all in accordance with IEC 62271-102. | 1 set |
| | | Three-pole, high-speed, power operated, fault making earthing switch, to be interlocked with the 33KV circuit breaker and earth switch. all in accordance with IEC 62271-102. | 1 set |
| | | Single-phase, ring type GIS Current Transformer (CT), of 2500 A rated current all in accordance with IEC 61869-1&2, with five (5) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 2000/1000/1, accuracy class PX for transformer differential protection.<br>– II Core: Rated transformation ratio: 2000/1000/1 A, accuracy class PX, for transformer differential protection, directional over-current protection, directional earth fault protection, CB failure protection and fault recorder equipment<br>– III Core: Rated transformation ratio: 2000/1000/1 A accuracy class 0.2S, for measurement purposes.<br>– IV Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Main protection,<br>– V Core: Rated transformation ratio: 3000/1500/1A, accuracy class PX for Busbar zone Check protection. | 3 sets |
| | | Single-phase, GIS inductive type Voltage Transformer (VT), in accordance with IEC 61869-1&3, with two (2) secondary windings with the following characteristics:<br>- I Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}}/\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 3P for Directional Over Current and Directional Earth Fault protections, synchronization and fault recorder equipment with appropriate output, | 3 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | - II Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}}$ / $\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for instrumentation with appropriate rated output. | |
| | | GIS Single-pole, metal-oxide, gapless type 132 kV Surge Arrester (SA), with surge counter, and with pressure relief capacity of 63kA, all in accordance with IEC 60099-4<br>**Note:** The characteristics of surge arresters shall be determined according to the Contractors calculations (insulation coordination with the equipment which needs to protect, for normal and transient operating conditions). | 3 sets |
| | | Single phase 3150 A Busbars arranged as duplicate 3 phase Busbar units for main and reserve Busbars | 1 set |
| | | Three phases set of cable termination unit<br>The 132 kV cables shall be terminated using plug-in type terminations. The GIS shall incorporate the insulator cones from the selected cable plug-in system such that the cable terminations can be plugged-in without degassing the GIS.<br>**NOTE:**<br>**Details of GIS cable terminations, 132kV cables and GIS cable termination unit (type, cross section, number of cables per phase, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided according to the Contractors Design.** | 1 set |
| | | Local control cubicle completed with mimic diagram, control switches for power operated switches & position indication for manually operated switches, Ammeter with reversible scale (0-1000, 0-2000A), Voltmeter scale 0-150kV with selector switch, Local/Remote selector switch and alarm annunciator for alarms with accept, cancel and lamp test, including all those necessary for the safety and efficient operation of the switchgear. In addition to all necessary cabling and wiring from switchgear and local control cabinet (Bay controller unit is acceptable). | 1 set |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Structural support steelwork, access ladders, access ways and platforms to provide easy and permanent access to all operative components. | 1 set |
| | | Monitoring equipment and gauges for SF6 gas and circuit breaker operating system (scaled & colored). | 1 set |
| | | Facility for primary injection testing of current transformers | 1 set |
| | | Complete set of maintenance and safety earthing devices associated with the switchgear circuit breaker isolators ……etc. | 1 set |
| B1.5 | 132 kV GIS Bus Coupler and Metering/Earthing Bay | 132 kV GIS Bus Coupler and Metering/Earthing Bay with the following equipment: | 1 set |
| | | Three-pole GIS 132 kV Circuit Breaker (CB), for 3150 A rated current and for 40 kA/3 s rated breaking current, with suitable operating mechanism for all three poles (three-pole operation), one (1) closing & two (2) tripping coils and all auxiliary equipment, all in accordance with IEC 62271-100. | 1 set |
| | | Three-pole GIS 132 kV Busbar Disconnector (DS) for busbar selection, for 3150 A rated current and for 40 kA/3 s rated withstand current, power operated, complete with power operated maintenance earth switch on circuit breaker side of disconnector, and all auxiliary equipment, all in accordance with IEC 62271-102. | 3 sets |
| | | Single-phase, ring type GIS Current Transformer (CT), all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 3000/1500/1 A, accuracy class 5P20, minimum rated output of 15 VA for over-current protection, earth fault protection, CB failure protection and Fault Recorder.<br>– II Core: Rated transformation ratio: 3000/1500/1 A, accuracy class PX for Busbar zone Main protection. | 3 sets |
| | | Single-phase, ring type GIS Current Transformer (CT), all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 3000/1500/1 A, accuracy class 0.5, minimum rated output of 10 VA for instrumentation. | 3 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – II Core: Rated transformation ratio: 3000/1500/1 A, accuracy class PX for Busbar zone Reserve protection. | |
| | | Single phase 3150 A Busbars arranged as duplicate 3 phase Busbar units for main and reserve Busbars | 1 set |
| | | Local control cubicle completed with mimic diagram, control switches for power operated switches & position indication for manually operated switches, Ammeter with reversible scale (0-1500, 0-3000A), Voltmeter scale 0-150KV with selector switch, Local/Remote selector switch and alarm annunciator for alarms with accept, cancel and lamp test, including all those necessary for the safety and efficient operation of the switchgear. In addition to all necessary cabling and wiring from switchgear and local control cabinet (Bay controller unit is acceptable). | 1 set |
| | | Structural support steelwork, access ladders, access ways and platforms to provide easy and permanent access to all operative components. | 1 set |
| | | Monitoring equipment and gauges for SF6 gas and circuit breaker operating system (scaled & colored). | 1 set |
| | | Facility for primary injection testing of current transformers | 1 set |
| | | Complete set of maintenance and safety earthing devices associated with the switchgear circuit breaker isolators ……etc. | 1 set |
| B1.6 | 132 kV GIS Bus Section Bay | 132 kV GIS Bus Section Bay with the following equipment: | 1 set |
| | | Three-pole GIS 132 kV Circuit Breaker (CB), for 3150 A rated current and for 40 kA/3 s rated breaking current, with suitable operating mechanism for all three poles (three-pole operation), one (1) closing & two (2) tripping coils and all auxiliary equipment, all in accordance with IEC 62271-100. | 1 set |
| | | Three-pole GIS 132 kV Busbar Disconnector (DS) for busbar section, for 3150 A rated current and for 40 kA/3 s rated withstand current, power operated, complete with power operated maintenance earth switch on circuit breaker side of disconnector, and all auxiliary equipment, all in accordance with IEC 62271-102. | 2 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Three-pole, high-speed, fault making earthing switch for reserve busbar earthing, all in accordance with IEC 62271-102. | 1 set |
| | | Single-pole VT disconnector, with motor operating mechanism, suitably interlocked with reserve busbar earthing switch and all auxiliary equipment, all in accordance with IEC 62271-102. | 1 set |
| | | Single-phase, inductive type Voltage Transformer (VT), to be connected in the middle phase (Y) on reserve busbar all in accordance with IEC 61869-1&3, with two (2) secondary windings with the following characteristics:<br>– I Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}}$ / $\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for synchronization with appropriate rated output.<br>– II Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}}$ / $\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for metering with appropriate rated output. | 1 set |
| | | Single-phase, ring type GIS Current Transformer (CT), all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 3000/1500/1 A, accuracy class 5P20, minimum rated output of 15 VA for over-current protection, earth fault protection, CB failure protection and Fault Recorder.<br>– II Core: Rated transformation ratio: 3000/1500/1 A, accuracy class PX for Busbar zone Main1 protection. | 3 sets |
| | | Single-phase, ring type GIS Current Transformer (CT), all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 3000/1500/1 A, accuracy class 0.5, minimum rated output of 10 VA for instrumentation,<br>– II Core: Rated transformation ratio: 3000/1500/1 A, accuracy class PX for Busbar zone Main2 protection | 3 sets |
| | | Three-pole, high-speed, fault making earthing switch for main busbar earthing, all in accordance with IEC 62271-102. | 2 sets |

| A/B AAWDCP 400/132/33kv substation | | | |
|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Single-pole VT disconnector, with motor operating mechanism, suitably interlocked with main busbar earthing switch and all auxiliary equipment, all in accordance with IEC 62271-102. | 2 sets |
| | | Single-phase, inductive type Voltage Transformer (VT), to be connected in the middle phase (Y) on main 1 ,2 busbar all in accordance with IEC 61869-1&3, with two (2) secondary windings with the following characteristics:<br>– I Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}}$ / $\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for synchronization with appropriate rated output.<br>– II Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}}$ / $\frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for metering with appropriate rated output | 2 sets |
| | | Note: Set of busbar VT with associated disconnector and high-speed, fault making earthing switch could be part of bus coupler, if it is solution of GIS manufacturer. | |
| | | Single phase Busbars arranged as duplicate 3 phase Busbar units for main and reserve Busbars (3150 A). | 1 set |
| | | Local control cubicle completed with mimic diagram, control switches for power operated switches & position indication for manually operated switches, Ammeter with reversible scale (0-1500A, 0-3000A), Voltmeter scale 0-150KV with selector switch, Local/Remote selector switch and alarm annunciator for alarms with accept, cancel and lamp test, including all those necessary for the safety and efficient operation of the switchgear. In addition to all necessary cabling and wiring from switchgear and local control cabinet (Bay controller unit is acceptable). | 1 set |
| | | Structural support steelwork, access ladders, access ways and platforms to provide permanent access to all operative components. | 1 set |
| | | Monitoring equipment and gauges for SF6 gas and circuit breaker operating system (scaled & colored). | 1 set |
| | | Facility for primary injection testing of current transformers | 1 set |
| | | Complete set of maintenance and safety earthing devices associated with the switchgear circuit breaker isolators ……etc. | 1 set |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| B1.7 | GIS Crane | Overhead travelling crane for GIS handling suitable for handling the heaviest GIS part, with motor drive **and lifting capacity not less than 5 Tons**, as per detailed technical specification.<br>***Note:*** GIS crane technical characteristics shall be coordinated with GIS requirements and GIS room building design. Details of GIS crane technical data shall be coordinated with civil design of the control building (GIS room). | 1 set |
| B1.8 | Tools for GIS installation - mandatory | Tools for GIS installation, including the following equipment: | 1 LOT |
| | | SF6 gas handling equipment. | 1 set |
| | | SF6 bottles for gas refilling, as per Manufacturer's recommendation | 1 set |
| | | Partial discharge and leakage detectors (portable) | 1 set |
| | | List of all special tools necessary for GIS installation as per Bidder's recommendation with prices | 1 set |
| **B2** | **132 kV & 33 kV Outdoor Equipment** | **132 kV & 33 kV Outdoor Equipment, comprising of the following equipment:** | |
| B2.1 | 132 kV Outdoor Surge Arrester | Single-pole, metal-oxide, gapless type 132 kV Surge Arrester (SA) for outdoor installation, complete with supporting steel structure and surge counter, all in accordance with IEC 60099-4. | 12 sets |
| B2.2 | 132 kV Outdoor Capacitive Voltage Transformer | Single-phase, capacitive type Voltage Transformer (CVT), all in accordance with IEC 61869-1&5, complete with supporting steel structure, with three (3) secondary windings with the following characteristics:<br>– I Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}} / \frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 3P for line differential and distance protection, synchronization and fault recorder equipment with appropriate output, | 12 sets |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – II Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}} / \frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 3P for directional over-current protection with appropriate output,<br>– III Winding: Rated transformation ratio: $\frac{132}{\sqrt{3}} / \frac{0,11}{\sqrt{3}}$ kV/kV, accuracy class 0.5 for instrumentation with appropriate rated output.<br>Note: The capacitive voltage transformer in middle (Y) phase shall be suitable for mounting of Line Trap and HF Coupling Unit, complete with brackets for mounting and other necessary auxiliaries. | |
| B2.3 | OHL earth switch | 132kV three phase motorized operated, line earth switch completes with locks, electrical interlocks, auxiliary switches and labels. | 12 sets |
| B2.4 | Gantry Steel Structure | 132KV terminal Gantry Steel Structure, complete with accessories for termination of final span from the overhead line terminal tower, with rods for lightning protection, access ladder, safety screens, etc. | 4 sets |
| B2.5 | 132 kV Connecting Material for OHL | Connecting material, such as conductors, connectors/clamps (bi-metal where necessary), fittings, suspension insulators, turnbuckles, etc., necessary to complete the connections from the overhead line slack span to the 132 kV outdoor cable terminations, outdoor surge arresters and CVTs. All connecting material shall be for 2000 A current rating. The conductors shall be super-heated thermal conductors.<br>NOTE: All necessary connecting material shall be provided, according to the Contractors Design. | 4 sets |
| B2.6 | 132 kV Connecting Material for Transformer | Connecting material, such as conductors, connectors/clamps (bi-metal where necessary), fittings, suspension insulators, turnbuckles, etc., necessary to complete the connections between main transformer HV neutral bushing and HV neutral CT. All connecting material shall be for 2000 A current rating. The conductors shall be super-heated thermal conductors.<br>NOTE: All necessary connecting material shall be provided, according to the Contractors Design. | 7 sets |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| B2.7 | 33 kV Connecting Material | Complete set of 33 kV connecting material, such as flexible conductors, connectors, post insulators, steel supports, clamps (bi-metal where necessary), fittings, turnbuckles, etc., necessary to complete all connections on 33 kV voltage level, connection between earthing transformer 33kV neutral bushing and 33kV neutral CT and between 33kV neutral CT and 33kV Cable Termination for cable to NER connection.<br>Note: **Connections between earthing transformer 33kV neutral bushing (air bushing) and 33kV neutral CT (overhead conductor) and between 33kV neutral CT and NER cubicle (overhead conductor between neutral CT and cable termination of cable to NER) shall be done according to the Contractor design.** | 7 sets |
| **B3** | **Neutral Earthing Equipment** | **Transformer Neutral Earthing Equipment, for outdoor installation, comprising of the following equipment** | |
| B3.1 | Current Transformer for Main Transformer HV Neutral Point (132/33 KV 80MVA) | Single-phase, oil-insulated, post type Current Transformer (CT), for outdoor installation, complete with supporting steel structure, all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 400/200/1 A, accuracy class PX for transformer HV REF protection,<br>– II Core: Rated transformation ratio: 400/200/1 A, accuracy class 5P20, minimum rated output of 15 VA for earth fault protection and fault recorder equipment.<br>Current Transformer shall be for Insulation Level 72.5 kV (140/325 kV) and shall be supplied with all necessary conductors and fittings for connection to the main transformer HV neutral bushing and to the earthing system. | 4 sets |
| B3.2 | Current Transformer for Main Transformer LV Artificial Neutral Point (132/33 KV 80MVA) | Single-phase, oil-insulated, post type Current Transformer (CT), for outdoor installation, complete with supporting steel structure, all in accordance with IEC 61869-1&2, with (1) core with the following characteristics:<br>– I Core: Rated transformation ratio: 1600/800/1 A, accuracy class PX for transformer LV REF protection. | 4 sets |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Current Transformer shall be for Insulation Level 36 kV (70/170 kV) and shall be supplied with all necessary conductors and fittings for connection to the earthing transformer bushing and to the earthing system. | |
| B3.3 | Neutral Earthing Resistor (NER) Equipment<br>(132/33 KV 80MVA) | Neutral Earthing Resistor (NER) cubicle for earthing of 33 kV system, for outdoor installation with IP55 degree of mechanical protection, complete with all necessary support structures and with the following installed equipment within the NER cubicle: | 1 set |
| | | Neutral Earthing Resistor (NER), metal grid type, with the following characteristics:<br>– Rated current: XX A for 10 s,<br>– Rated Resistance: XX Ω. | 1 set |
| | | Single-pole 33 kV neutral earthing resistor disconnector with earthing switch, for 1600 A rated current, complete with manual operating mechanism, auxiliary equipment, all in accordance with IEC 62271-102. | 1 set |
| | | Single-pole 33 kV transformer neutral disconnector for XX A rated current, complete with manual operating mechanism, auxiliary equipment, all in accordance with IEC 62271-102. | 4 sets |
| | | Single-phase, cast in epoxy resin Current Transformer (CT), all in accordance with IEC 61869-1&2, with one (1) core with the following characteristics:<br>– I Core: Rated transformation ratio: XX/1 A, accuracy class 5P20, minimum rated output of 15 VA for stand-by earth fault protection.<br>Current Transformer shall be for Insulation Level 36 kV (70/170 kV). | 1 set |
| | | Terminal plate for connecting 33 kV cables to NER cubicle. | 4 sets |
| | | **Note:**<br>**The Contractor shall be responsible for calculating and specifying the value indicated as XX in the item above. Such value shall be subject to the Client's review and approval.** | |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | **The Contractor shall ensure the accuracy, completeness, and compliance of the calculation with all applicable requirements.** | |
| B3.4 | Current Transformer for Main Transformer HV Neutral Point (132/33 KV 63MVA) | Single-phase, oil-insulated, post type Current Transformer (CT), for outdoor installation, complete with supporting steel structure, all in accordance with IEC 61869-1&2, with two (2) cores with the following characteristics:<br>– I Core: Rated transformation ratio: 300/150/1 A, accuracy class PX for transformer HV REF protection,<br>– II Core: Rated transformation ratio: 300/150/1 A, accuracy class 5P20, minimum rated output of 15 VA for earth fault protection and fault recorder equipment.<br>Current Transformer shall be for Insulation Level 72.5 kV (140/325 kV) and shall be supplied with all necessary conductors and fittings for connection to the main transformer HV neutral bushing and to the earthing system. | 3 sets |
| B3.5 | Current Transformer for Main Transformer LV Artificial Neutral Point (132/33 KV 63MVA) | Single-phase, oil-insulated, post type Current Transformer (CT), for outdoor installation, complete with supporting steel structure, all in accordance with IEC 61869-1&2, with (1) core with the following characteristics:<br>– I Core: Rated transformation ratio: 1200/600/1 A, accuracy class PX for transformer LV REF protection.<br>Current Transformer shall be for Insulation Level 36 kV (70/170 kV) and shall be supplied with all necessary conductors and fittings for connection to the earthing transformer bushing and to the earthing system. | 3 sets |
| B3.6 | Neutral Earthing Resistor (NER) Equipment (132/33 KV 63MVA) | Neutral Earthing Resistor (NER) cubicle for earthing of 33 kV system, for outdoor installation with IP55 degree of mechanical protection, complete with all necessary support structures and with the following installed equipment within the NER cubicle: | 1 set |
| | | Neutral Earthing Resistor (NER), metal grid type, with the following characteristics:<br>– Rated current: XX A for 10 s, | 1 set |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – Rated Resistance: XX Ω. | |
| | | Single-pole 33 kV neutral earthing resistor disconnector with earthing switch, for XX A rated current, complete with manual operating mechanism, auxiliary equipment, all in accordance with IEC 62271-102. | 1 set |
| | | Single-pole 33 kV transformer neutral disconnector for XX A rated current, complete with manual operating mechanism, auxiliary equipment, all in accordance with IEC 62271-102. | 4 sets |
| | | Single-phase, cast in epoxy resin Current Transformer (CT), all in accordance with IEC 61869-1&2, with one (1) core with the following characteristics:<br>– I Core: Rated transformation ratio: XX /1 A, accuracy class 5P20, minimum rated output of 15 VA for stand-by earth fault protection.<br>Current Transformer shall be for Insulation Level 36 kV (70/170 kV). | 1 set |
| | | Terminal plate for connecting 33 kV cables to NER cubicle. | 4 sets |
| | | **Note:**<br>**The Contractor shall be responsible for calculating and specifying the value indicated as XX in the item above. Such value shall be subject to the Client's review and approval. The Contractor shall ensure the accuracy, completeness, and compliance of the calculation with all applicable requirements**. | |
| B4 | 132 kV Control, Protection & Metering Equipment for Substation AAWDCP 132/33 kV – New substation | 132 kV Control, Protection & Metering equipment, comprising of the following panels, equipment & devices: | |
| B4.1 | Control & Protection Panel | Control & Protection Panel for 132 kV OHTL Feeder Bay for indoor installation with IP41 degree of mechanical | 4 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | for 132 kV OHTL Feeder Bay | protection (at least), completely wired, arranged in two (2) parts/sections (upper and lower section).<br>The upper section of Control & Protection Panel for 132 kV OHTL Feeder shall be equipped with the following equipment and devices:<br>– Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for disconnectors and earthing switches with buzzer to indicate discrepancy conditions,<br>– Lockable control selector switch (“*Remote/Supervisory*”),<br>– Lockable selector switch (“*Off/Synchro*”) with indicating lamp for Off position,<br>– Auto-reclosure Lockable selector switch (“*On/Off*”) with indicating lamp for Off position.<br>– Multifunction Digital Meter<br>– Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor’s Design (with at least 20% spare),<br>– Auxiliary relays for supervisory control of the circuit breaker (50 V DC),<br>– Transducers for supervisory indications (Programmable Transducers with multi outputs).<br>The lower section of Control & Protection Panel for 132 kV OHTL Feeder shall be equipped to provide the following:<br>– Line differential protection relay with distance protection feature, with fault location feature, with synchronizing and synchro- check feature and auto- reclose function (**To be compatible with OHL protection relays in BPS2 & BPS3**).<br>– Directional overcurrent protection relay with Directional earth fault protection and Sensitive earth fault protection,<br>– Trip circuit supervision relays,<br>– Inter-trip sends and receive relays, circuit test switch with appropriate test push buttons, signal lamps for distance, and direct inter trip signals.<br>– Self-reset trip relay,<br>– All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: | |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | link in fuse holder), terminals, labels, test blocks for protection relays, wiring, etc. to complete the scheme. | |
| B4.2 | Control & Protection Panel for 132 kV Transformer Bay | Control & Protection Panel for 132 kV Transformer Bay for indoor installation with IP41 degree of mechanical protection, completely wired, arranged in two (2) parts/sections (upper and lower section).<br>The upper section of Control & Protection Panel for 132 kV Transformer Bay shall be equipped with the following equipment and devices:<br>– Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for disconnectors and earthing switches with buzzer to indicate discrepancy conditions,<br>– Lockable control selector switch ("Remote/Supervisory"),<br>– Multifunction Digital Meter<br>– Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare),<br>– Auxiliary relays for supervisory control of the circuit breaker (50 V DC),<br>– Transducers for supervisory indications. (Programmable Transducers with multi outputs).<br>The lower section of Control & Protection Panel for 132 kV Transformer Bay shall be equipped to provide the following:<br>– Transformer biased differential protection relay with HV Restricted Earth Fault (REF) high impedance protection.<br>– Overcurrent and earth fault protection relay.<br>– Transformers mechanical (physical) protection voltage operated relays with hand reset indicators flags for the alarms according to Contractor's Design,<br>– Trip circuit supervision relays,<br>– (Electrical / Hand) reset trip relays,<br>– All necessary switches, MCBs, auxiliary relays, interposing transformers (if applicable), transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme. | 7 sets |
| B4.3 | Control & Protection Panel | Control & Protection Panel for 132 kV Transformer Bay for indoor installation with IP41 degree of mechanical | 3 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | for 132 kV Transformer Bay 400/132/33 KV<br>400 MVA | protection, completely wired, arranged in two (2) parts/sections (upper and lower section).<br>The upper section of Control & Protection Panel for 132 kV Transformer Bay shall be equipped with the following equipment and devices:<br>– Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for disconnectors and earthing switches with buzzer to indicate discrepancy conditions,<br>– Lockable control selector switch("Remote/Supervisory"),<br>– Multifunction Digital Meter<br>– Lockable selector switch ("*Off/Synchro*") with indicating lamp for Off position,<br>– Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare),<br>– Auxiliary relays for supervisory control of the circuit breaker (50 V DC),<br>– Transducers for supervisory indications. (Programmable Transducers with multi outputs).<br>The lower section of Control & Protection Panel for 132 kV Transformer Bay shall be equipped to provide the following:<br>– Directional Overcurrent and Directional earth fault protection relay.<br>– Synchro check relay.<br>– Trip circuit supervision relays,<br>– (Electrical / Hand) reset trip relays,<br>All necessary switches, MCBs, auxiliary relays, interposing transformers (if applicable), transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme. | |
| B4.4 | Control & Protection Panel for 132 kV Bus Coupler Bay | Control & Protection Panel for 132 kV Bus Coupler Bay for indoor installation with IP41 degree of mechanical protection, completely wired, arranged in two (2) parts/sections (upper and lower section).<br>The upper section of Control & Protection Panel for 132 kV Bus Coupler Bay shall be equipped with the following equipment and devices: | 1 set |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for disconnectors and earthing switches with buzzer to indicate discrepancy conditions,<br>– Lockable control selector switch ("Remote/Supervisory"),<br>– Lockable selector switch ("Off/Synchro") with indicating lamp for Off position,<br>– Digital multifunctional meter,<br>– Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare),<br>– Auxiliary relays for supervisory control of the circuit breaker (50 V DC),<br>– Transducers for supervisory indications (Programmable Transducers with multi outputs).<br>The lower section of Control & Protection Panel for 132 kV Bus Coupler Bay shall be equipped to provide the following:<br>– Overcurrent protection relay, with Earth fault protection, synchronizing and Synchro-check function.<br>– Trip circuit supervision relays,<br>– Self-reset trip relay,<br>– All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme. | |
| B4.5 | Control & Protection Panel for 132 kV Bus Section Bay | Control & Protection Panel for 132 kV Bus Section Bay for indoor installation with IP41 degree of mechanical protection, completely wired, arranged in two (2) parts/sections (upper and lower section).<br>The upper section of Control & Protection Panel for 132 kV Bus Section Bay shall be equipped with the following equipment and devices:<br>– Mimic diagram with discrepancy-type control switch for circuit breaker, discrepancy indicators for disconnectors and earthing switches with buzzer to indicate discrepancy conditions,<br>– Lockable control selector switch ("Remote/Supervisory"), | 1 set |

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|---|---|---|---|
| 132 kV GIS and AIS equipments | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – Lockable selector switch (“Off/Synchro”) with indicating lamp for Off position.<br>– Digital multifunctional meter,<br>– Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor’s Design (with at least 20% spare),<br>– Auxiliary relays for supervisory control of the circuit breaker (50 V DC),<br>– Transducers for supervisory indications. (Programmable Transducers with multi outputs).<br><br>The lower section of Control & Protection Panel for 132 kV Bus section Bay shall be equipped to provide the following:<br>– Overcurrent protection relay, with Earth fault protection, synchronizing and Synchro-check function.<br>– Trip circuit supervision relays,<br>– Self-reset trip relay,<br>– All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme. | |
| B4.6 | 132 kV High Impedance Busbar Protection Panel | 132 kV High Impedance Busbar Protection Panel (comprising two panels) for indoor installation with IP41 degree of mechanical protection, completely wired, equipped with the following equipment and devices:<br>– Four (4) High Impedance Busbar protection relays for Main 1, Main 2, Reserve & Check Zones,<br>– Four (4) CT supervision relays,<br>– Electrical/ Hand reset trip relays for tripping the required circuits (1 trip relay for each circuit + 2 trip relays for Bus Coupler + 2 trip relays for Bus Section + 4 spare trip relays),<br>– Any necessary test blocks for testing the Busbar protection relays and any alarm relays necessary for remote alarms and indications,<br>– Isolation switches (In & Out of service) for each High Impedance Busbar protection relay with indicating lamps for in & out of service status.<br>– Signaling lamps for each Zone (i.e. Busbar protection operated for each Zone, Busbar protection fail for each | 1 set |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Zone, DC healthy, Busbar protection in/out of service for each zone…),<br>– Annunciator with accept, reset and lamp test push buttons with alarms according to Contractor's Design (with at least 20% spare),<br>– All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.<br>The panel shall be equipped & fully ready with 4 spare (future) circuits, 2 circuit at each side of the Busbar (Trip relays, test blocks, open short link…). | |
| B4.7 | 132 kV Circuit Breaker Failure Protection Panel | 132 kV Circuit Breaker Failure Protection Panel (comprising two panels) for indoor installation with IP41 degree of mechanical protection, completely wired, equipped with the following equipment and devices:<br>– Circuit Breaker Failure relays required for CB failure protection for all circuits as shown on the single line diagrams and for future circuits (4 circuits),<br>– Selector switch "Protection in Service/out of service", for each CBF relay with indicating lamp in case out of service.<br>– All necessary switches, MCBs, auxiliary relays, interposing transformers, transducers, links (fuse block: link in fuse holder), terminals, labels, test blocks for main relays, wiring, etc. to complete the scheme.<br>The tripping commands shall be sent directly to circuit breakers or through Trip relays, (tripping through auxiliary relays shall not be accepted). | 1 set |
| B4.8 | 132 kV Fault Recorder Panel | 132 kV Fault Recorder Panel for indoor installation with IP41 degree of mechanical protection, completely wired, equipped with fault recorders arranged to record the waveforms of three (3) phase voltages and three (3) phase and neutral currents:<br>– Four (4) 132 kV OHTL feeder circuits,<br>– Seven (7) 132/33kV TR circuits,<br>– Three (3) for 400/132KV TR circuits.<br>– One (1) 132 kV Bus coupler circuit,<br>– One (1) 132 kV Bus section circuit, | 1 set |

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|---|---|---|---|
| 132 kV GIS and AIS equipments | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – Four (4) 132 kV spare (future) circuits,<br>Fault recorders shall be provided to cater for a minimum of 256 event/digital inputs & 128 analogues. The device shall be equipped with distance to fault, time, date, and alarms for “recorder faulty” and “fault recorder triggered”.<br>All necessary auxiliary transformers and interposing relays, all necessary wiring and additional relay contacts shall be included in relay panels to enable recorder to be connected.<br>Recorder(s) are to be triggered by the operation of the main, backup protections and trip relays of new substation circuits.<br>Recorder(s) are to produce a record for a period adjustable from 5 to 60 seconds. The record is to include, at least 15 cycles of pre fault conditions.<br>The device shall generally have features as indicated below for all the substation circuits, however the final arrangement shall be agreed with the Client during the design stage of the contract.<br>Waveforms to be captured:<br>– 3 phase currents (for all cct.).<br>– Residual current (for all cct.).<br>– 3 phase voltage (for all cct.).<br>Events/Digital inputs to be captured:<br>– Distance protection/transformer trip relays.<br>– Distance PLC send and receive signals.<br>– Main protection for each feeder.<br>– Back up protection for each feeder.<br>– Tripping of each feeder circuit breaker.<br>– Tripping of bus-section circuit breaker.<br>– Tripping of bus coupler circuit breaker.<br>– All the events/digital input channels in order to comply with NEPCO scheme, with wiring up to recorder panel terminal blocks.<br>In addition, the recorders shall also include:<br>– Inter trigger between recorders.<br>– Time synch module, synchronized either by GPS receiver and antenna or BNC socket for IRIG-B signal (TTL).<br>– At least one Remote connection either by internal modem or Ethernet connection 10BASE-T. | |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | – Software packages for configuration and records retrieval, display, analyzing, and printing capabilities.<br>– Non-volatile storage for normal DFR recorders and triggered slow scan records.<br>– Automatic printout for the fault records through external Printer.<br>– Global positioning system<br>**GPS receiver for clock synchronization of numeric protection device's fault recorders complete with antenna and cable.** | |
| B4.9 | Supervisory Control & Telemetering Marshalling Cabinets | Supervisory Control & Telemetering Marshalling Cabinet (comprising two panels) for indoor installation with IP41 degree of mechanical protection, completely wired, equipped for the following:<br>– Four (4) 132 kV OHTL feeder circuits,<br>– Seven (7) 132/33kV TR circuits,<br>– Three (3) for 400/132KV TR circuits.<br>– One (1) 132 kV Bus coupler circuit,<br>– One (1) 132 kV Bus section circuit,<br>– Four (4) 132 kV spare (future) circuits, | 1 set |
| B4.10 | Alarm and Control Station Desk | Alarm and Control Station Desk in 132 kV control room for indoor installation, completely wired, equipped with the following equipment and devices:<br>- Annunciator with accept, reset and lamp test push buttons with station alarms according to Contractor's Design (with at least 20% spare),<br>- Selector switch for "Substation unattended/Substation attended". The selector switch shall disconnect all audible alarms when in the "Unattended" position. Two (2) pairs of potential free contacts, one pair arranged to close in the "Attended" position and the other pair "Unattended position", shall be wired to the remote control and supervisory marshalling cabinet. A further set of two (2) pairs of contacts (closed with the switch in the "Attended" position) shall be provided as well, | 1 set |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | - For accept / reset command for acceptable and cancellation of alarms should be controllable from NCC<br>- Common push button to accept all alarms for all annunciators.<br>- Common push button to reset all alarms for all annunciators.<br>- three differentiated audible alarms for trip signal, non-trip signals, and discrepancy alarms.<br>- Temperature and humidity indicator (0-10 mA DC) and range scale for temperature (-20 ºC ÷ 60 ºC) and for humidity (0 ÷ 100%).<br>– A suitable padded, swivel type office chair shall be provided with the work station control desk. | |
| **B5** | **400 V AC Equipment for 132KV GIS building** | **400 V AC Equipment, comprising of the following equipment:** | **1 set** |
| B5.1 | 400 V AC Distribution Board/Switchgear | 400 V AC Distribution Board/Switchgear, free-standing type, for indoor installation with IP41 degree of mechanical protection, with two (2) busbar sections for suitable rated current and for 40 kA rated short-time (3 s) withstand current, completely wired, with alarm fascia/display, with all cable glands for cables entering from the bottom side, with interlocking specified in Particular Technical Specifications and shown on the Tender Drawing, with the following installed equipment: | 1 set |
| | | Automatic Transfer Switch (ATS) with all necessary switching and control equipment (incoming supply automatic changeover contactor mechanical and electrical interlock) for quickly and reliably switching between power supply sources from Three (3) Earthing & Auxiliary transformers (132/33KV TR1 &132/33KV TR3) and (132/33KV TR5). | 1 set |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Main incoming Circuit Breaker for main incoming power supplies from the Earthing & Auxiliary transformers, for suitable rated current. Main incoming Circuit Breakers shall be mutually interlocked and interlocked with Stand-by incoming Circuit Breaker& Bus section Circuit Breaker as per Tender Drawing. | 3 sets |
| | | Stand-by incoming Circuit Breaker for stand-by incoming power supply from diesel generator for suitable rated current, interlocked with Main incoming Circuit Breaker & Bus section Circuit Breaker as per Tender technical specification and Drawing. | 1 set |
| | | Bus section Circuit Breaker for suitable rated current, interlocked with Main incoming Circuit Breakers & Stand-by incoming Circuit Breaker as per Tender Drawing . | 1 set |
| | | – Incoming ammeter scaled 0 ÷ xx A with phase selector switch. | 4 sets |
| | | – Bus section ammeter scaled 0 ÷ xx A with phase selector switch. | 1 set |
| | | – Incoming voltmeter scaled 0 ÷ 420 V with selector switch. | 4 sets |
| | | – Incoming 3-phase kWh meter. | 4 sets |
| | | – Moulded Case Circuit Breakers (MCCBs) of adequate ratings for all substation equipment/consumers according to the Contractors Design. | 1 set |
| | | – Miniature Circuit Breakers (MCBs) of adequate ratings for all substation equipment/consumers according to the Contractors Design. | 1 set |
| | | – One (1) spare MCCB of each type/rating. | 1 set |
| | | – One (1) spare MCB of each type/rating. | 1 set |
| B5.2 | Socket Outlet for Transformer Oil Treatment Plant | Socket Outlet for 160 A rated current, for outdoor installation, for transformer oil treatment plant (each socket shall be mounted in the transformer area). | 7 sets |
| | | Note: the rated current for the LVAC SWG shall be determined by the calculations and design of the contractor. | |

| A/B AAWDCP 400/132/33kv substation | | | |
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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| B6 | 110 V DC Equipment for Substation -New substation | 110 V DC Equipment, comprising of the following equipment:<br>This system shall cover the 132 kV and 33 kV systems, including all associated equipment, interfaces, and requirements. | 1 set |
| B6.1 | 110 V DC Batteries | High-performance, Nickel-Cadmium (Ni-Cd), vented (open) or semi-sealed type, pocket plate or sintered plate, housed in a totally enclosed polystyrene translucent plastic containers. Each battery shall have capacity to meet the total requirements of the actual complete equipment to be supplied for substation, plus 50% spare capacity, but not less than 450 Ah/5 h. Batteries shall be supplied complete with adequate battery racks/stands and accessories stated in Particular Technical Specifications. | 2 sets |
| B6.2 | Fuse Boxes | Wall mounted fuse box with double-pole fuses of adequate rating. | 2 sets |
| B6.3 | 110 V DC Battery Charger – Rectifier | 110 V DC Battery Charger – Rectifier Panel, free-standing type, for indoor installation with IP41 degree of mechanical protection, completely wired, with the following installed equipment per Panel: | 2 sets |
| | | 110 V Battery Charger – Rectifier, with float & boost charging modes, with rated capacity according to Contractor's calculation, but not less than 150 A. | 1 set |
| | | Incoming Circuit Breaker of adequate rating according to the Contractors Design. | 1 set |
| | | Voltage dropping diodes of adequate rating. | 1 set |
| | | Outgoing Circuit Breaker of adequate rating according to the Contractors Design. | 1 set |
| | | Measuring instruments & indicators according to Particular Technical Specifications. | 1 set |
| B6.4 | 110 V DC Distribution Board | 110 V DC Distribution Board, free-standing type, for indoor installation with IP41 degree of mechanical protection, completely wired, with the following installed equipment: | 1 set |

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|---|---|---|---|
| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | Incoming Circuit Breaker of adequate rating according to the Contractors Design. | 2 sets |
| | | Bus Section Circuit Breaker of adequate rating according to the Contractors Design. | 1 set |
| | | Double-pole Miniature Circuit Breakers (MCBs) of adequate ratings with alarm contact for all substation equipment/consumers according to the Contractors Design. | 1 set |
| | | Incoming Voltmeter | 2 sets |
| | | Incoming Ammeter | 2 sets |
| | | Earth fault relay | 2 sets |
| | | One (1) spare MCB of each type/rating. | 1 set |
| | | Note: interlocking between 110 V DC switchboards shall be provided with electrical type and hard-wired interlocks. | |
| **B7** | **Cables and Cable Accessories** | **Cables and Cable Accessories, comprising of the following equipment:** | |
| B7.1 | 132kV cables between GIS and OHL gantries | 132 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 132 kV GIS feeder bay to 132 kV outdoor cable terminations installed on steel supports, near the OHL gantries.<br>**Note: Ratings and other characteristics of cables shall be according to the Contractors Design.**<br>**Cable continuous current rating shall be min. 1600A.**<br>Rated short circuit for cable conductor is 40kA, 3s.<br>NEPCO preferable the cables installed in the concrete cable trench/cable trough/ between OHL gantry and GIS building, separate trench for each OHL 3-phase circuit, as per enclosed layout drawing, at ambient temperature, as given at the Technical Data Schedule.<br>**NEPCO preferable One cable for each phase (one run)** | 4 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | **Contractor shall perform necessary design calculation to confirm cables cross section, and coordinate cable terminations with cable characteristics.** | |
| B7.2 | 132kV cables between GIS and 132/33KV TR | 132 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 132 kV GIS transformer bay to the 132-kV outdoor cable box on the 132/33KV Main Transformer HV side.<br>**Note: Ratings and other characteristics of cables shall be according to the Contractors Design.**<br>Rated short circuit for cable conductor is 40kA, 3s.<br>NEPCO preferable the cables installed in the concrete cable trench/ cable trough/ between Transformer and GIS building, at ambient temperature, as given at the Technical Data Schedule.<br>**NEPCO preferable One cable for each phase (one run) Contractor shall perform necessary design calculation to confirm cables cross section and number per phase, and coordinate cable terminations with cable characteristics.** | 7 sets |
| B7.3 | 132kV cables between GIS and 400/132/33KV TR | 132 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 132 kV GIS transformer bay to the 132-kV outdoor cable box on 400/132/33KV Auto Transformer 132KV side.<br>**Note: Ratings and other characteristics of cables shall be according to the Contractors Design.**<br>Rated short circuit for cable conductor is 40kA, 3s.<br>NEPCO preferable the cables installed in the concrete cable trench/ cable trough/ between Transformer and GIS building, at ambient temperature, as given at the Technical Data Schedule.<br>**NEPCO preferable One cable for each phase (one run) Contractor shall perform necessary design calculation to confirm cables cross section and number per phase, and coordinate cable terminations with cable characteristics.** | 2 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| B7.4 | 132 kV Outdoor Cable Termination with supports – OHL bay | 132 kV Outdoor Cable Termination (3-phase set), for outdoor installation, complete with supporting steel structure, all in accordance with IEC 60840. Those cable terminations shall be installed in the OHL feeders.<br>**NOTE:**<br>**Details of cables and 132kV cables (type, cross section, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided according to the Contractors Design.** | 4 sets |
| B7.5 | 132/33kV Transformer Cable Termination – to be installed inside Main Transformer HV connection box | 132 kV Cable Oil / Air Transformer Termination, (3-phase set) suitable for installation in the Main Transformer HV oil box, complete with support steel structure, all in accordance with IEC 60840 and EN 50299 standards.<br>NOTE:<br>**Details of transformer cable terminations, 132kV cables and transformer cable box (type, cross section, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided, according to the Contractors Design.** | 7 sets |
| B7.6 | 400/132/33 kV Transformer Cable Termination – to be installed inside Auto Transformer 132KV connection box | 132 kV Cable Oil / Air Transformer Termination, (3-phase set) suitable for installation in the Auto Transformer 132KV oil box, complete with support steel structure, all in accordance with IEC 60840 and EN 50299 standards.<br>NOTE:<br>**Details of transformer cable terminations, 132kV cables and transformer cable box (type, cross section, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided, according to the Contractors Design.** | 2 sets |
| B7.7 | 132 kV Cable Termination for GIS – 7 (132/33KV TR) + 4 OHL+2 (400/132/33KV TR) | Indoor 132 kV SF6 Cable Terminations (3 -phase set) for connection to GIS, complete with support steel structure, all in accordance with IEC 60840, and IEC 62271-209 standards.<br>The 132 kV cables shall be terminated using plug-in type terminations. The GIS shall incorporate the insulator cones from the selected cable plug-in system such that the cable terminations can be plugged-in without degassing the GIS. | 13 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | NOTE:<br>**Details of GIS cable terminations, 132kV cables and GIS cable termination units (type, cross section, limits of supply, etc.) shall be coordinated, and all necessary equipment & material provided according to the Contractors Design.** | |
| B7.8 | 132kV cables earthing accessories | Set of necessary accessories for 132kV cable sheath grounding (cable earthing boxes, SVL boxes and grounding cables), according to Contractors Design, for each 3-phase cable circuit/ line. | 13 sets |
| B7.9 | 132kV cables installation accessories | 132kV Cable accessories, such as cable cleats, supports, trays, ladders, clamps, fittings, bolts, etc. for proper functioning of 132kV cable, according to the Contractors Design, for each cable circuit/ line. | 13 sets |
| B7.10 | 132kV cable terminations installation tools for supplied cables | All necessary tools for installation of 132kV cable terminations for supplied cable type and cross section, according to the Contractors Design. | 1 set |
| B7.11 | 33kV cables between 132/33KV TR and 33kV SWG | 33 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 33 kV side of main transformer cable box to 33 kV indoor switchgear, including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design.<br>Design of transformer 33kV cable box shall be coordinated by contractor. | 7 sets |
| B7.12 | 33kV cables between 132/33 KV TR and ET | 33 kV cables (3 - phase circuits) with copper conductor and XLPE insulation, from the 33 kV side of main transformer cable box to the earthing transformer 33kV side (HV cable box) including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design.<br>Design of transformer 33kV cable box shall be coordinated by contractor. | 7 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| B7.13 | 33kV cables between 400/132/33KV ATR and ET | 33 kV cables (3 - phase circuits) with copper conductor and XLPE insulation, from the Auto transformer TV (33 kV) side to the earthing transformer 33kV side (HV cable box) including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design.<br>Design of transformer 33kV cable box shall be coordinated by contractor. | 2 sets |
| B7.14 | 33kV cables between LV artificial neutral point CT and NER | 33 kV cable (single phase) with copper conductor and XLPE insulation, from the current transformer for main transformer LV (33 kV) artificial neutral point to the NER cubicle, including cable terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design. | 7 sets |
| B7.15 | 33kV cables between 33kV SWG and 33kV capacitor banks 10MVAR | 33 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 33 kV capacitor bank cubicle/panel within 33 kV switchgear to 33 kV capacitor bank, including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design. | 7 sets |
| B7.16 | 33kV cables between400/132/ 33KV ATR and 33KV SWGR | 33 kV cables (3 - phase circuits) with copper conductor and XLPE insulation, from the Auto transformer TV (33 kV) side to the earthing transformer 33kV side (HV cable box) including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design.<br>Design of transformer 33kV cable box shall be coordinated by contractor. | 2 sets |
| B7.17 | 33kV cables between 33kV SWG and 33kV 20 MVAR capacitor banks | 33 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 33 kV capacitor bank cubicle/panel within 33 kV switchgear to 33 kV capacitor bank that connecting to ATR 400/132/33 KV, including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design. | 4 sets |
| B7.18 | 33kV cables between 33kV SWG and 33kV reactor | 33 kV single-core cables (3-phase circuit), with copper conductor and XLPE insulation, from the 33 kV reactor cubicle/panel within 33 kV switchgear to 33 kV reactor that connecting to ATR 400/132/33 KV, including terminations, | 2 sets |

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| **132 kV GIS and AIS equipments** | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | accessories, etc., with ratings and other characteristics according to the Contractors Design. | |
| B7.19 | LV AC and DC cables | LV AC & DC power (single core & multi-core) cables for proper functioning of **complete substation**, including all accessories, with ratings and other characteristics according to the Contractors Design. (SWA) | 1 set |
| B7.20 | Control and signaling cables | Control, signaling and measuring cables for proper functioning of **complete substation**, including all accessories, with ratings and other characteristics according to the Contractors Design. (SWA) | 1 set |
| B7.21 | Cable accessories | Cable accessories, such as cable trays, ladders, clamps, fittings, bolts, etc. for proper functioning of **complete substation**, according to the Contractors Design. | 1 set |
| B7.22 | Cable glands | Cable Glands of adequate size and quantity (plus 10% spare) according to the Contractors Design. | 1 set |
| B7.23 | Fiber Optics Cables | Fiber optics cables, with all accessories (batch cords, batch panels, splicing…etc) and works, necessary for the communications of Differential protection relays in AAWDCP, RO, IPS and BPS1.<br>The fiber optics cables and accessories shall be SINGLE MODE only. | 1 set |
| B7.24 | **External** 33KV cables from AAWDCP s/s to IPS, BPS1, RO North and RO South. | 33 kV cables (3-phase circuit), **with ALUMINUM conductor** and XLPE insulation, from the 33 kV Switchgear in AAWDCP s/s to IPS, BPS1, RO North and RO South substations, including terminations, accessories, etc., with ratings and other characteristics according to the Contractors Design. | LOT |
| **B**8 | Standby Diesel Generator for 132KV GIS Building | **Automatic, Mains Failure, Standby Diesel Generator** Complete with all fuel filling facilities, storage tanks, generator circuit breaker, control board, batteries, power cable to connections to the LVAC Services Board, also it shall be under an appropriate enclosure with it is auxiliary equipment keeping protected from the direct | **1 set** |

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|---|---|---|---|
| 132 kV GIS and AIS equipments | | | |
| **List No.** | **Name of Goods** | **Brief Description** | **Quantity** |
| | | sun. Installation will be safe from accidental trips. Generator is to be installed in the dedicated building; however, noise levels will be below those defined OSHA standards.<br>**Note: the rated power for the Diesel Generator (Not less than 200kVA) shall be determined by the contractor according to actual SS load, with spare of 20%.** | |