**ANNEXURE A2(a) / FORMAT IB**

**LIST OF ELEMENTS PROPOSED TO BE FIRST TIME ENERGIZED AND THEIR DETAILS**

**<Name of the User>**

1. **List of Elements to be first time energized:**
2. **Element Details:**
   1. **Transmission Line (AC/ HVDC)**

|  |  |  |
| --- | --- | --- |
| 1 | From Substation |  |
| 2 | To Substation |  |
| 3 | Voltage Level (kV) |  |
| 4 | Circuit Number |  |
| 5 | Owner |  |
| 6 | Tower Configuration (Single/Double/Multi Circuit Towers) |  |
| 7 | Total Line length (km) irrespective of ownership  (owner-wise breakup should also be mentioned) |  |
| 8 | Conductor Type and rated conductor temperature |  |
| 9 | No of Sub Conductors per phase (NSC) |  |
| 10 | Conductor Ampacity (per phase per conductor per circuit) |  |
| 11 | Thermal Capacity\* (MVA)  (Line capacity to be provided at Nominal Voltage and at specified conductor temperature & ambient temperature) |  |
| 12 | Modelling Parameters  (in per unit per circuit per kilometre at 100 MVA base): | |
| 12(a) | Positive Sequence:  R1 (Resistance), X1 (Reactance) and B1 (Susceptance) |  |
| 12(b) | Zero Sequence:  R0 (Resistance), X0 (Reactance) and B0 (Susceptance) |  |
| 12(c) | Mutual impedance:  Rom (Resistance), Xom (Reactance) |  |

* 1. **Transformer**

|  |  |  |
| --- | --- | --- |
| 1 | Type (Inter-Connecting / Station /Generating/Coupling) |  |
| 2 | Transformer Number |  |
| 3 | Make/Manufacturer |  |
| 4 | Owner |  |
| 5 | Voltage (HV kV /LV kV/ TerV kV) |  |
| 6 | Capacity (MVA) |  |
| 7 | Configuration (Single Phase/Three Phase) |  |
| 8 | Spare Transformer Unit (Yes/No) |  |
| 9 | Transformer Vector group |  |
| 10 | Total no of taps |  |
| 11 | Nominal Tap Position |  |
| 12 | Present Tap Position |  |
| 13 | Tertiary Winding Rating and Ratio |  |
| 14 | Percentage Impedance |  |

* 1. **Reactor**

|  |  |  |
| --- | --- | --- |
| 1 | Type (Bus/Line/Series) |  |
| 2 | Reactor Number |  |
| 3 | Make/Manufacturer |  |
| 4 | Owner |  |
| 5 | Substation Name |  |
| 6 | Line Name (in case of Line Reactor) |  |
| 7 | Rated Voltage (kV) |  |
| 8 | MVAR Rating |  |
| 9 | Configuration (Single Phase/Three Phase) |  |
| 10 | Spare Reactor Unit (Yes/No) |  |
| 11 | Type of Neutral Earthing (Whether NGR Connected/ Other) |  |
| 12 | NGR Rating |  |
| 13 | Percentage Impedance |  |
| 14 | Switchable / Non-Switchable |  |
| 15 | In case of Line Reactor, whether Convertible or Non-convertible as Bus Reactor |  |

* 1. **Filter Banks/Capacitor Banks**

|  |  |  |
| --- | --- | --- |
| 1 | Type |  |
| 2 | Make/Manufacturer |  |
| 3 | Owner |  |
| 4 | Substation Name |  |
| 5 | Filter/Capacitor Bank Number and Sub-Number |  |
| 6 | Rated Voltage (kV) |  |
| 7 | Rated Output/MVAR Rating (at nominal voltage and fundamental frequency) |  |
| 8 | Associated HVDC Pole Name and Number/ Associated RE plant Name and Capacity (MW) |  |
| 9 | Switchable / Non-Switchable |  |
| 10 | Whether used for mitigation of harmonics? |  |
| 11 | Ambient Temperature (°C) |  |

* 1. **Bus-Bar/Bays**

|  |  |  |
| --- | --- | --- |
| 1 | Substation Name |  |
| 2 | Substation Owner |  |
| 3 | Voltage Level (kV) |  |
| 4 | Substation Bus Scheme/Arrangement |  |
| 5 | Bus/Bay Type |  |
| 6 | Bus/Bay Number |  |
| 7 | Associated Transmission Element |  |

* 1. **Generating Unit**

|  |  |  |
| --- | --- | --- |
| 1 | Fuel/Source |  |
| 2 | Installed Capacity of generating station (MW) |  |
| 3 | Installed Capacity of generating station (MVA) |  |
| 4 | Maximum Continuous Rating (MCR) (MW) |  |
| 5 | Number x unit size (No x MW) |  |
| 6 | Time required for cold start (Minute) |  |
| 7 | Time required for warm start (Minute) |  |
| 8 | Time required for hot start (Minute) |  |
| 9 | Time required for combined cycle operation under cold conditions (Minute) |  |
| 10 | Time required for combined cycle operation under warm conditions (Minute) |  |
| 11 | Ramping up capability (% per minute) |  |
| 12 | Ramping down capability (% per minute) |  |
| 13 | Minimum turndown level (% of MCR) |  |
| 14 | Minimum turndown level (MW (ex-bus)) |  |
| 15 | Inverter Loading Ratio (DC/AC capacity) |  |
| 16 | Name of QCA (where applicable) |  |
| 17 | Full reservoir level (FRL) (Metre) |  |
| 18 | Design Head (Metre) |  |
| 19 | Minimum draw down level (MDDL) (Metre) |  |
| 20 | Water released at Design Head (M3/ MW) |  |
| 21 | Unit-wise forbidden zones (MW) |  |
| 22 | Associated Transmission System |  |

* 1. **Battery Energy Storage System (BESS)**

|  |  |  |
| --- | --- | --- |
| 1 | Substation Name |  |
| 2 | HV side and LV side Voltage Level (kV) |  |
| 3 | Type / Chemistry |  |
| 4 | Make/Manufacturer |  |
| 5 | Owner |  |
| 6 | Design capacity of battery in terms of MWh |  |
| 7 | Rated AC Power in terms of MW |  |
| 8 | Self-Discharge rate |  |
| 9 | Depth of Discharge (DOD) |  |
| 10 | Life cycle of battery |  |
| 11 | Number of Cycles per day |  |
| 12 | Round trip efficiency (AC-DC, DC-AC and AC-AC) |  |
| 13 | Number of series & parallel connected |  |
| 14 | Power/energy rating cells and modules |  |
| 15 | BESS design temperature |  |
| 16 | Black Start capability (Yes/No) |  |

**(Name and Designation of the authorized person with official seal)**

**(not below the rank of Assistant General Manager or equivalent)**

**Place:**

**Date:**