**ANNEXURE TPSP: DETAILS OF PUMPED STORAGE PLANTS (PSP)**

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| **TECHNICAL DETAILS OF THE HYDRO GENERATING UNIT/STATION:** | |
| **Description** | **Units** |
| Installed Capacity of generating station ( MW) |  |
| Installed Capacity of generating station ( MVA) |  |
| Maximum Continuous Rating (MCR) (MW) |  |
| Number x Unit size (No X MW) |  |
| Ramping up capability (% per minute) |  |
| Ramping down capability (% per minute) |  |
| Minimum turndown level ( % of MCR) |  |
| Minimum turndown level (MW (ex-bus)) |  |
| Full reservoir level (FRL) ( Metre) |  |
| Design Head ( Metre) |  |
| Maximum Head loss (metre) |  |
| Minimum draw down level (MDDL) ( Metre) |  |
| Water released at Design Head (M3/MW) |  |
| Unit-wise forbidden zones (MW) |  |
| Monthly designed energy (MU) |  |
| Design Energy Benefit (MU) |  |
| Energy content w.r.t. water level (MU) |  |
| Plant Load Factor (%) |  |
| **Mode change timings:** |  |
| 1. Standstill to Turbine Full load – |  |
| 2. Turbine Full Load to stand Still- |  |
| 3. Standstill to Pump Full load – |  |
| 4. Pump Full Load to stand still- |  |
| 5. Turbine Full load to Pump Operation- |  |
| 6. Pump Full load to Turbine Full load - |  |
| 7. Pump Condenser to Pump Full load - |  |
| 8. Pump Full load to Pump Condenser- |  |
| 9. Turbine No load to Turbine Condenser- |  |
| 10. Turbine Condenser to Turbine no load-  with and without SFC. Including in Diagram format |  |

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| **HYDRO PLANT DETAILS**  **PROJECT/ PLANT DETAILS** | | |
| 1 | Company Name: |  |
| 2 | Owner of the power station: |  |
| 3 | Project name and location: |  |
| 4 | Contact Number & Name of the Nodal person: Mr./ Ms. |  |
| 5 | Total Installed Capacity (MW): (e.g.2x100MW): |  |
| 6 | Turbine type: Francis /Kaplan / Pelton/Bulb/Any other |  |
| 7 | Turbine Generation Efficiency (%) |  |
| 8 | Intake River & Diversion dam: |  |
| 9 | Hydro station type - ROR/ ROR with poundage/Storage type: |  |
| 10 | In case of RoR generating station with pondage, what is the time period for which all the units  can run at their MCR using the available water stored in the pondage (considering full pondage water level) |  |
|  | **RESERVOIR DETAILS** | |
| 1 | Power station- Underground/Surface: |  |
| 2 | Full Reservoir Level (FRL),Minimum Draw Down Level (MDDL) in meters, Energy content at FRL and Target energy for financial year |  |
| 3 | Monthly design energy/10 daily energy: |  |
| 4 | Water usage (other than electricity production)- Irrigation/Flood control/ Bilateral treaty/ hydrology: |  |
| 5 | Which are the riparian States? |  |
| 6 | Is the Station part of the tandem hydro system? If yes then what are the constraints in operating the station? |  |
| 7 | Which is next hydro station (with pondage /reservoir) on the upstream and downstream side? |  |
| 8 | What is the accounting period for total water inflows and releases from the station? |  |
| 9 | Monthly pattern of release of water (over the day too) |  |
| 10 | What are the tools for forecasting the inflow silt etc. how much early (from the generation time)  In flow forecasting is available? Is there any tool for forecasting of generation from the plant? If yes, |  |
| 11 | If the reservoir water level and inflow being monitored in real time? Whether these parameters  are being recorded manually or automatically by a sensor? Also, Is the historical reservoir water |  |
|  | **BENEFICIARIES OF PLANT** | |
| 12 | Who owns the Station and Who operates the Hydro Electric Station? |  |
| 13 | Which are the entities having entitlement on the power generated from the Station? |  |
|  | **CONTROL/DIRECTION** | |
| 14 | Which agency assesses the water inflows for the river basin on which the hydro station is built? |  |
| 15 | Which are the sectors/ entities that are entitled for water usage from the reservoir? |  |
| 16 | Who decides the allocation of water available for different usage such as drinking water, irrigation, industrial use, tourism, power generation? |  |
| 17 | Is the Station operation governed under some water sharing treaty? |  |
| 18 | In case the hydro station has multiple beneficiaries- Who coordinate the scheduling? |  |
| 19 | Who manages the water releases? Who decides the quantum of water available for power generation? |  |
| 20 | Where is the offtake for water for irrigation/drinking water- From the upstream from the reservoir or  downstream of the tail race? What is the operating domain for the plant operator with respect to the |  |

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| 21 | What is the philosophy for despatching the station - (managing peak demand / load following / ramping / deviation control / other) |  |
| 22 | How is the station compensated for the energy generated? Is the tariff multi-part or single part? |  |
|  | **PUMPED MODE OPERATION** | |
| 23 | Pumped Storage Capability available (Y/N), If yes operational since when? /Reason for Not utilized |  |
| 24 | In case of a pumped storage station, can the water be released when the lower reservoir is full? |  |
|  | **SCHEDULING ASPECTS** | |
| 25 | Is the Station given a day-ahead schedule? If yes, can the schedule be revised in real- time? |  |
| 26 | What are the considerations/aspects to be taken care while revising day-ahead injection schedule? |  |
|  | Operations |  |
| 27 | Unit wise lower and upper limit of Vibration zone or Forbidden zone in MW. Specify the operating range of each unit. |  |
| 28 | Does the station have overload capacity (Yes/No)? If yes, how much? |  |
| 29 | Time required for synchronizing the unit and Time from synchronization to full load. |  |
| 30 | Is the station capable of operating in condenser mode? If yes, has it ever operated in this mode? |  |
| 31 | Is the station capable of black start (Yes/No) & AGC (Yes/No). Specify the capacity of DG set? |  |
| 32 | Who assesses the performance of the station? What are the indices for measuring the performance of the station? |  |
| 33 | What is the periodicity of assessing the performance and any incentive scheme? |  |
| 34 | Whether units are capable of accepting simulated frequency signals for third party Primary Frequency Response (PFR) testing |  |
| **35** | **Operational constraint** |  |
| 36 | Regarding speed governor:   1. What is the minimum speed droop setting possible? 2. Whether the ripple filter is programmed at previously sampled frequency or 50 Hz? eg. If frequency change from 50.02 Hz to 50.05 Hz is observed by the governor, whether response shall be provided or not? 3. What is the sampling rate for monitoring and data recording in speed governor system and AVR system? d. What is the maximum period of storage of generator data in Data Acquisition System (DAS)? e.g. 1 year, 3 year, 5 year, etc.? |  |