|  |
| --- |
| **FOR INTERNAL USE ONLY** |
| **Project Number:** |
| **Queue Date:** |

**Generation Interconnection Study Data Sheet – Synchronous Machines**

Customers must provide the following information in its entirety. (Add Company Name) will not proceed with an interconnection study until all data is received and confirmed to be practical. (Add Company Name) uses power technology incorporated (PTI) or IEEE standard models to perform power flow and stability analysis. If the information provided conforms to a PTI or IEEE model, please specify. Study results are dependent on study data provided by the customer. Notification of changes to data should be provided to the cooperative, in writing, as promptly as possible. Any change in the study data will have an impact on the performance of the study and the study results provided.

\*\*\*\*\*\*\*

|  |  |
| --- | --- |
| Application Date: |  |
| Datasheet Revision #:  |
| Revision Date:  |

**REQUESTOR OF INTERCONNECTION STUDY**

|  |  |
| --- | --- |
| Company Name:  | Company Phone Number:  |
| Company Address:  |
| Company City/State/Zip Code: |
| Project Name: |
| Project Address:  |
| Project City/State/Zip Code: |  |
| Contact Name:  |   |
| Contact Title:  |  |
| Contact Phone Number:  | Email:  |

**DESCRIPTION OF REQUEST**

|  |
| --- |
| 1. **Type of Request (i.e. ERIS, NRIS, IPP):** Choose an item.
 |
| **2) Is this request an alternate to another request?** *NOTE: This information is needed to alleviate duplication of analysis of generation requests.*YES \_\_\_\_\_\_\_\_ NO \_\_\_\_\_\_\_\_*If yes, please indicate location and M/MVA of other request.*Location: MW/MVA: *When making multiple requests for interconnection, the customer is required to provide a separate datasheet for each request.* |

|  |
| --- |
| 1. **Maximum Gross Capacity**:
	1. MW at °F Ambient and % Relative Humidity
	2. Will generation be installed incrementally? YES \_\_\_\_\_\_\_\_ NO \_\_\_\_\_\_\_\_
	3. Portion of request which is designated a network resource: %
	4. Portion of request for interconnection service only: %
	5. Number of machines:
 |
| 1. **Location of Interconnection**
	1. County: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Distance of customer plant from ITS point of interconnection: miles
	3. Substation or Transmission Line: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |
| 1. **Single-Line Diagram**:
	1. Requestor must provide a dimensioned *(in miles)* single-line diagram illustrating the proposed customer switchyard and the distance of the proposed point of interconnection from the nearest existing substation. Please include information on:GSU *(HV-LV)* connection and winding, and three-winding generator step-up (GSU) transformer.
	2. When making multiple requests for interconnection, the Requestor is required to provide this information for each request.
 |
| **Single Line Diagram of Requestor’s Project: Please draw diagram here or attach file.** |
| 1. **Key Dates:**
	1. Expected In Service Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Expected Synchronization Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. Expected Commercial Operation Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |
| **7) Voltage level requested for interconnection**: \_\_\_\_\_\_\_\_kV |

**GENERATOR MACHINE DATA**

|  |
| --- |
| 1. **Type of Generation and fuel(s)** *(Simple Cycle, Combined Cycle, Cogeneration, etc.*) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **2) Expected Load Factor of Generation**:  | **3) Generator Base MVA**:  |
| 1. **Generator Active Power Gross Output at 60 % Relative Humidity for Change in Ambient Temperature:**
	1. Maximum Gross Output: ii) Minimum Gross Output:

 MW at 40°F MW at 40°F MW at 59°F MW at 59°F MW at 95°F MW at 95°F**Generator Active Power Gross Output at °F Ambient for Change in Humidity:**iii) Maximum Gross Output: iv) Minimum Gross Output: MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity MW at % Relative Humidity  |
| **5) Generator Rated Terminal Power Factor:**Lagging: Leading:  |
| **6) Generator Reactive Power Output at Rated Power Factor:**Maximum Gross Output: Minimum Gross Output: MVAr at 40°F MVAr at 40°F MVAr at 59°F MVAr at 59°F MVAr at 95°F MVAr at 95°F |
| **7) Generator Rated Terminal Voltage:** \_\_\_\_\_\_\_\_kV |
| **8) Generation Saturation Factor Data:** Attach Generator(s) Saturation Curves |
| **9)** S (1.0): S (1.2):  |
| **10) Attach Generator(s) Capability Curve(s) at Rated Terminal Voltage and Rated Power Factor(s)** |
| **11) Attach Generator(s) Performance V-Curves** |

|  |
| --- |
| 1. **Provide all Applicable Generator(s) Reactance in per unit on Machine MVA Base:**
	1. **Direct-axis synchronous *Unsaturated*:**

*reactance* Xd = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ *transient reactance* Xd’= \_\_\_\_\_\_\_\_\_\_\_\_\_\_ *sub-transient reactance* Xd” = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ *armature resistance RA*’= \_\_\_\_\_\_\_\_\_\_\_\_\_\_* 1. **Direct-axis synchronous *Saturated*:**

*reactance* Xd = \_\_\_\_\_\_\_\_\_\_\_\_\_\_*transient reactance* Xd’= \_\_\_\_\_\_\_\_\_\_\_\_\_\_*sub-transient reactance* Xd” = \_\_\_\_\_\_\_\_\_\_\_\_\_\_* 1. **Quadrature-axis synchronous *Unsaturated*:**

*reactance* Xq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_*transient reactance* Xq' = \_\_\_\_\_\_\_\_\_\_\_\_\_\_*sub-transient reactance* Xq” = \_\_\_\_\_\_\_\_\_\_\_\_\_\_* 1. **Quadrature-axis synchronous *Saturated*:**

*reactance* Xq = \_\_\_\_\_\_\_\_\_\_\_\_\_\_*transient reactance* Xq’= \_\_\_\_\_\_\_\_\_\_\_\_\_\_*sub-transient reactance* Xq” = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **13) Leakage reactance** Xl = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 1. **Z (Impedance)**
	1. Negative sequence Z = \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Zero sequence Z = \_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |
|  **15) Generator neutral grounding transformer type** *(as show on one-line diagram): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* |
| **16) Generator neutral grounding resistor** – provided in item ***12*** *(as show on one-line diagram): \_\_\_\_\_\_\_\_\_\_\_\_\_* |

**APPLICABLE TIME CONSTANTS (IN SECONDS)**

|  |  |
| --- | --- |
| **1)** Tdo’ = *(D-axis transient open-circuit time constant)* | **2)** Tdo” = *(D-axis sub-transient open-circuit time constant)* |
| **3)** Tqo’= *(Q-axis transient open-circuit time constant)* | **4)** Tqo” = *(Q -axis sub-transient open-circuit time constant)* |
| **5)** Td’ = *(D-axis transient short-circuit time constant)* | **6)** Td” = *(D-axis sub-transient short-circuit time constant)* |
| 1. Tq’=

*(Q-axis transient short-circuit time constant)* | **8)** Tq” = *(Q-axis sub-transient short-circuit time constant)* |
| **9)** Turbine-Generator combined inertia constant *(H) (KW-sec/KVA)*:  | **10)** Speed damping factor, D =  |
| **11)** Provide positive, negative and zero sequence reactance in per unit:  | **12)** Neutral grounding resistor in Ohms unit *(if applicable)*: *Ohms* |
| **13)** Phase: Single: \_\_\_\_\_\_ Three: \_\_\_\_\_\_\_\_ | **14)** R.P.M.: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **15)** Frequency: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **16)** Describe if any MUST-RUN designation is applicable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**GENERATOR MODEL DATA**

|  |
| --- |
| Please attach documentation for the following information:1. Generator model type selected *(example: Round Rotor generator model (GENROU) and Salient pole generator model (GENSAL).*
2. Valid model data for dynamic simulation corresponding to the models selected.

***\*\* It is preferred that dynamic data submitted is in version 30 PSS/E data sheet format and the selected models conform to IEEE or PTI models. \*\**** |

**EXCITATION SYSTEM DATA**

|  |
| --- |
| Please attach documentation for the following information: 1. Excitation system model *(exciter and A.V.R.)* model type selected.
2. Power compensator model selected *(if applicable)*.
3. Power Stabilizer models selected *(if applicable)*.
4. Block diagrams for each model selected in **1)** through **3)** above.
5. All applicable gains, time constants, limits, and saturation constants.
6. Appropriate nomenclature sheet describing parameters together with tabulated parameter values.

***\*\* It is preferred that dynamic data submitted is in version 30 PSS/E data sheet format and the selected models conform to IEEE or PTI models*. \*\*** |

**TURBINE-GOVERNOR SYSTEM DATA**

|  |
| --- |
| Please attach documentation for the following information: 1. Governor model type selected.
2. Block diagrams for each model selected in **1)**.
3. All applicable gains, time constants, and limits.
4. Appropriate nomenclature sheet describing parameters together with tabulated parameter values.

***\*\* It is preferred that dynamic data submitted is in version 30 PSS/E data sheet format and the selected models conform to IEEE or PTI models. \*\**** |

**CIRCUIT BREAKER / PROTECTION SWITCH DATA**

|  |
| --- |
| 1) Rated Voltage in kV *(maximum, R.M.S., Line-to-line, 60 Hz Operating Voltage):*  |
| 2) Rated Ampere *(Maximum, R.M.S., continuous, 60 Hz rated current)*:  |
| 3) Interrupting Rating:  |
| 4) Cycle rating for interruption *(Rated interrupting time):*  |
| 5) BIL Rating:  |
| 6) Interrupting and insulating media:  |
| 7) Tripping and closing control voltages:  |
| 8) Relay accuracy class:  |
| 9) Cycles required for interrupting:  |

**GENERATOR STEP-UP TRANSFORMER DATA**

|  |
| --- |
| 1. **Two-winding step-up (GSU) transformer Data** *(if applicable):*
	1. Transformer Base MVA *(for impedance)*:
	2. Full Load Ratings *(OA/FA/FOA)*:
	3. Sequence impedance *(R and X)* in per unit: Positive: Negative: Zero:
	4. Available Tap positions:
	5. Voltage in kV: Rated High Side: Rated Low side:
	6. X/R ratio
	7. Neutral grounding Resistor in Ohms *(if applicable):*
	8. GSU *(HV-LV)* Connection and winding *(Please show on the single line diagram in section #5 above.)*
	9. BIL Rating:
	10. Impedance to ground:
	11. Load losses in watts:
	12. Current Tap position:
 |
| 1. **Three-winding Generator step-up (GSU) transformer Data *(if applicable):***
	1. Provide connection and winding *(Please show on the single line diagram in section #5 above.)*
	2. Provide the following:
		1. ***H-Winding Data:***

Full Load MVA Rating *(i.e. OA/FA/FOA)* Rated kV base: Grounding Data: BIL Rating: * + 1. ***X-Winding Data:***

Full Load MVA Rating *(i.e. OA/FA/FOA)* Rated kV base: Grounding Data: BIL Rating: * + 1. ***Y-Winding Data***:

Full Load MVA Rating *(i.e. OA/FA/FOA)* Rated kV base: Grounding Data: BIL Rating: * + 1. ***H-X Winding Data:***

Transformer base for impedance: MVASequence impedance: Positive: R: per unit X: per unit Negative: R: per unit X: per unitZero: R: per unit X: per unitAvailable Tap positions: Current Tap position: * + 1. ***H-Y Winding Data:***

Transformer base for impedance: MVASequence impedance: Positive: R: per unit X: per unit Negative: : R: per unit X: per unitZero: R: per unit X: per unitAvailable Tap positions: Current Tap position: * + 1. ***X-Y winding Data:***

Transformer base for impedance: MVASequence impedance: Positive: R: per unit X: per unit Negative: R: per unit X: per unitZero: R: per unit X: per unitAvailable Tap positions: Current Tap position:  |

**STATION AUXILIARY LOAD**

|  |
| --- |
| **1) For total plant (MW and MVAr):**  |
| **2) Served through which transformer(s) – (*e.g., the 2 CT GSU’s of the 2-on-1 CC*):**  |
| **3) Amount served through each transformer (MW and MVAr):**  |