APPENDIX 1 to LGIP

INTERCONNECTION REQUEST

FOR A LARGE GENERATING

FACILITY

1. The undersigned Interconnection Customer submits this request to interconnect its Large Generating Facility with Transmission Provider's Transmission System pursuant to a Tariff.

2. This Interconnection Request is for (check one):

   ____A proposed new Large Generating Facility.

   ____An increase in the generating capacity or a Material Modification of an existing Generating Facility.

3. The type of interconnection service requested (check one):

   ____Energy Resource Interconnection Service

   ____Network Resource Interconnection Service

4. ____Check here only if Interconnection Customer requesting Network Resource Interconnection Service also seeks to have its Generating Facility studied for Energy Resource Interconnection Service

5. Interconnection Customer provides the following information:

   a. Address or location or the proposed new Large Generating Facility site (to the extent known) or, in the case of an existing Generating Facility, the name and specific location of the existing Generating Facility;

b. Maximum summer at _____degrees C and winter at _degrees C megawatt electrical output of the proposed new Large Generating Facility or the amount of megawatt increase in the generating capacity of an existing Generating Facility;

c. General description of the equipment configuration;

d. Commercial Operation Date (Day, Month, and Year);

e. Name, address, telephone number, and e-mail address of Interconnection Customer's contact person;

f. Approximate location of the proposed Point of Interconnection (optional);

g. Interconnection Customer Data (set forth in Attachment A);

h. Primary frequency response operating range for electric storage resources;

i. Requested capacity (in MW) of Interconnection Service (if lower than the Generating Facility Capacity);

j. If applicable, (1) the requested operating assumptions (i.e., whether the interconnecting Generating Facility will or will not charge at peak load) to be used by Transmission Provider that reflect the proposed charging behavior of a Generating Facility that includes at least one electric storage resource, and (2) a description of any control technologies (software and/or hardware) that will limit the operation of the Generating Facility to its intended operation.

k. The expected time during which the generating facility will remain in operation and will maintain site control of the land upon which it is constructed.

6. Applicable deposit amount as specified in the LGIP.

7. Evidence of Site Control as specified in the LGIP (check one)

____ Is attached to this Interconnection Request

____ Will be provided at a later date in accordance with this LGIP

8. This Interconnection Request shall be submitted to the representative indicated below:

{To be completed by Transmission Provider}

9. Representative of Interconnection Customer to contact:

{To be completed by Interconnection Customer}

10. This Interconnection Request is submitted by:

Name of Interconnection Customer: ________________________________

By (signature): ____

Name (type or print): ____

Title: ____

Date: _______________

Attachment A to Appendix 1

Interconnection Request

LARGE GENERATING FACILITY DATA

UNIT RATINGS

kVA ________ °F ____ Voltage ________

Power Factor ____

Speed (RPM) ____ Connection (e.g. Wye) ______________________________

Short Circuit Ratio ___ Frequency, Hertz _______

Stator Amperes at Rated kVA _______ Field Volts __________

Max Turbine MW _______°F _______

Primary frequency response operating range for electric storage resources:

Minimum State of Charge:____________

Maximum State of Charge:___________

COMBINED TURBINE-GENERATOR-EXCITER INERTIA DATA

Inertia Constant, H = ___________ kW sec/kVA

Moment-of-Inertia, WR^2 =____________ lb. $ft.^2$

REACTANCE DATA (PER UNIT-RATED KVA)

	DIRECT AXIS		QUADRATURE AXIS	
Synchronous – saturated	X_{dv}	__________	X_{qv}	__________
Synchronous – unsaturated	X_{di}	__________	X_{qi}	__________
Transient – saturated	X'_{dv}	__________	X'_{qv}	__________
Transient – unsaturated	X'_{di}	__________	X'_{qi}	__________
Subtransient – saturated	X''_{dv}	__________	X''_{qv}	__________
Subtransient – unsaturated	X''_{di}	__________	X''_{qi}	__________
Negative Sequence – saturated	$X2_{v}$	__________		
Negative Sequence – unsaturated	$X2_{i}$	__________		
Zero Sequence – saturated	$X0_{v}$	__________		
Zero Sequence – unsaturated	$X0_{i}$	__________		
Leakage Reactance	Xl_{m}	__________		

FIELD TIME CONSTANT DATA (SEC)

Open Circuit	T'_{do} __________	$T'qo$ _________
Three-Phase Short Circuit	T'_{d3} ____	T'_{q} ________
Transient Line to Line Short	T'_{d2} _______	
Circuit Transient Line to Neutral	_______	
Short Circuit Transient	T'_{d1} _______	
Short Circuit Subtransient	T''_{d} _______	T''_{q} ________
Open Circuit Subtransient	T''_{do} ________	T''_{qo} ________

ARMATURE TIME CONSTANT DATA (SEC)

Three Phase Short Circuit	T_{a3}______
Line to Line Short Circuit	T_{a2}______
Line to Neutral Short Circuit	T_{a1}______

NOTE: If requested information is not applicable, indicate by marking “N/A.”

MW CAPABILITY AND PLANT CONFIGURATION

LARGE GENERATING FACILITY DATA

ARMATURE WINDING RESISTANCE DATA (PER UNIT)

Positive	R_1	________
Negative	R_2	________
Zero	R_0	________

Rotor Short Time Thermal Capacity I_2^2t = __

Field Current at Rated kVA, Armature Voltage and PF = ______amps Field Current at

Rated kVA and Armature Voltage, 0 PF = __________________amps Three Phase

Armature Winding Capacitance = _____________microfarad

Field Winding Resistance = __ohms ______°C

Armature Winding Resistance (Per Phase) = __ohms ______°C

CURVES

Provide Saturation, Vee, Reactive Capability, Capacity Temperature Correction curves. Designate normal and emergency Hydrogen Pressure operating range for multiple curves.

GENERATOR STEP-UP TRANSFORMER DATA RATINGS

Capacity Self-cooled/ Maximum Nameplate

_________/________________kVA

Voltage Ratio(Generator Side/System side/Tertiary)

_________/_______________/_______________kV

Winding Connections (Low V/High V/Tertiary V (Delta or Wye))

________/______________/________________

Fixed Taps Available ____

Present Tap Setting ____

IMPEDANCE

Positive Z_1 (on self-cooled kVA rating)______________% ________________X/R

Zero Z_0 (on self-cooled kVA rating)_______________% ________________X/R

EXCITATION SYSTEM DATA

Identify appropriate IEEE model block diagram of excitation system and power system stabilizer (PSS) for computer representation in power system stability simulations and the corresponding excitation system and PSS constants for use in the model.

GOVERNOR SYSTEM DATA

Identify appropriate IEEE model block diagram of governor system for computer representation in power system stability simulations and the corresponding governor system constants for use in the model.

WIND GENERATORS

Number of generators to be interconnected pursuant to this Interconnection Request:

____

Elevation: ________ ______Single Phase ______Three Phase

Inverter manufacturer, model name, number, and version:

____

List of adjustable setpoints for the protective equipment or software:

____

Note: A completed General Electric Company Power Systems Load Flow (PSLF) data sheet or other compatible formats, such as IEEE and PTI power flow models, must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device, then they shall be provided and discussed at Scoping Meeting.

INDUCTION GENERATORS

(*) Field Volts: ____________

(*) Field Amperes: _________

(*) Motoring Power (kW): ___

(*) Neutral Grounding Resistor (If Applicable): _______

(*) $I2^2t$ or K (Heating Time Constant): ______

(*) Rotor Resistance: _______

(*) Stator Resistance: _______

(*) Stator Reactance: ________

(*) Rotor Reactance: ________

(*) Magnetizing Reactance: ______

(*) Short Circuit Reactance: ______

(*) Exciting Current: ___________

(*) Temperature Rise: ___________

(*) Frame Size: __________

(*) Design Letter: ________

(*) Reactive Power Required In Vars (No Load): ___

(*) Reactive Power Required In Vars (Full Load): ___

(*) Total Rotating Inertia, H: ___Per Unit on KVA Base

Note: Please consult Transmission Provider prior to submitting the Interconnection Request to determine if the information designated by (*) is required.

MODELS FOR NON-SYNCHRONOUS GENERATORS

For a non-synchronous Large Generating Facility, Interconnection Customer shall provide (1) a validated user-defined root mean squared (RMS) positive sequence dynamics model; (2) an appropriately parameterized generic library RMS positive sequence dynamics model, including model block diagram of the inverter control and plant control systems, as defined by the selection in Table 1 or a model otherwise approved by the Western Electricity Coordinating Council, that corresponds to Interconnection Customer's Large Generating Facility; and (3) if applicable, a validated electromagnetic transient model if Transmission Provider performs an electromagnetic transient study as part of the interconnection study process. A user-defined model is a set of programming code created by equipment manufacturers or developers that captures the latest features of controllers that are mainly software based and represents the entities' control strategies but does not necessarily correspond to any generic library model.

Interconnection Customer must also demonstrate that the model is validated by providing evidence that the equipment behavior is consistent with the model behavior (e.g., an attestation from Interconnection Customer that the model accurately represents the entire Large Generating Facility; attestations from each equipment manufacturer that the user defined model accurately represents the component of the Large Generating Facility; or test data).

Table 1: Acceptable Generic Library RMS Positive Sequence Dynamics Models

GE PSLF	Siemens PSS/E*	PowerWorld Simulator	Description
pvd1		PVD1	Distributed PV system model
der_a	DERAU1	DER_A	Distributed energy resource model
regc_a	REGCAU1, REGCA1	REGC_A	Generator/converter model

GE PSLF	Siemens PSS/E*	PowerWorld Simulator	Description
regc_b	REGCBU1	REGC_B	Generator/converter model
wt1g	WT1G1	WT1G and WT1G1	Wind turbine model for Type-1 wind turbines (conventional directly connected induction generator)
wt2g	WT2G1	WT2G and WT2G1	Generator model for generic Type-2 wind turbines
wt2e	WT2E1	WT2E and WT2E1	Rotor resistance control model for wound-rotor induction wind-turbine generator wt2g
reec_a	REECAU1, REECA1	REEC_A	Renewable energy electrical control model
reec_c	REECCU1	REEC_C	Electrical control model for battery energy storage system
reec_d	REECDU1	REEC_D	Renewable energy electrical control model
wt1t	WT12T1	WT1T and WT12T1	Wind turbine model for Type-1 wind turbines (conventional directly connected induction generator)
wt1p_b	wt1p_b	WT12A1U_B	Generic wind turbine pitch controller for WTGs of Types 1 and 2
wt2t	WT12T1	WT2T	Wind turbine model for Type-2 wind turbines (directly connected induction generator wind turbines with an external rotor resistance)
wtgt_a	WTDTAU1, WTDTA1	WTGT_A	Wind turbine drive train model
wtga_a	WTARAU1, WTARA1	WTGA_A	Simple aerodynamic model
wtgp_a	WTPTAU1, WTPTA1	WTGPT_A	Wind Turbine Generator Pitch controller

GE PSLF	Siemens PSS/E*	PowerWorld Simulator	Description
wtgq_a	WTTQAU1, WTTQA1	WTGTRQ_A	Wind Turbine Generator Torque controller
wtgwgo_a	WTGWGOAU	WTGWGO_A	Supplementary control model for Weak Grids
wtgibffr_a	WTGIBFFRA	WTGIBFFR_A	Inertial-base fast frequency response control
wtgp_b	WTPTBU1	WTGPT_B	Wind Turbine Generator Pitch controller
wtgt_b	WTDTBU1	WTGT_B	Drive train model
repc_a	Type 4: REPCAU1 (v33), REPCA1 (v34) Type 3: REPCTAU1 (v33), REPCTA1 (v34)	REPC_A	Power Plant Controller

GE PSLF	**Siemens PSS/E***	**PowerWorld Simulator**	**Description**
repc_b	PLNTBU1	REPC_B	Power Plant Level Controller for controlling several plants/devices In regard to Siemens PSS/E*: Names of other models for interface with other devices: REA3XBU1, REAX4BU1- for interface with Type 3 and 4 renewable machines SWSAXBU1- for interface with SVC (modeled as switched shunt in powerflow) SYNAXBU1- for interface with synchronous condenser FCTAXBU1- for interface with FACTS device
repc_c	REPCC U	REPC_C	Power plant controller