State of North Dakota

Engineering data submittal

For interconnection of distributed generation to Otter Tail Power Company

WHO SHOULD FILE THIS SUBMITTAL : Anyone in the final stages of in terconnecting a Generation System with Otter Tail Power. This submittal shall be completed and provided to Otter Tail Power's Generation Interconnection Coordinator during the design of the Generation System, as established in the "Otter Tail Power's State of North Dakota Interconnection Process for Distributed Generation Systems".

INFORMATION: This submittal is used to document the interconnected Generation System. The Applicant shall complete as much of the form as applicable. The Applicant will be contacted if additional information is required.

OWNER / APPLICANT		
Company / Applicant:		
Representative:	Phone Number:	FAX Number:
Title:		
Mailing Address:		
Email Address:		

PROPOSED LOCATION OF GENERATION SYSTEM INTERCONNECTION
Street Address, Legal Description or GPS coordinates:

PROJECT DESIGN / ENGINEERING (if applicable)		
Company:		
Representative:	Phone:	FAX Number:
Mailing Address:		
Email Address:		

ELECTRICAL CONTRACTOR (if applicable)		
Company:		
Representative:	Phone:	FAX Number:
Mailing Address:		
Email Address:		

TYPE OF INTERCONNECTED OPERATION	
Interconnection / Transfer method: □ Open □ Quick Open □ Closed □ Soft Loading □ Inverter	
Proposed use of generation: (Check all that may apply) □ Peak Reduction □ Standby □ Energy Sales □ Cover Load	Duration Parallel: □ None □ Limited □ Continuous
Pre-Certified System: Yes / No (Circle one)	Exporting Energy Yes / No (Circle one)

GENERATION SYSTEM OPERATION / MAINTENANCE CONTACT INFORMATION		
Maintenance Provider:	Phone #:	Pager #:
Operator Name:	Phone #:	Pager #:
Person to Contact before remote starting of units		
Contact Name:	Phone #:	Pager #:
	24hr Phone #:	

GENERATION SYSTEM OPERATING INFORMATION	
Fuel Capacity (gals):	Full Fuel Run-time (hrs):
Engine Cool Down Duration (Minutes):	Start time Delay on Load Shed signal:
Start Time Delay on Outage (Seconds):	

ESTIMATED LOAD		
The following information will be used to help properly design the interconnection. This Information is not intended as a commitment or contract for billing purposes.		
Minimum anticipated load (generation not operating):	kW:	kVA:
Maximum anticipated load (generation not operating):	kW:	kVA:

REQUESTED CONSTRUCTION START/COMPLETION DATES	
Design Completion:	
Construction Start Date:	
Footings in place:	
Primary Wiring Completion:	
Control Wiring Completion:	
Start Acceptance Testing:	
Generation operational (In-service):	

(Complete all applicable items, Copy this page as required for additional generators)

SYNCHRONOUS GENERATOR (if applicable)

Unit Number:	Total number of units with listed specifications on site:		
Manufacturer:	Type:	Phases: 1 or 3	
Serial Number (each)	Date of manufacture:	Speed (RPM):	Freq. (Hz);
Rated Output (each unit) kW Standby:	kW Prime:	kVA:	
Rated Power Factor (%):	Rated Voltage(Volts):	Rated Current (Amperes):	
Field Voltage (Volts):	Field Current (Amperes):	Motoring Power (kW):	

Synchronous Reactance (X_d):	% on	kVA base
Transient Reactance (X'_d):	% on	kVA base
Subtransient Reactance (X''_d):	% on	kVA base
Negative Sequence Reactance (X_s):	% on	kVA base
Zero Sequence Reactance (X_o):	% on	kVA base

Neutral Grounding Resistor (if applicable):

I^2t or K (heating time constant):

Exciter data:

Governor data:

Additional Information:

INDUCTION GENERATOR (if applicable)

Rotor Resistance (R_r): Ohms	Stator Resistance (R_s): Ohms
Rotor Reactance (X_r): Ohms	Stator Reactance (X_s): Ohms
Magnetizing Reactance (X_m): Ohms	Short Circuit Reactance (X_d''): Ohms
Design Letter:	Frame Size:
Exciting Current:	Temp Rise (deg C°):
Rated Output (kW):	
Reactive Power Required: k Vars (no Load)	kVars (full load)

If this is a wound-rotor machine, describe any exter nal equipment to be connected (resistor, rheostat, power converter, etc.) to rotor circuit, and circ uit configuration. Describe ability, if any, to adjust generator reactive output to provide power system voltage regulation.

Additional Information:

PRIME MOVER (Complete all applicable items)

Unit Number:	Type:		
Manufacturer:			
Serial Number:		Date of Manufacture:	
H.P. Rated:	H.P. Max:	Inertia Constant: lb.-ft.^{2}	
Energy Source (hydro, steam, wind, wind etc.):			

INTERCONNECTION (STEP-UP) TRANSFORMER (If applicable)		
Manufacturer:	kVA:	
Date of Manufacture:	Serial Number:	
High Voltage: kV	Connection: delta wye	Neutral solidly grounded?
Low Voltage: kV	Connection: delta wye	Neutral solidly grounded?
Transformer Impedance (Z):	% on	kVA base
Transformer Resistance (R):	% on	kVA base
Transformer Reactance (X):	% on	kVA base
Neutral Grounding Resistor (if applicable)		

TRANSFER SWITCH (If applicable)	
Model Number:	Type:
Manufacturer:	Rating(amps):

INVERTER (If applicable)		
Manufacturer:	Model:	
Rated Power Factor (%):	Rated Voltage (Volts):	Rated Current (Amperes):
Inverter Type (ferroresonant, step, pulse-width modulation, etc.):		
Type of Commutation: forced line	Minimum Short Circuit Ratio required:	
Minimum voltage for successful commutation:		
Current Harmonic Distortion Maximum	Maximum Individual Harmonic (%): Total Harmonic Distortion (%):	
Voltage Harmonic Distortion Maximum	Maximum Individual Harmonic (%): Total Harmonic Distortion (%):	
Describe capability, if any, to adjust reactive output to provide voltage regulation:		
NOTE: *Attach all available calculations, test reports, and oscillographic prints showing inverter output voltage and current waveforms.*		

POWER CIRCUIT BREAKER (if applicable)					
Manufacturer:	Model:				
Rated Voltage (kilovolts):	Rated Ampacity (Amperes):				
Interrupting Rating (Amperes):	BIL Rating:				
Interrupting Medium (vacuum, oil, gas, etc.)	Insulating Medium (vacuum, oil, gas, etc.)				
Control Voltage (Closing): (Volts)	AC	DC			
Control Voltage (Tripping): (Volts)	AC	DC	Battery	Charged Capacitor	
Close Energy (circle one):	Spring	Motor	Hydraulic	Pneumatic	Other
Trip Energy (circle one):	Spring	Motor	Hydraulic	Pneumatic	Other
Bushing Current Transformers (Max. ratio):	Relay Accuracy Class:				
CT'S Multi Ratio? (circle one); No / Yes:	(Available taps):				

MISCELLANEOUS (Use this area and any additional sheets for applicable notes and comments)

SIGN OFF AREA
This Engineering Data Submittal documents the equipment and design of the Generation System. We agree to supply Otter Tail Power with an updated Engineering Data Submittal any time significant changes are made in the equipment used or the design of the proposed Generation System. The Applicant agrees to design, operate and maintain the Generation System within the requirements set forth by the "Otter Tail Power's State of North Dakota Distributed Generation Interconnection Requirements".
Applicant Name (print):
Applicant Signature: **Date:**

SEND THIS COMPLETED & SIGNED ENGINEERING DATA SUBMITTAL AND ANY ATTACHMENTS TO OTTER TAIL POWER'S GENERATION INTERCONNECTION COORDINATOR