Upper Peninsula Power Company

GENERATOR INTERCONNECTION APPLICATION

Category 4

For All Projects with Aggregate Generator Output of More Than 550 kW but Less Than or Equal to 2 MW

ELECTRIC UTILITY CONTACT INFORMATION	FOR OFFICE USE ONLY
Upper Peninsula Power Company ATTN: Account Manager 500 N Washington Street Ishpeming, MI 49849 (906) 449-2013 customergeneration@uppco.com	Application Number Date and Time Application Received

CUSTOMER / ACCOUNT INFORMATION

Electric Utility Customer Information (As shown on utility bill)

Customer Name (Last, First, Middle)	Customer Mailing Address
Customer Phone Number	Customer E-mail Address (Optional)

INSTALLATION INFORMATION

Project Developer/Single Point of Contact

Name	Phone Number	Fax Number
Address		
E-Mail Address		
Project Site Address		

GENERATION SYSTEM SITE INFORMATION

Project Type (Base load, Peaking, Intermediate)	Energization Date for Project Interconnection Facilities
First Parallel Operation Date for Testing	Project Commercial Operation Date
Estimated Project Cost	Operation Mode

Attached Customer's Proof of General Liability Insurance for a minimum of $1,000,000

Page # _____

(Per MPSC Order in Case No. U-15787 – Customer must maintain a minimum of $1,000,000 General Liability Insurance.)

Attached Site Plan

Page # _____

Attached Electrical One-Line Drawing

Page # _____

(Per MPSC Order in Case No. U-15787 – The One-Line Drawing must be signed and sealed by a licensed professional engineer, licensed in the State of Michigan.)

- **See Page 6 for sample Site Plan**
- **See Page 7 for sample of Synchronous Generator Electrical One-Line Drawing**
- **See Page 8 for sample of Induction Generator Electrical One-Line Drawing**

Attached Specification for Equipment

Page # _____

ISOLATING TRANSFORMER(S) BETWEEN GENERATOR(S) AND UTILITY

Transformer Model Number	Transformer Manufacturer
Rated kV and connection (delta, wye, wye-gnd) of each winding	kVA of each winding (kW)
BIL of each winding	Fixed taps available for each winding (kW)
Positive/Negative range for any LTC windings	%Z impedance on transformer self cooled rating (kW)
Percent Excitation current at rated kV	Load Loss Watts at full load or X/R ratio (kW)

SYNCHRONOUS, INDUCTION AND INVERTER GENERATOR - BASED SYSTEMS
(Must complete Page 3, Page 4 or Page 5 and attach Electrical One-Line Drawing

The following information on these system components shall appear on the Electrical One-Line Drawing:

- **Breakers – Rating, location and normal operating status (open or closed)**
- **Buses – Operating voltage**
- **Capacitors – Size of bank in Kvar**
- **Circuit Switchers – Rating, location and normal operating status (open or closed)**
- **Current Transformers – Overall ratio, connected ratio**
- **Fuses – Normal operating status, rating (Amps), type**
- **Generators – Capacity rating (kVA), location, type, method of grounding**
- **Grounding Resistors – Size (ohms), current (Amps)**
- **Isolating Transformers – Capacity rating (kVA), location, impedance, voltage ratings, primary and secondary connections and method of grounding**
- **Potential Transformers – Ratio, connection**
- **Reactors – Ohms/phase**
- **Relays – Types, quantity, IEEE device number, operator lines indicating the device initiated by the relays**
- **Switches – Location and normal operating status (open or closed), type, rating**
- **Tagging Point – Location, identification**

Manufacturer	Model Name	Model Number

CUSTOMER AND PROJECT DEVELOPER/CONTRACTOR SIGNATURES AND FEES

☐ **Attached $250 Interconnection Application Fee**

☐ Check # _____ ☐ Money Order # _____

Sign and Return Completed Application with Application Fee to Electric Utility Contact (at top of page 1).

To the best of my knowledge, all the information provided in this application form is complete and correct.

Customer Signature: _____ Date _____

Project Developer/Contractor Signature (if applicable): _____ Date _____

Note: Refer to the applicable "Michigan Electric Utility Generator Interconnection Requirements" for a detailed explanation of the Interconnection Process, Fees, Timelines, and Technical Requirements.

INVERTER GENERATORS	
GENERATOR INFORMATION	
System Type (Solar, Wind, Biomass, Methane Digester, etc)	Generation Nameplate Rating (kW or MVA)
AC Operation Voltage	Manufacturer
Model (Name/Number)	Attached Grid Configuration Page # _____

SYNCHRONOUS GENERATORS

GENERATOR INFORMATION

Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes
Generator Nameplate Power Factor (pf)	RPM

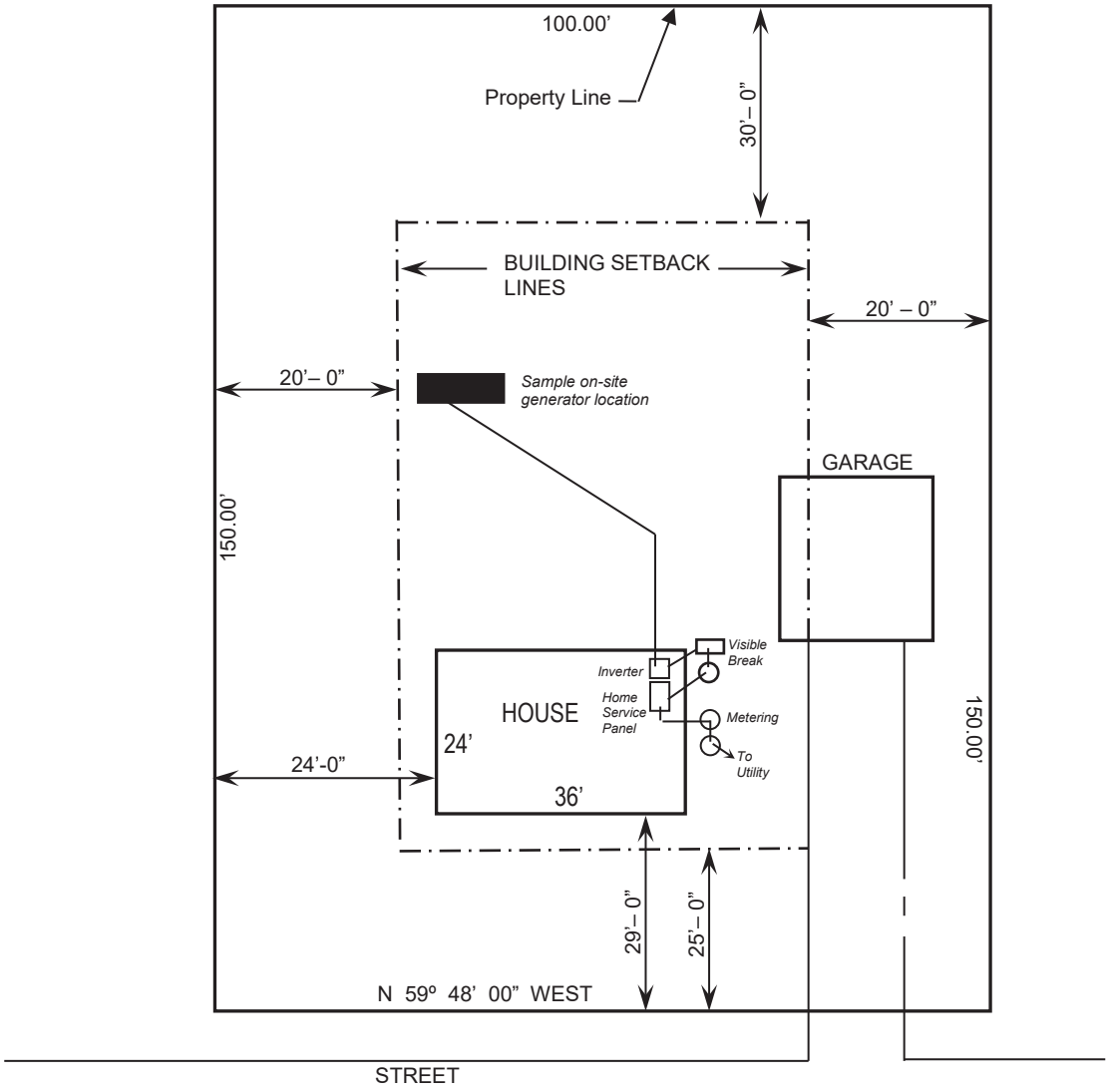
TECHNICAL INFORMATION

Minimum and Maximum Acceptable Terminal Voltage
Direct Axis Reactance (saturated)
Direct Axis Reactance (unsaturated)
Quadrature Axis Reactance (unsaturated)
Direct Axis Transient Reactance (saturated)
Direct Axis Transient Reactance (unsaturated)
Quadrature Axis Transient Reactance (unsaturated)
Direct Axis Sub-Transient Reactance (saturated)
Direct Axis Sub-Transient Reactance (unsaturated)
Leakage Reactance
Direct Axis Transient Open Circuit Time Constant
Quadrature Axis Transient Open Circuit Time Constant
Direct Axis Sub-Transient Open Circuit Time Constant
Quadrature Axis Sub-Transient Open Circuit Time Constant
Open Circuit Saturation Curve
Reactive Capability Curve Showing Overexcited and Underexcited Limits (Reactive Information if Non-Synchronous)
Excitation System Block Diagram with Values for Gains and Time Constants (Laplace Transforms)
Short Circuit Current Contribution From Generator at the Point of Common Coupling
Rotating Inertia of Overall Combination Generator, Prime Mover, Couplers and Gear Drives
Station Power Load When Generator is Off-Line, Watts, pf
Station Power Load During Start-Up, Watts, pf
Station Power Load During Operation, Watts, pf

INDUCTION GENERATORS	
GENERATOR INFORMATION	
Generator Nameplate Voltage	Generator Nameplate Watts or Volt-Amperes
Generator Nameplate Power Factor (pf)	RPM
TECHNICAL INFORMATION	
Synchronous Rotational Speed	Rotation Speed at Rated Power
Slip at Rated Power	
Minimum and Maximum Acceptable Terminal Voltage	
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)	
Short Circuit Current Contribution from Generator at the Point of Common Coupling	
Rotating Inertia, H in Per Unit on kVA Base, of Overall Combination Generator, Prime Mover, Couplers and Gear Drives	
Station Power Load When Generator is Off-Line, Watts, pf	
Station Power Load During Start-Up, Watts, pf	
Station Power Load During Operation, Watts, pf	

SAMPLE SITE PLAN – PROVIDED FOR REFERENCE ONLY

SITE PLAN
Applicant
Address
City/Town
Signature



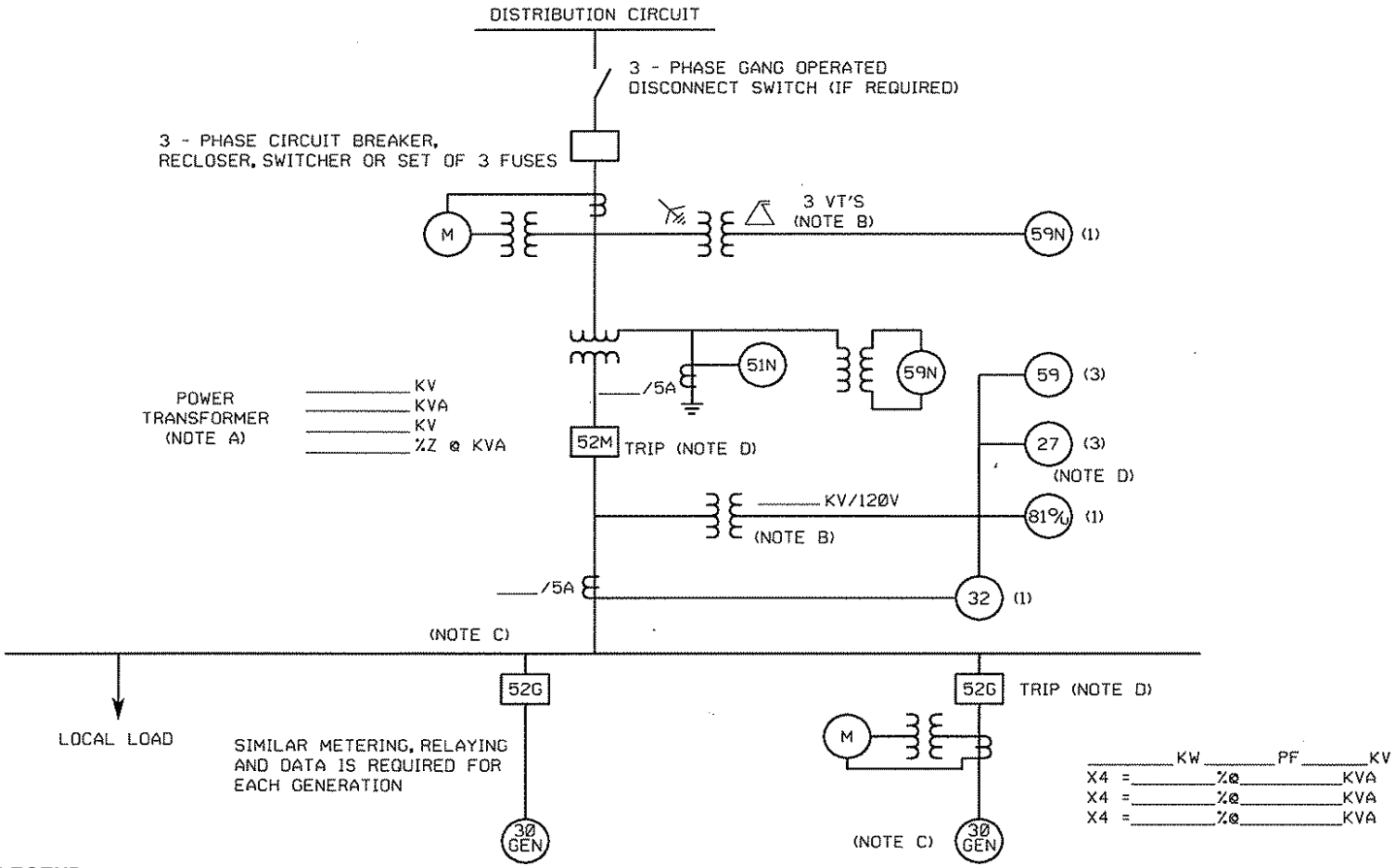
Weblink to State of Michigan / Plats:

http://www.cis.state.mi.us/platmaps/sr_subs.asp

Legible hand drawn site plans are acceptable

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY
TYPICAL ISOLATION AND FAULT PROTECTION FOR SYNCHRONOUS GENERATOR

ONE–LINE DRAWING	
Licensed PE/Contractor	PE/Contractor License Number
PE/Contractor Address	PE/Contractor Signature



LEGEND

27 Undervoltage
32 Reverse Power (Not Required for Flow-Back)
51N Neutral overcurrent (required for grounded secondary)
59 Overvoltage
59N Zero sequence overvoltage (assuming ungrounded secondary on power transformer)
81o/u Over/Underfrequency

NOTES

A) See technical requirements for permissible connection configurations and protection. Transformer connections proposed shall be shown on the one-line drawing by the Project Developer. Transformer connection and secondary grounding to be approved by Utility.

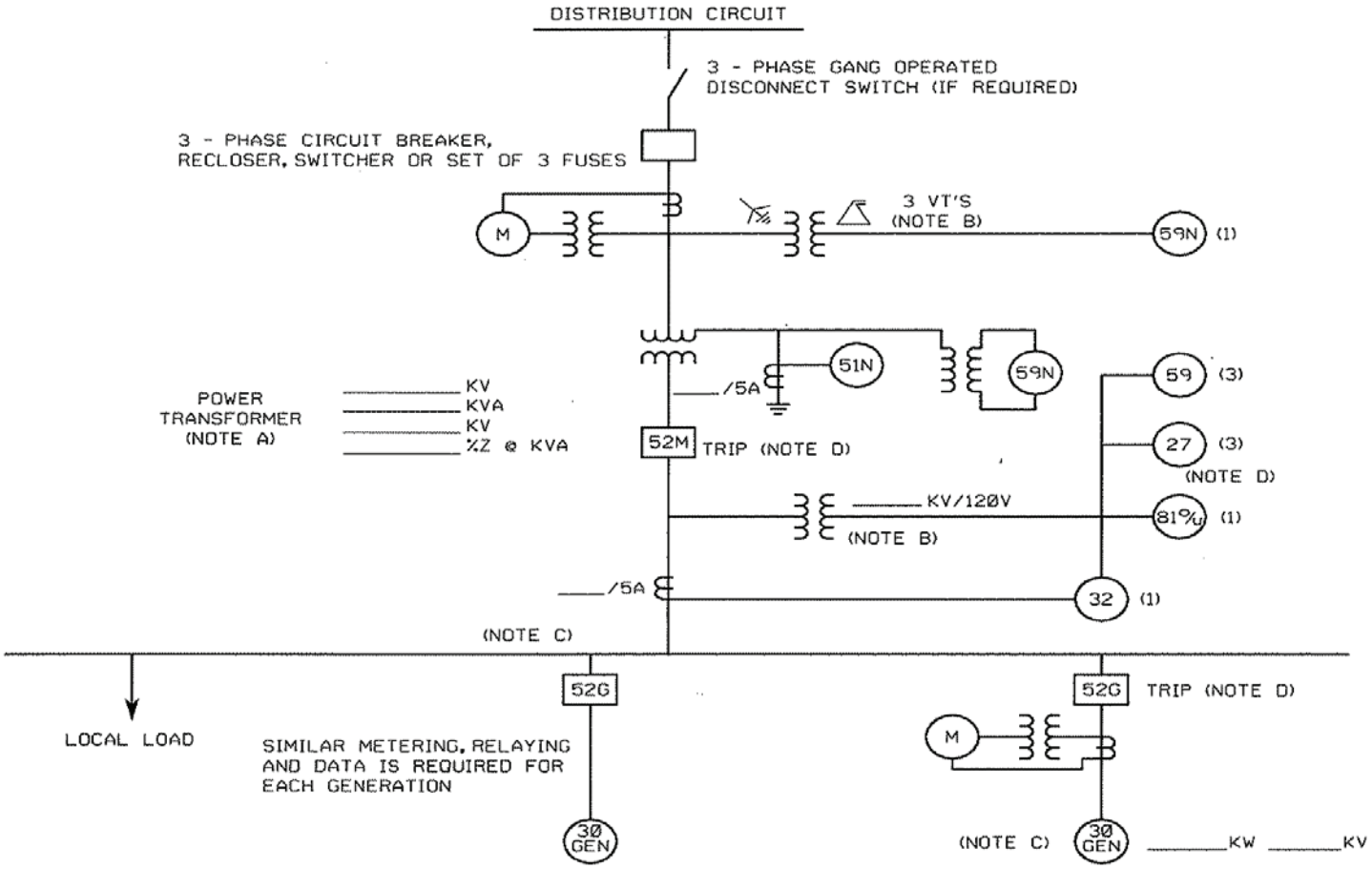
B) Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VT's for 59, 27, 81o/u and 32 are shown connected on the primary (Project side) of the power transformer, but may instead be connected on the secondary (Utility side). VT's are required on the secondary of the power transformer if a 59N is required for an ungrounded secondary connection. IEEE std 1547 requirements for voltage and frequency must be met at the PCC. IEEE Std. 1547 permits the VT's to be connected at the point of generator connection in certain cases.

C) Main breaker protection, generator protection and synchronizing equipment are not shown.

D) Trip of all 52G breakers or the 52M breaker is acceptable, depending upon whether the Project Developer wants to serve its own isolated load after loss of Utility service.

SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY
TYPICAL ISOLATION AND FAULT PROTECTION FOR INDUCTION GENERATOR

ONE–LINE DRAWING	
Licensed PE/Contractor	PE/Contractor License Number
PE/Contractor Address	PE/Contractor Signature



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