Upper Peninsula Power Company

# GENERATION INTERCONNECTION APPLICATION
## Category 2
**For All Projects with Aggregate Generator Output of More Than 20 kW But Less Than or Equal to 150 kW**
Also Serves as Application for
Category 2 Customer Owned Distributed Generation

| ELECTRIC UTILITY CONTACT INFORMATION | FOR OFFICE USE ONLY |
|---|---|
| Upper Peninsula Power Company<br>ATTN: Account Manager<br>500 N Washington Street<br>Ishpeming, MI 49849<br>(906) 449-2013<br>customergeneration@uppco.com | Application Number<br><br>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) |
| Electric Service Account Number | Electric Service Meter Number |

**Are you applying for the Customer Owned Distributed Generation program?**
☐ Yes ☐ No

**Will you have an Alternative Electric Supplier?**
☐ Yes ☐ No If Yes, Name _____

**Notes:** Enter name of Alternative Electric Supplier above ONLY if your energy is supplied by a 3rd party, not UPPCO.
You must apply to both the Distribution Utility and your Alternate Energy Provider (if applicable) for Customer Owned Distributed Generation.

## GENERATION SYSTEM SITE INFORMATION

Physical Site Service Address (If Not Billing Address)

| Annual Site Requirements Without Generation in kWh | Peak Annual Site Demand in kW (only for customers billed on Demand Rates) | Attached Site Plan |
|---|---|---|
| kWh/year | kW | 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 or by an electrical contractor licensed by the State of Michigan with the electrical contractor's license number noted on the drawing.)

- **See page 5 for sample Site Plan**
- **See Page 6 for sample of Inverter Generator Electrical One-Line Drawing**
- **See Page 7 for sample of Synchronous Generator Electrical One-Line Drawing**
- **See Page 8 for sample of Induction Generator Electrical One-Line Drawing**

## GENERATION SYSTEM MANUFACTURER INFORMATION

| System Type (Solar, Wind, Biomass Methane Digester, etc.) | Generator Type (Inverter, Induction, Synchronous) |
|---|---|
| Total Generator(s) Nameplate DC Rating (Solar Only)<br>kW | Total Generator(s) Nameplate AC Rating<br>kW |
| A.C. Operating Voltage | Wiring Configuration (Single Phase, Three Phase) |
| Expected Annual Output in Kilowatt Hours<br>kWh/year | Is the Inverter tested to IEEE 1547.1?<br>☐ Yes ☐ No ☐ Not Applicable |

## INVERTER GENERATOR - BASED SYSTEMS

| Manufacturer | Model (Name/Number) | Inverter Power Rating (kW) | Number of Inverters |
|---|---|---|---|
| | | | |

## SYNCHRONOUS AND INDUCTION GENERATOR - BASED SYSTEMS
## (Must complete either Page 3 or Page 4 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 |
|---|---|---|
| | | |

## INSTALLATION INFORMATION
## Project Single Point of Contact: (Electric Utility Customer, Developer or Other)

| Name | Company (If Applicable) | Phone Number |
|---|---|---|
| | | |
| E-mail Address | | Requested in Service Date |
| | | |
| Licensed Contractor(Name of Firm or Self) | | |
| | | |
| Contractor Name (Last, First, MI) | Contractor Phone Number | Contractor E-mail |
| | | |

## CUSTOMER AND CONTRACTOR SIGNATURES AND FEES

☐ **Attached $50 Customer Owned Distributed Generation Application Fee ONLY**

☐ **Attached $100 Interconnection Application Fee ONLY**

☐ **Attached $150 Interconnection and Customer Owned Distributed Generation Application Fee COMBINED**
(Includes $100 Interconnection Application Fee along with $50 Fee required if selecting Customer Owned Distributed Generation)

☐ Check #_____ ☐ Money Order # _____

***Sign and return completed application with Application Fee to the Electric Utility Contact (at top of page).***

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

Customer Signature _____ Date _____

Contractor Signature (if applicable) _____ Date _____

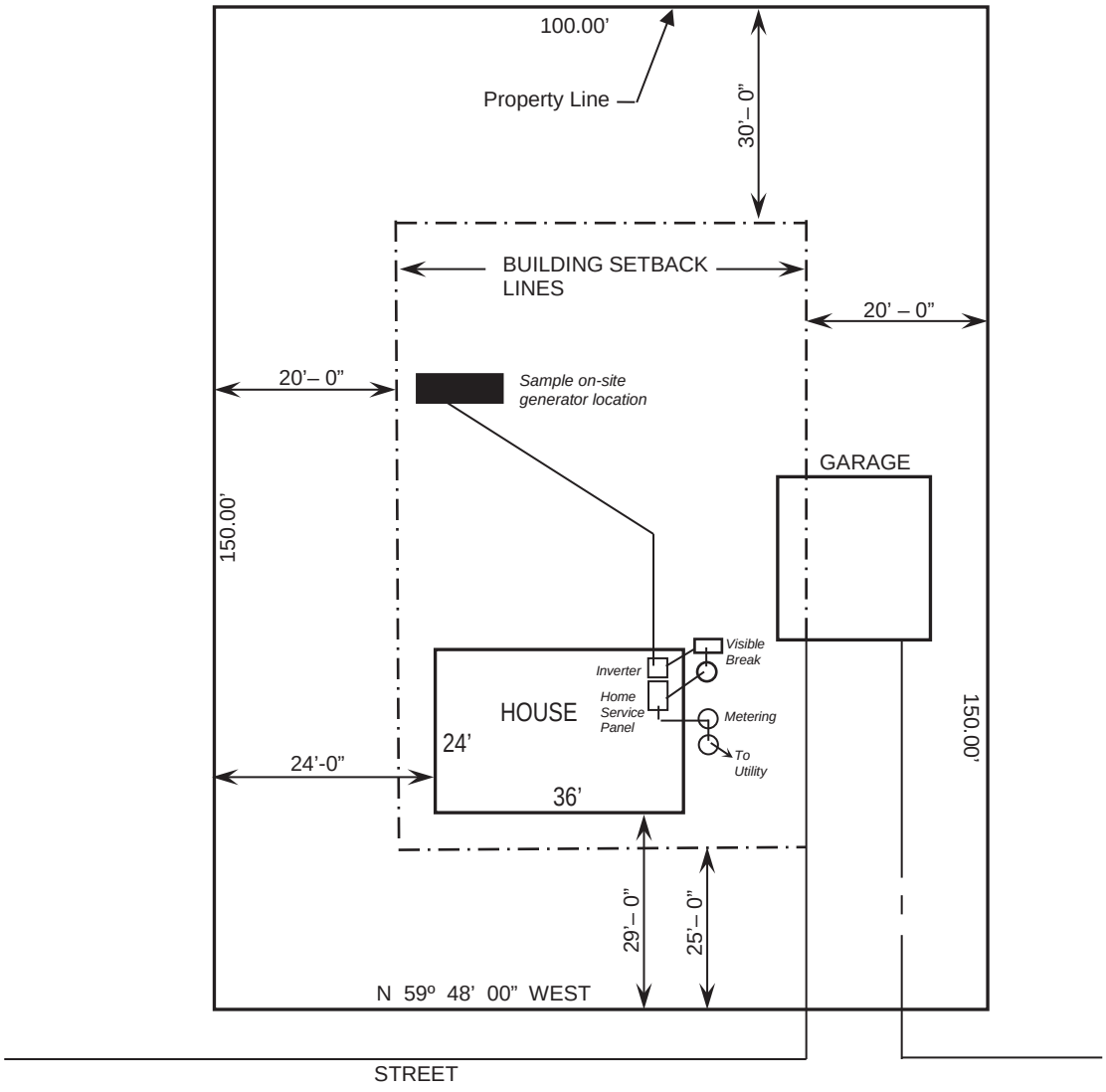
Note: Refer to the applicable "Michigan Electric Utility Generator Interconnection Requirements" for a detailed explanation of the Interconnection Process and Technical Requirements.

| 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 Sub-Transient Reactance (saturated) |
| Direct Axis Reactance (saturated) | Direct Axis Sub-Transient Reactance (unsaturated) |
| Direct Axis Reactance (unsaturated) | Leakage Reactance |
| Quadrature Axis Reactance (unsaturated) | Direct Axis Transient Open Circuit Time Constant |
| Direct Axis Transient Reactance (saturated) | Quadrature Axis Transient Open Circuit Time Constant |
| Direct Axis Transient Reactance (unsaturated) | Direct Axis Sub-Transient Open Circuit Time Constant |
| Quadrature Axis Transient Reactance (unsaturated) | 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 | Stator Resistance |
| Rotation Speed at Rated Power | Stator Reactance |
| Slip at Rated Power | Rotor Reactance |
| Minimum and Maximum Acceptable Terminal Voltage | Magnetizing Reactance |
| Motoring Power (kW) | Short Circuit Reactance |
| Neutral Grounding Resistor (If Applicable) | Exciting Current |
| ½ 2t or K (Heating Time Constant) | Temperature Rise |
| Rotor Resistance | 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 |
| Project Site Address |
| City/Town |
| Site Plan Prepared By |
| Prepared Date |




Weblink to State of Michigan / Plats:

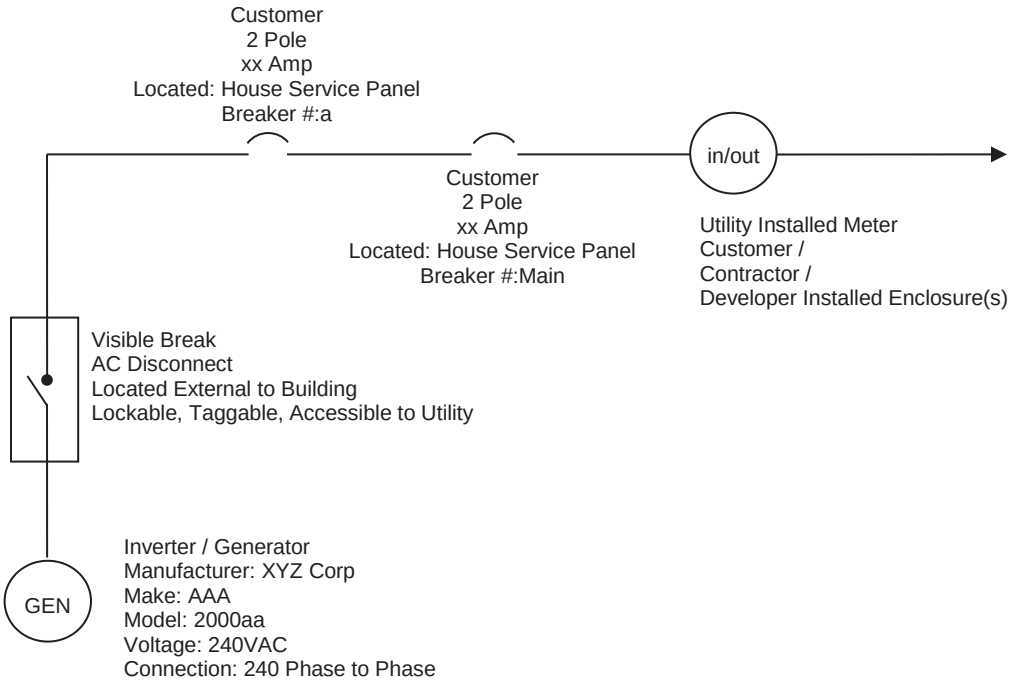
http://www.cis.state.mi.us/platmaps/sr_subs.asp

*Legible hand drawn site plans are acceptable*

## SAMPLE ELECTRICAL ONE-LINE DRAWING – PROVIDED FOR REFERENCE ONLY

## NET METERING INVERTER - BASED GENERATOR

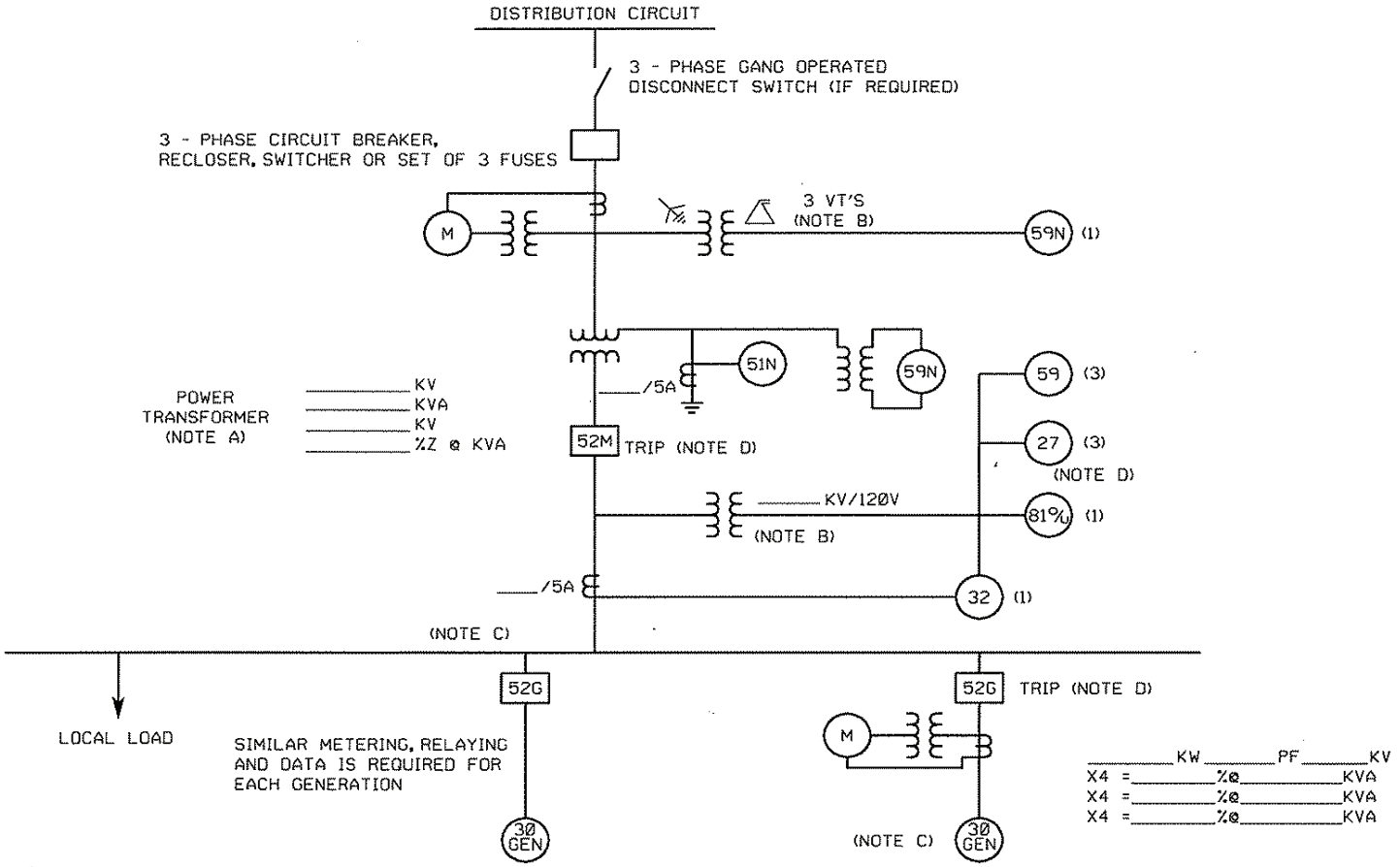
| ONE–LINE DRAWING | | |
|---|---|---|
| Customer Name | Licensed PE/Contractor (if applicable) | |
| Project Site Address | Electrical Contractor License Number | |
| Licensed PE/Contractor or<br>Licensed Electrical Contractor Signature | | Date |




*Legible hand drawn one-line drawings are acceptable. It must be signed and sealed by a Licensed Professional Engineer, licensed in the State of Michigan **OR** by an electrical contractor licensed by the State of Michigan.*

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

| ONE–LINE DRAWING | |
|---|---|
| Customer Name | Licensed PE/Contractor (if applicable) |
| Project Site Address | Electrical Contractor License Number |
| Licensed PE/Contractor Signature | Date |




**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.**

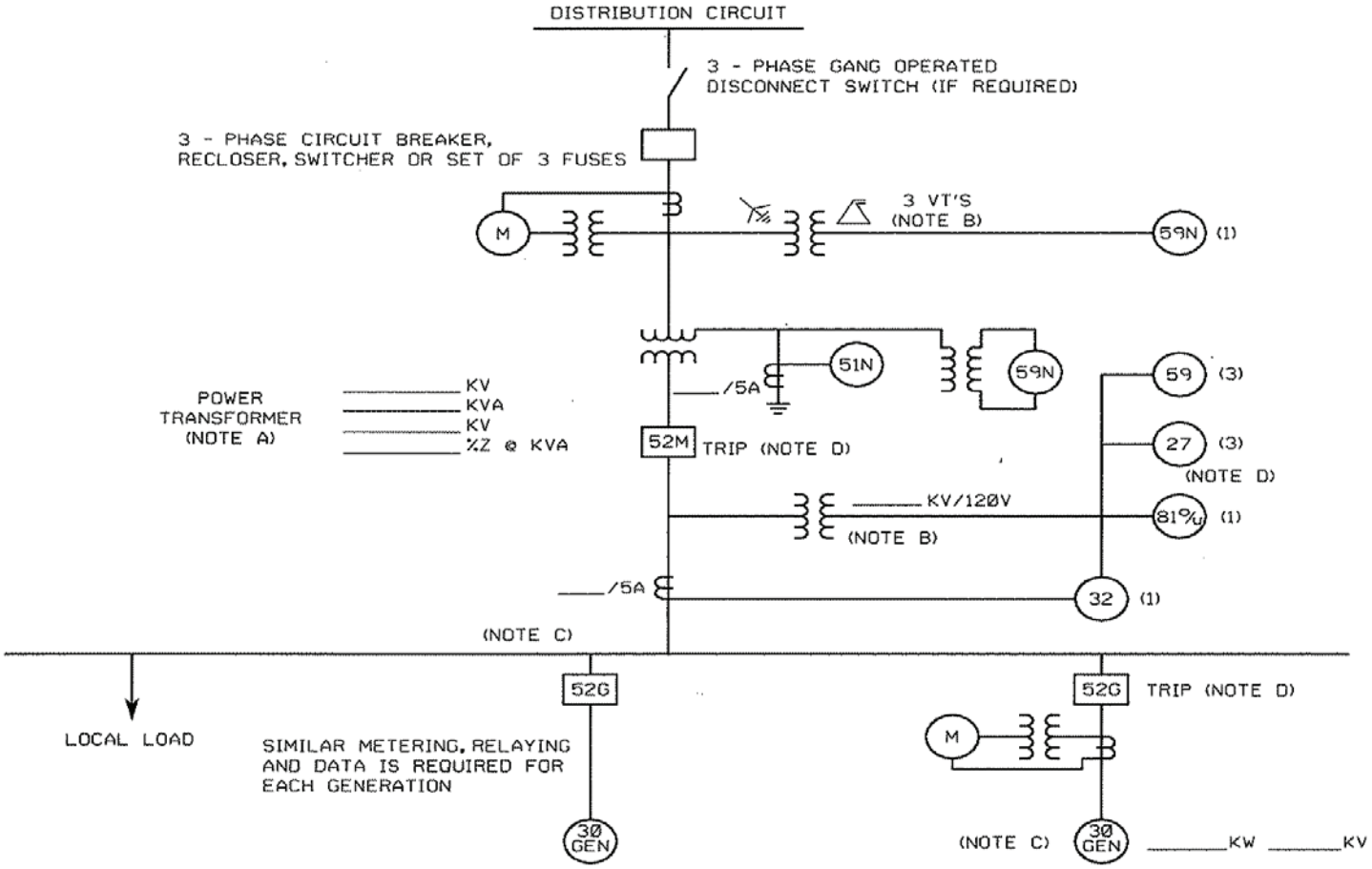
**C) Main breaker protection, generator protection and synchronizing equipment are not shown.**

**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.**

**E) One-line drawing must be signed and sealed by a Licensed Professional Engineer, licensed in the State of Michigan or by an electrical contractor licensed by the State of Michigan.**

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

| ONE–LINE DRAWING | |
|---|---|
| Customer Name | Licensed PE/Contractor (if applicable) |
| Project Site Address | Electrical Contractor License Number |
| Licensed PE/Contractor Signature | Date |

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