

STATE OF MICHIGAN
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter, on the Commission's own motion,)
to approve procedures, agreements, and forms,)
for use with the Category 1 and Category 2) Case No. U-15919
interconnection and net metering programs.)
_____)

At the December 20, 2012 meeting of the Michigan Public Service Commission in Lansing,
Michigan.

PRESENT: Hon. John D. Quackenbush, Chairman
 Hon. Orjiakor N. Isiogu, Commissioner
 Hon. Greg R. White, Commissioner

ORDER APPROVING PROCEDURES, AGREEMENTS, AND FORMS

Section 173 of Public Act 295 of 2008 (Act 295), MCL 460.1173, requires the Commission to promulgate administrative rules governing net metering standards. In its May 26, 2009 order in Case No. U-15787, the Commission formally adopted administrative rules governing electric interconnection and net metering (Interconnection Rules) that became effective May 27, 2009. *See*, 1999 AC, R 460.601 *et seq.* On March 18, 2009, the Commission opened this docket directing all electric utilities to file proposed interconnection applications, interconnection agreements, and net metering applications as provided under Rule 15(1) of the Interconnection Rules, 1999 AC, R 460.615(1).

On August 3, 2009, Consumers Energy Company (Consumers), The Detroit Edison Company (Detroit Edison), the Michigan Electric and Gas Association (MEGA), on behalf of its electric utility members, and the Michigan Electric Cooperative Association, on behalf of its members,

filed a joint application for approval of proposed uniform interconnection procedures, agreements, and application forms.

On September 15, 2009, the Commission issued an order (September 15 order) in this docket providing notice and an opportunity to comment on the proposed procedures and forms attached to the joint application. While the Category 1¹ Interconnection Procedures were part of the documents released for comments, the Category 1 Interconnection Agreement and Category 1 Interconnection Application were inadvertently excluded.²

On February 8, 2011, the Commission issued an order (February 8 order) in this docket giving notice and an opportunity to comment on the following amended uniform forms for Category 1 interconnection and net metering projects: (1) Net Metering Application; (2) Interconnection and Parallel Operating Agreement; (3) Interconnection Application; and (4) Combined Application for both net metering and interconnection. Additionally, the Commission requested comments on the interconnection process flow diagrams for all project categories.

On September 25, 2012, the Commission issued an order (September 25 order) requesting final comments on the application forms, agreements, and interconnection procedures for Category 1 and Category 2 projects. The forms attached to that order had been revised in response to comments filed after the September 15 and February 8 orders, and the various documents also incorporated recommendations from the Michigan Renewable Energy Collaborative. Interested

¹Renewable energy projects are classified by size and complexity. A Category 1 project is an inverter based project of 20 kilowatts (kW) or less that uses equipment certified by a nationally recognized testing laboratory to IEEE 1547.1 testing standards; Category 2 is greater than 20 kW to 150 kW and projects less than or equal to 20 kW that do not meet the criteria for Category 1 projects; Category 3 is greater than 150 kW to 550 kW; Category 4 is greater than 550 kW to 2 megawatts (MW); and Category 5 is above 2 MW. Currently, the great majority of renewable energy projects in Michigan fall into Categories 1 and 2.

²A Category 1 interconnection agreement and application were approved by the Commission for interim use on May 26, 2009 in an order issued in this docket.

parties were asked to file comments by October 30, 2012. Comments were received from Thomas W. Straith, P.E., of Syndevo, Inc., MEGA on behalf of its members, and Abigail Elias, on behalf of the City of Ann Arbor (Ann Arbor).

As an initial matter, Mr. Straith comments that there is confusion created by using interchangeable terms (interconnection procedures versus interconnection requirements) to refer to certain documents. R 460.601a(aa) of the Interconnection Rules defines Interconnection Procedures as “the requirements that govern project interconnection adopted by each electric utility and approved by the commission.” The Commission agrees that consistently referring to the documents using one term would be helpful and revises the documents so that the term “Interconnection Procedures” is used throughout.³

Interconnection Applications

With respect to the interconnection applications, MEGA requests that the sample one-line diagrams provided for both Category 1 and 2 applications (Attachments A, C, D, and F) be modified to include inverter information. The Commission agrees and has revised the applications accordingly.

Interconnection and Parallel Operating Agreement

There were a number of comments concerning the Interconnection and Parallel Operating Agreement (Attachment G). MEGA comments that Section 5.1, which was revised in the September 25 order to ensure that the provider’s right to enter the property did not include the right to access a residence or other enclosed structure on the property, could operate to deny access to utility equipment that is located within a residence or other enclosed structure on the property.

³In addition, there were a small number of minor revisions to cross-references and typographical errors that are not discussed in this order.

The Commission adopts MEGA's proposed modification which clarifies that utility access is provided where interconnection facilities are located within the residence or other enclosed structure upon reasonable notice by the utility.

Revisions to the indemnification provisions of Section II of the Interconnection and Parallel Operating Agreement drew several comments from interested parties. MEGA recommends that Section II Paragraph 6.1 be revised as follows:

As between the Parties, unless caused by the sole negligence or intentional wrongdoing of the other Party, each Party to this Agreement shall at all times assume all liability for, any and all damages, losses, claims, demands, suits, recoveries, costs, legal fees, and expenses, to the extent caused by its directors, officers, employees, and agents: (a) for injury to or death of any person or persons whomsoever occurring on its own system, and/or (b) for any loss, destruction of or damage to any property of third persons, firms, corporations or other entities occurring on its own system, including environmental harm or damage arising out of or resulting from, either directly or indirectly, the Interconnection Facilities or the Applicant Facilities, or arising out of or resulting from, either directly or indirectly, any electric energy furnished to it hereunder after such energy has been delivered to it by such other Party.

MEGA comments, pp. 3-4.

MEGA notes that (a) and (b) describe circumstances where either party may be liable and that (c) and (d) have been removed to avoid confusion because these clauses are not categories themselves but rather modify (a) and (b). MEGA adds that it recommends removing the last sentence of the section because it recites a term that is already part of the agreement, set forth in Section II Paragraph 6.4. The Commission finds MEGA's revisions to be reasonable and has revised Paragraph 6.1 accordingly.

MEGA comments that because of the revisions to Paragraph 6.1, Paragraph 6.3 also should be revised to remove references to indirect, punitive, special, or exemplary damages. MEGA claims the term "indirect damages" is vague and could lead to confusion regarding the scope of the waiver. The Commission disagrees and declines to adopt the proposed revision.

Section II Paragraph 6.6 concerns indemnification by the State of Michigan and other governmental units. MEGA comments that whether or not governmental units or agencies are permitted to sign agreements with indemnification provisions is disputed. As such, MEGA recommends that “governmental customers that are restricted from entering into indemnification provisions by law” be changed to “governmental customers that may be restricted . . .”

Ann Arbor comments that although the language in Paragraph 6.5, which preserves the defense of governmental immunity, is a significant improvement, the City still has concerns that Paragraph 6.1, even when read together with Paragraph 6.6, could result in a situation where a governmental entity is found liable for the negligence of a third party or the provider. Ann Arbor recommends that Paragraph 6.6 be revised to eliminate all possible indemnification clauses that might apply to a governmental entity. Alternatively, Ann Arbor recommends that Paragraph 6.1 be amended to allocate liability according to fault.

The Commission declines to adopt either the indemnification revision requested by MEGA or that recommended by Ann Arbor. The Commission notes that while it expects this standard agreement to be used in virtually every situation (and always when there is significant economic disparity between the parties, as is the case with residential customers and most commercial customers seeking to interconnect), there will be individualized circumstances where the terms of the contract will need to be modified on a case-by-case basis. The concerns raised by Ann Arbor should therefore be addressed through modification of the agreement, as provided in Section II Paragraph 12. If a party seeking to modify the agreement is unable to obtain consent to a modification, that party should avail itself of the alternative dispute resolution provision of the Interconnection Rules.

Mr. Straith comments that for Category 1 installations, the assignment provision in Section II Paragraph 17 should be revised so that operation of the generator would continue upon the sale of the residence and that assignment of the agreement would become a routine component of a residential real estate transfer. The Commission has considered Mr. Straith's comment and notes that the provision was modified based on previous comments to indicate that assignment of the agreement shall not be unreasonably withheld. The Commission therefore declines to adopt this recommendation.

Interconnection Procedures

MEGA proposed revisions to the Category 1 and 2 Meter Install, Testing and Inspection sections of the Interconnection Procedures to clarify the final approval criteria. MEGA comments that a project should be approved based on the written application filed, subject to final approval that is based on whether the project was constructed as approved and the commissioning test has been satisfactorily completed. The Commission agrees with MEGA's modifications and has incorporated them into the Interconnection Procedures.

MEGA recommends revising the Category 1 Technical Requirements, p. 7 to clarify that the provider will be responsible for the costs related to its evaluation and application of newly developed protection and operation schemes but only for changes to its distribution system. The Commission agrees and adopts MEGA's suggested revision.

Under the heading "Interconnection Lines" on page 8 of the Category 1 Interconnection Procedures, MEGA recommends clarifying that new distribution service lines should be installed at the applicant's expense. MEGA explains that while customers do not pay for distribution upgrade costs on the existing system, new service line extensions are a different matter. The Commission agrees and has modified the Interconnection Procedures accordingly.

Mr. Straith comments that the telephone circuit mentioned in the Category 2 Interconnection Procedures should be modified to require that the utility accept cell phone communication where there is adequate cell phone service. The Commission notes that on page 18 under Communication Circuits, the utility has the option to select an alternative communication method, such as wireless communication. The Commission agrees to partially adopt this recommendation. The Communication Circuits section of the Category 2 Interconnection Procedures is modified to indicate that the utility will reasonably consider wireless communication or other communication methods if they are less costly than traditional telephone circuits.

Interconnection Process Flow Diagram for Categories 2 - 5

MEGA points out that Category 3 through Category 5 documents will be addressed in a future order. The Process Flow Diagram provided by the Commission for comments in the Category 2 Interconnection Procedures is labeled as being applicable to Categories 2-5. MEGA recommends revising the document label so that it is only applicable to Category 2 projects. The Commission agrees and has made the revision.

THEREFORE, IT IS ORDERED that the revised Category 1 and Category 2 interconnection and net metering application forms, agreement, and procedures attached as Attachments A through I to this order are approved. Due to the size of Attachments H and I, these documents are not physically attached to the printed versions of this order but are attached to the electronic versions of the order and are available on the Commission's website.

The Commission reserves jurisdiction and may issue further orders as necessary.

Any party desiring to appeal this order must do so in the appropriate court within 30 days after issuance and notice of this order, under MCL 462.26.

MICHIGAN PUBLIC SERVICE COMMISSION

John D. Quackenbush, Chairman

Orjiakor N. Isiogu, Commissioner

Greg R. White, Commissioner

By its action of December 20, 2012.

Mary Jo Kunkle, Executive Secretary

GENERATOR INTERCONNECTION APPLICATION

FOR ALL INVERTER BASED PROJECTS WITH AGGREGATE GENERATOR OUTPUT 20 kW OR LESS

Electric Utility Contact Information

Utility Name
 Interconnection Coordinator
 Utility Street Address
 Utility Street Address
 Interconnection Hotline: XXX.XXX.XXXX
 Interconnection Email: xxx@xxx.com

For office use only

Application No. _____
 Date & 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 #
 Electric Service Meter Number:

Generation System Site Information

Physical Site Service Address (if not Billing Address):

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Attached Site Plan:
 Attached Electrical One-Line Drawing:

Page # --
Page # --

Generation System - Manufacturer Information

System Type (Solar, Wind, Biomass, Fuel Cell, etc):
 Generator Type (Inverter):
 Total Generator Nameplate DC Rating (Solar Only):
 Total Generator Nameplate AC Rating:
 Generator AC Output Voltage:
 Generator Wiring Configuration (Single Phase, Three Phase):
 Expected Annual Output in Kilowatthours
 Is the Inverter tested to IEEE1547.1? Yes No

kW
kW
V
kWh/year

Inverter Based Systems:

Manufacturer
 Model (Name / Number)
 Inverter Output Power Rating (kW)
 No. of Inverter(s)

kW

GENERATOR INTERCONNECTION APPLICATION
FOR ALL INVERTER BASED PROJECTS WITH AGGREGATE GENERATOR OUTPUT 20 kW OR LESS

Installation Information

Project Single Point of Contact: (Electric Utility Customer, Developer, or other)

Name:	<input type="text"/>
Company (If Applicable):	<input type="text"/>
Phone Number:	<input type="text"/>
E-Mail Address:	<input type="text"/>

Requested In Service Date:	<input type="text"/>
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Contractor (Name of Firm or Self):	<input type="text"/>
Contractor Name (Last, First, MI):	<input type="text"/>
Contractor Phone #:	<input type="text"/>
Contractor E-Mail:	<input type="text"/>

Customer and Contractor Signature and Fees

Attach \$75 Interconnection Application Fee

(Check # / Money Order #)

(Sign and Return complete application with Application Fee to Electric Utility Contact)
To the best of my knowledge, all the information provided in this Application Form is complete and correct.

Customer Signature

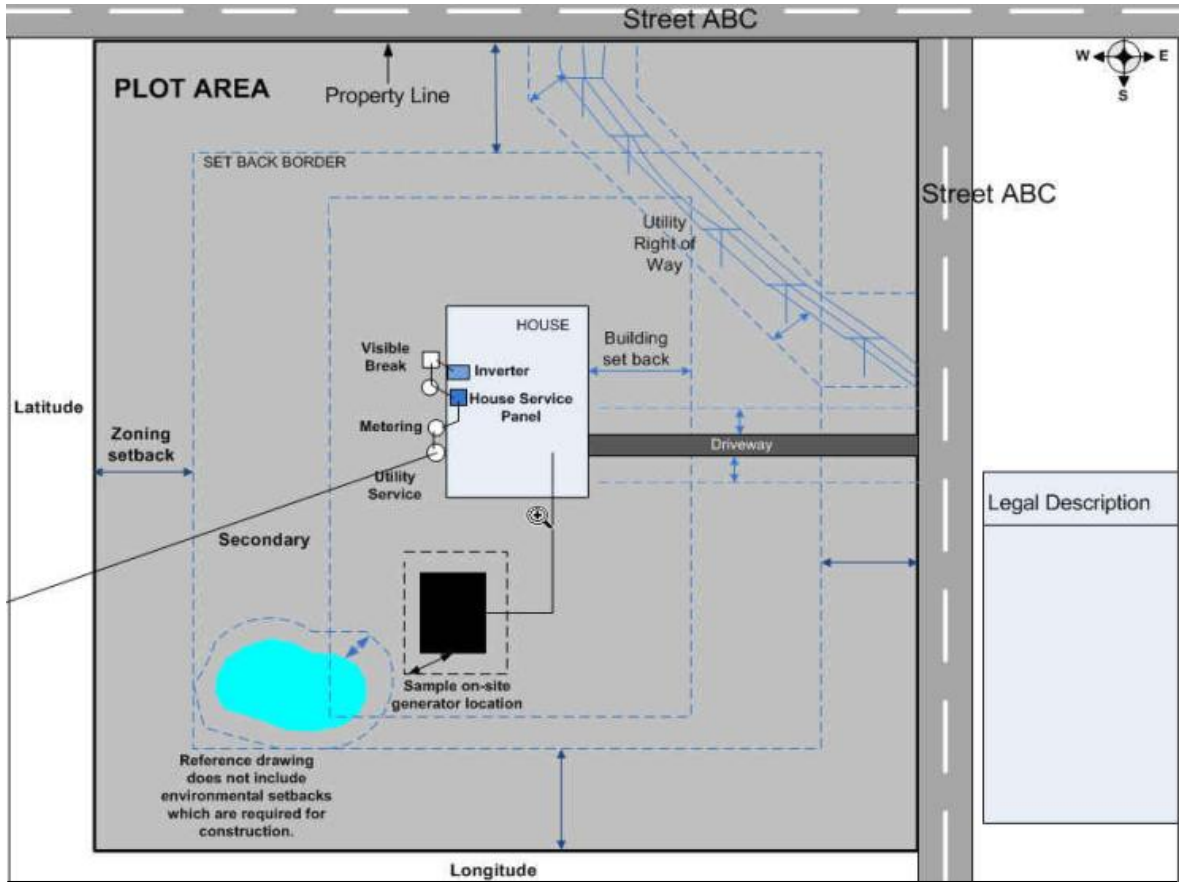
Contractor Signature (if applicable)

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

Sample Site Plan - Provided for Reference Only

Customer Name:	
Customer Address:	
Site Plan Prepared By:	
Date:	

Note: Legible hand drawn site plans are acceptable

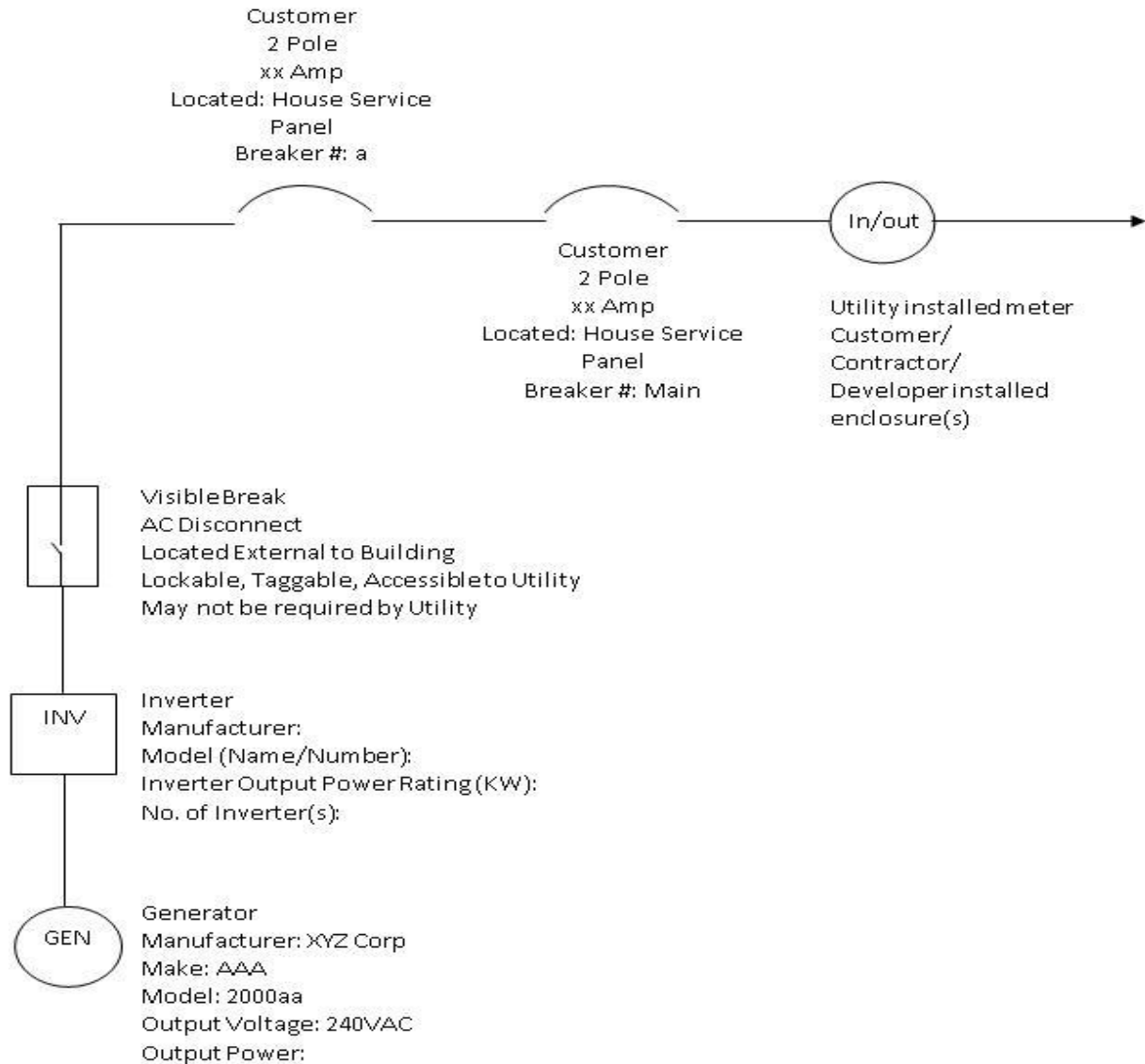


SAMPLE ONE-LINE DRAWING

Customer Name:	
Customer Address:	
Site Plan Prepared By:	
Date:	

Note: The one-line drawing below is a general drawing for Net Metering Customer

Note: Legible hand drawn site plans are acceptable



NET METERING APPLICATION

FOR PROJECTS WITH AGGREGATE GENERATOR OUTPUT 20 kW OR LESS

Electric Utility Contact Information	For office use only
Utility Name	Application No. _____
Interconnection Coordinator	Date & Time Application Received
Utility Street Address	
Utility Street Address	
Interconnection Hotline: XXX.XXX.XXXX	
Interconnection Email: xxx@xxx.com	

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 #	
Electric Service Meter Number:	

Are you interested in selling Renewable Energy Credits (REC's)? Yes No

Do You Have an Alternative Electric Supplier Yes No **Name:**

Notes:: Enter name ONLY if your energy is supplied by a 3rd party, not the utility.
 You must apply to both the Distribution Utility and your Alternate Energy Provider (if applicable) for Net Metering

Generation System Site Information

Interconnection Application Number, if known	
Physical Site Service Address (if not Billing Address):	
Annual Site Requirements Without Generation in KIlowatthours	kW/year
Peak Annual Site Demand in Kilowatts (only for customers billed on demand rates)	kW

Generation System Information

System Type (Solar, Wind, Biomass, Fuel Cell, etc):	
Total Generator Nameplate DC Rating (Solar Only):	kW
Total Generator Nameplate AC Rating:	kW
Generator AC Output Voltage:	V
Generator Wiring Configuration (Single Phase, Three Phase):	kW
Expected Annual Output in KIlowatthours	kW/year

Customer Signature and Fees

Attach \$25 Net Metering Application Fee (Check # / Money Order #)

(Sign and Return complete application with Application Fee to Electric Utility Contact)
To the best of my knowledge, all the information provided in this Application Form is complete and correct.

Customer Signature

GENERATOR INTERCONNECTION APPLICATION

FOR ALL INVERTER BASED PROJECTS WITH AGGREGATE GENERATOR OUTPUT 20 kW OR LESS

Also Serves as Application for Category 1 Net Metering

Electric Utility Contact Information	For office use only
Utility Name	Application No. _____
Interconnection Coordinator	Date & Time Application Received
Utility Street Address	
Utility Street Address	
Interconnection Hotline: XXX.XXX.XXXX	
Interconnection Email: xxx@xxx.com	

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 #	
Electric Service Meter Number:	

Are you applying for the Net Metering Program? Yes No

Are you interested in selling Renewable Energy Credits (REC's)? Yes No

Will you have an Alternative Electric Supplier? Yes No **Name:**

Notes: Enter name ONLY if your energy is supplied by a 3rd party, not the utility.
 You must apply to both the Distribution Utility and your Alternate Energy Provider (if applicable) for Net Metering

Generation System Site Information

Physical Site Service Address (if not Billing Address):	
Annual Site Requirements Without Generation in Kilowatthours	
Peak Annual Site Demand in Kilowatts (only for customers billed on demand rates)	
Attached Site Plan:	Page # --
Attached Electrical One-Line Drawing:	Page # --

GENERATOR INTERCONNECTION APPLICATION

FOR ALL INVERTER BASED PROJECTS WITH AGGREGATE GENERATOR OUTPUT 20 kW OR LESS

Also serves as application for category 1 Net Metering

Generation System - Manufacturer Information

System Type (Solar, Wind, Biomass, Fuel Cell, etc):

Generator Type (Inverter):

Total Generator Nameplate DC Rating (Solar Only):

Total Generator Nameplate AC Rating:

Generator AC Output Voltage:

Generator Wiring Configuration (Single Phase, Three Phase):

Expected Annual Output in Kilowatthours

Is the Inverter tested to IEEE1547.1?

	kW
	kW
	V
	kWh/year

Yes No

Inverter Based Systems:

Manufacturer

Model (Name / Number)

Inverter Output Power Rating (kW)

No. of Inverter(s)

	kW

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:

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Contractor (Name of Firm or Self):

Contractor Name (Last, First, MI):

Contractor Phone #:

Contractor E-Mail:

Customer and Contractor Signature and Fees

Attached \$75 Interconnection Application Fee or

Attached \$100 combined Interconnection & Net Metering Program application fees

(\$75 Interconnection Application Fee plus \$25 fee required if selecting net metering)

(Check # / Money Order #)

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(Sign and Return complete application with Application Fee to Electric Utility Contact)

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

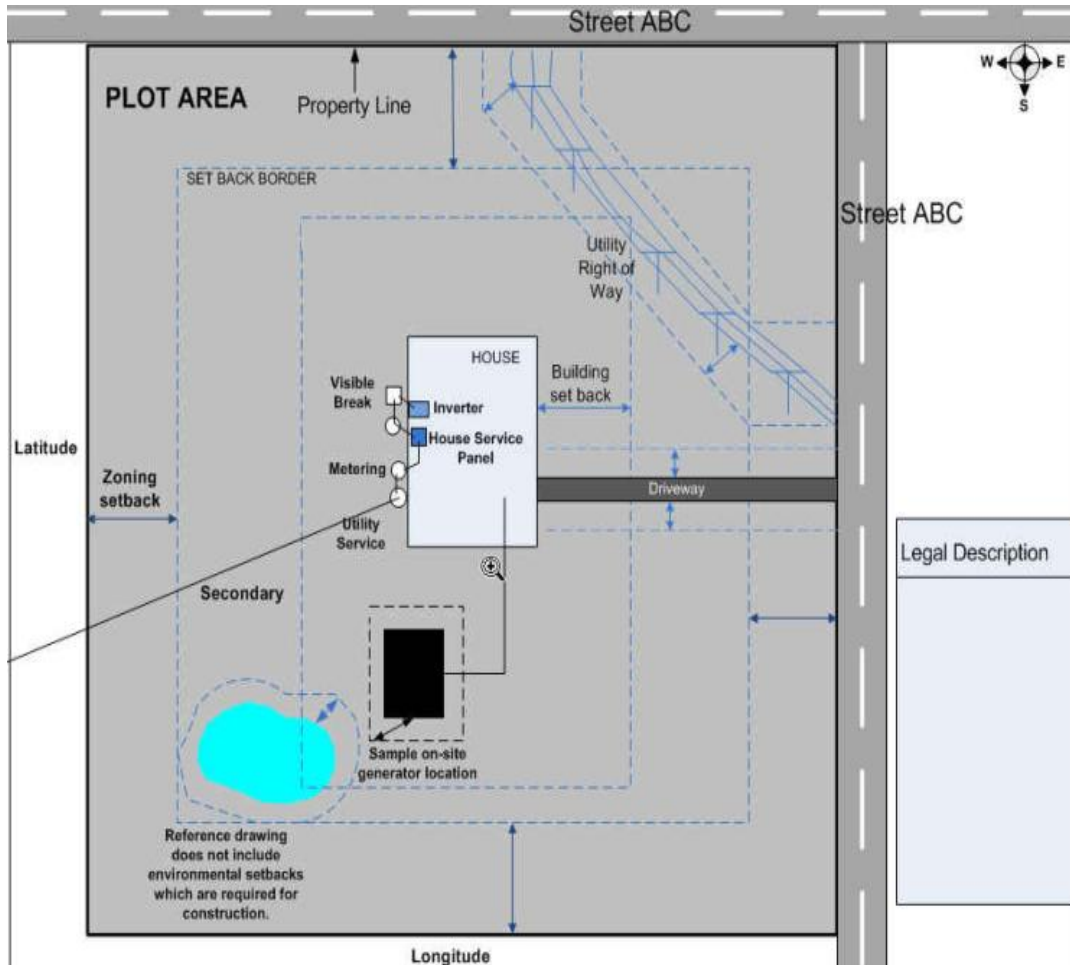
Customer Signature

Contractor Signature (if applicable)

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

Sample Site Plan - Provided for Reference Only

Customer Name:	
Customer Address:	
Site Plan Prepared By:	
Date:	

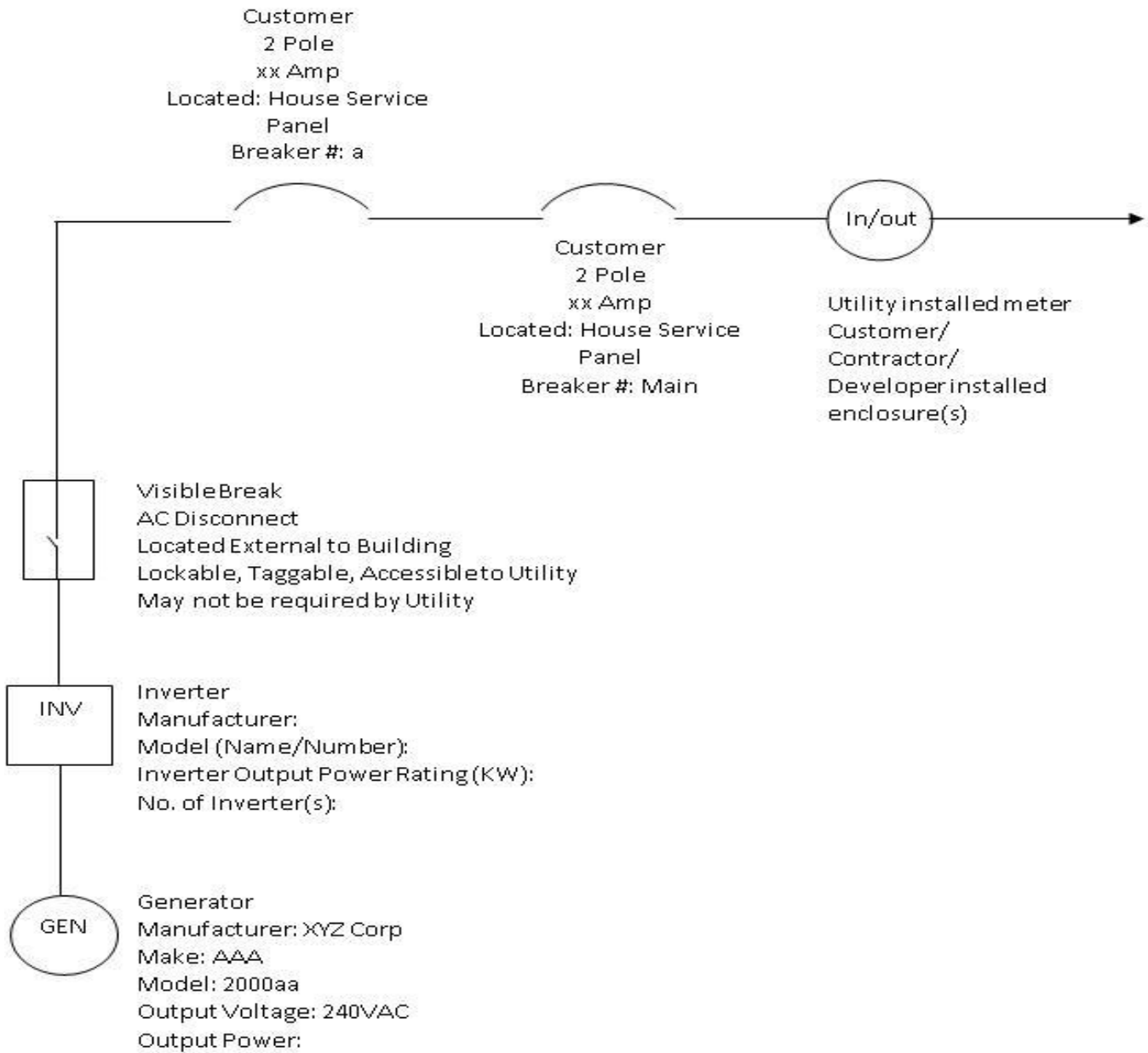


Note: Legible hand drawn site plans are acceptable

SAMPLE ONE-LINE DRAWING FOR NET METERING CATEGORY 1 PROJECTS

Note: Hand drawn One - Line Drawings are acceptable

Customer Name:	
Customer Address:	
Site Plan Prepared By:	
Date:	



CATEGORY 2 GENERATOR INTERCONNECTION APPLICATION
 FOR ALL PROJECTS WITH AGGREGATE GENERATOR OUTPUT OF
 MORE THAN 20 KW BUT LESS THAN OR EQUAL TO 150 KW

Electric Utility Contact Information

Utility Name
 Interconnection Coordinator
 Utility Street Address
 Utility Street Address
 Interconnection Hotline: XXX.XXX.XXXX
 Interconnection Email: xxx@xxx.com

For Office Use Only
Application No. _____
Date & Time Application Received _____

Customer / Account Information

Electric Utility Customer Information: (As shown on utility bill)

Customer Name (Last, First, Middle):
 Customer Mailing Address:

Customer E-Mail Address: (optional)
 Electric Service Account #
 Electric Service Meter Number:

Are you interested in selling Renewable Energy Credits (REC's)

Yes No

Generation System Site Information

Physical Site Service Address (if not Billing Address):

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Annual Site Requirements Without Generation in Kilowatthours
Peak Annual Site Demand in Kilowatts (only for customers billed on demand rates)

	kWh/year
	kW/year

Attached Site Plan:

Attached Electrical One-Line Drawing (See the Appendix D for a sample Inverter Type Project)
 (Per MPSC Order in Case No. U-15787- The one-line diagram 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 diagram.)

Page #
Page #

Synchronous/Induction Generators: Must fill out Appendix A or B and provide a Detail One-Line Diagram
 See Appendix E and F for a sample the Detail One-Line Diagram for Synchronous or Induction projects
 Note: The following information on these system components shall appear on the preliminary Detail One-Line Diagram

Page #

- 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

CATEGORY 2 GENERATOR INTERCONNECTION APPLICATION
 FOR ALL PROJECTS WITH AGGREGATE GENERATOR OUTPUT OF
 MORE THAN 20 KW BUT LESS THAN OR EQUAL TO 150 KW

Generation System - Manufacturer Information

System Type (Solar, Wind, Biomass, Methane Digester, etc):	
Generator Type (Inverter, Induction, Synchronous):	
Total Generator(s) Nameplate AC Rating:	kW
Total Generator(s) Nameplate DC Rating (solar only):	kW
Expected Annual Output in Kilowatthours	kWh/year
AC Output Operating Voltage:	
Generator Wiring Configuration (Single Phase, Three Phase):	
Is the Inverter tested to IEEE1547.1?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Applicable

Inverter Based Systems:

Manufacturer	
Model (Name / Number)	
Inverter Output Power Rating (kW)	
No. of Inverter(s)	

Induction & Synchronous Based Systems

Manufacturer	
Model (Name / 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:	
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Licensed Professional Engineer Name (If applicable)	
Licensed Electrical Contractor Name (If applicable)	
Electrical Contractor/PE Phone #:	
Electrical Contractor/PE E-Mail:	

Customer and Contractor Signature and Fees

Attached \$100 Interconnection Application Fee

(Check # / Money Order #)

(Sign and Return complete application with Application Fee to Electric Utility Contact)
To the best of my knowledge, all the information provided in this Application Form is complete and correct.

Customer

Project Developer/Contractor (If Applicable)

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

APPENDIXES

Appendix A: Technical Information for Synchronous-Type Generators
Appendix B: Technical Information for Induction-Type Generators
Appendix C: Sample Site Plan
Appendix D: Sample One-Line diagram for Inverter Type Project
Appendix E: Sample One-Line diagram for Synchronous Type Project
Appendix F: Sample One-Line diagram for Induction Type Project

Appendix A

Synchronous Generators

Generator Information

- a. Generator Nameplate Voltage
- b. Generator Nameplate Watts or Volt-Amperes
- c. Generator Nameplate Power Factor (pf)
- d. RPM

a.
b.
c.
d.

Technical Information

- e. Minimum and Maximum Acceptable Terminal Voltage
- f. Direct axis reactance (saturated)
- g. Direct axis reactance (unsaturated)
- h. Quadrature axis reactance (unsaturated)
- i. Direct axis transient reactance (saturated)
- j. Direct axis transient reactance (unsaturated)
- k. Quadrature axis transient reactance (unsaturated)
- l. Direct axis sub-transient reactance (saturated)
- m. Direct axis sub-transient reactance (unsaturated)
- n. Leakage Reactance
- o. Direct axis transient open circuit time constant
- p. Quadrature axis transient open circuit time constant
- q. Direct axis subtransient open circuit time constant
- r. Quadrature axis subtransient open circuit time constant
- s. Open Circuit saturation curve
- t. Reactive Capability Curve showing overexcited and underexcited limits (Reactive Information if non-synchronous)
- u. Excitation System Block Diagram with values for gains and time constants (Laplace transforms)
- v. Short Circuit Current contribution from generator at the Point of Common Coupling
- w. Rotating inertia of overall combination generator, prime mover, couplers and gear drives
- x. Station Power load when generator is off-line, Watts, pf
- y. Station Power load during start-up, Watts, pf
- z. Station Power load during operation, Watts, pf

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Appendix B

Induction Generators

Generator Information

- a. Generator Nameplate Voltage
- b. Generator Nameplate Watts or Volt-Amperes
- c. Generator Nameplate Power Factor (pf)
- d.RPM

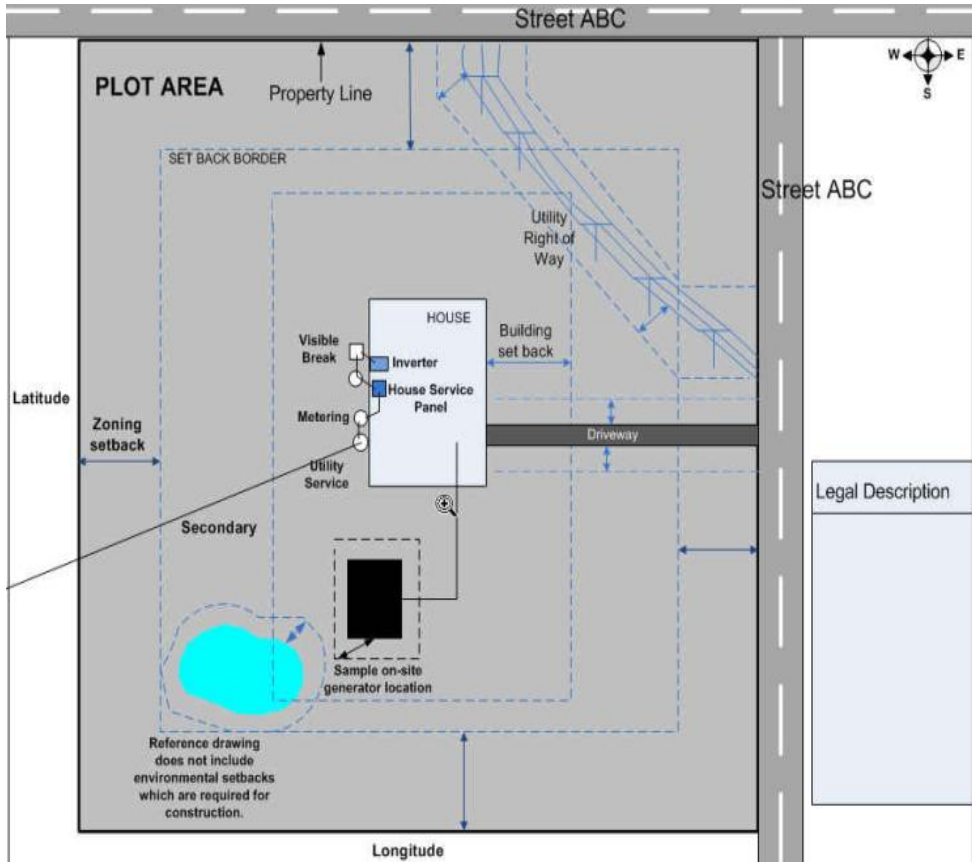
a.
b.
c.
d.

Technical Information

- e. Synchronous Rotational Speed
- f. Rotation Speed at Rated Power
- g. Slip at Rated Power
- h. Minimum and Maximum Acceptable Terminal Voltage
- i. Motoring Power (kW)
- j. Neutral Grounding Resistor (If Applicable)
- k. I_2^2t or K (Heating Time Constant)
- l. Rotor Resistance
- m. Stator Resistance
- n. Stator Reactance
- o. Rotor Reactance
- p. Magnetizing Reactance
- q. Short Circuit Reactance
- r. Exciting Current
- s. Temperature Rise
- t. Frame Size
- u. Design Letter
- v. Reactive Power Required in Vars (No Load)
- w. Reactive Power Required in Vars (Full Load)
- x. Short Circuit Current contribution from generator at the Point of Common Coupling
- y. Rotating inertia, H in Per Unit on kVA Base, of overall combination generator, prime mover, couplers and gear drives
- z. Station Power load when generator is off-line, Watts, pf
- aa. Station Power load during start-up, Watts, pf
- bb. Station Power load during operation, Watts, pf

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aa.
bb.

Appendix C: Sample Site Plan - Provided for Reference Only



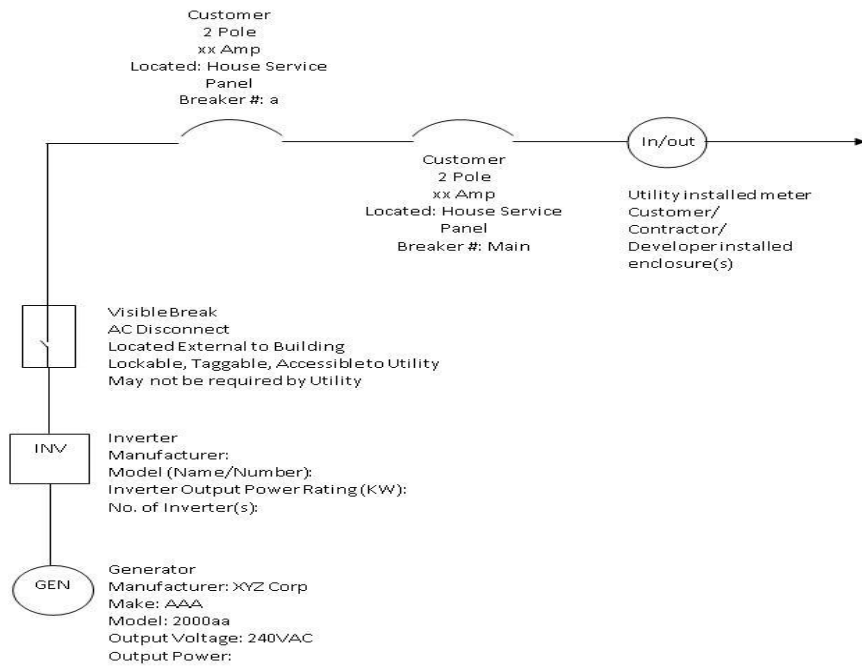
Customer Name: _____

Project Site Address: _____

Site Plan Prepared By: _____

Prepared Date: _____

Appendix D - Sample One Line Drawing for Net Metering Inverter Based Generators



NOTE: One-line diagram 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

Customer Name: _____

Project Site Address: _____

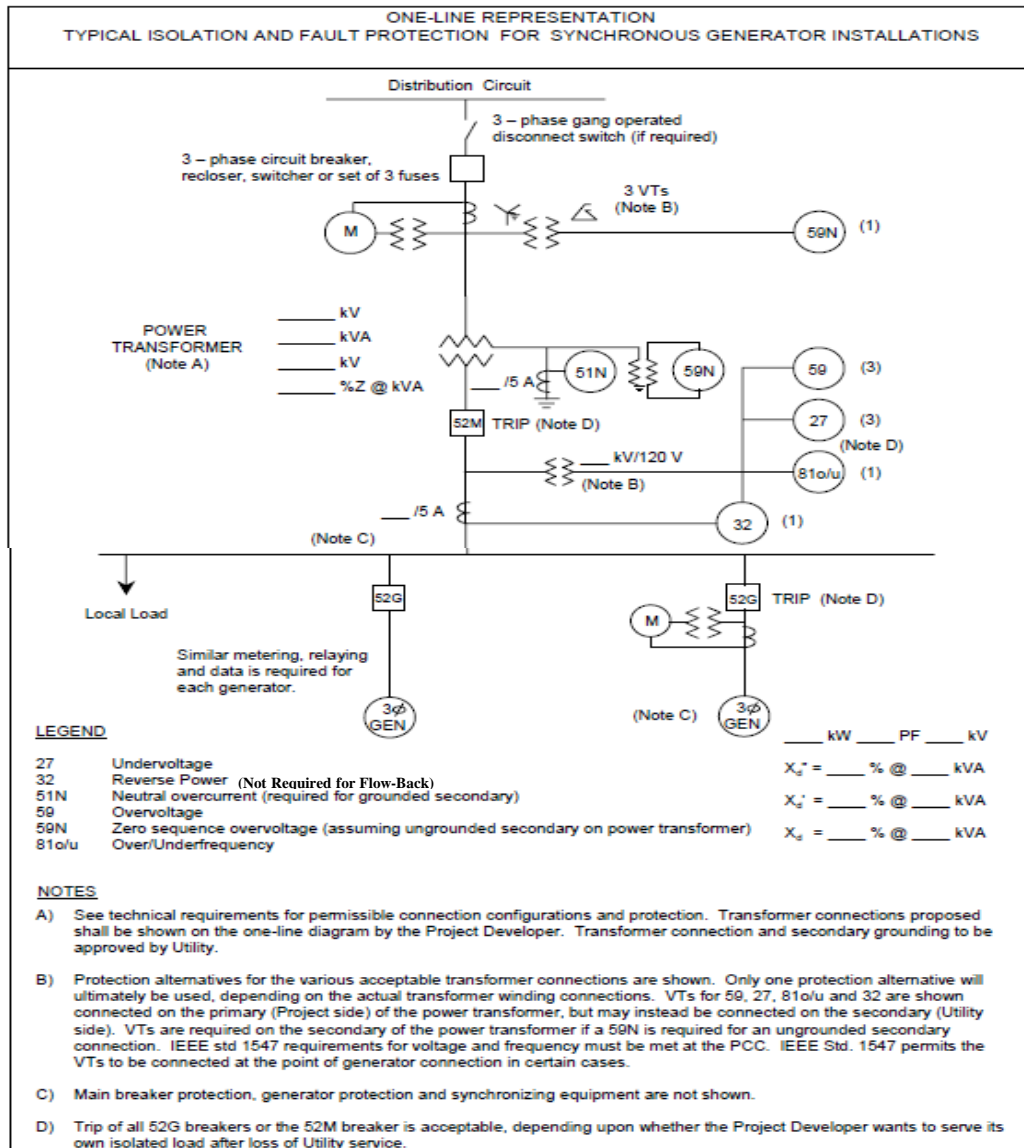
Licensed Professional Engineer Name (If applicable): _____

Licensed Professional Engineer Signature: _____

Electrical Contractor License Number: _____

Date: _____

Appendix E: Sample One-Line Drawing for Synchronous Generators



NOTE: One-line diagram 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

Customer Name: _____

Project Site Address: _____

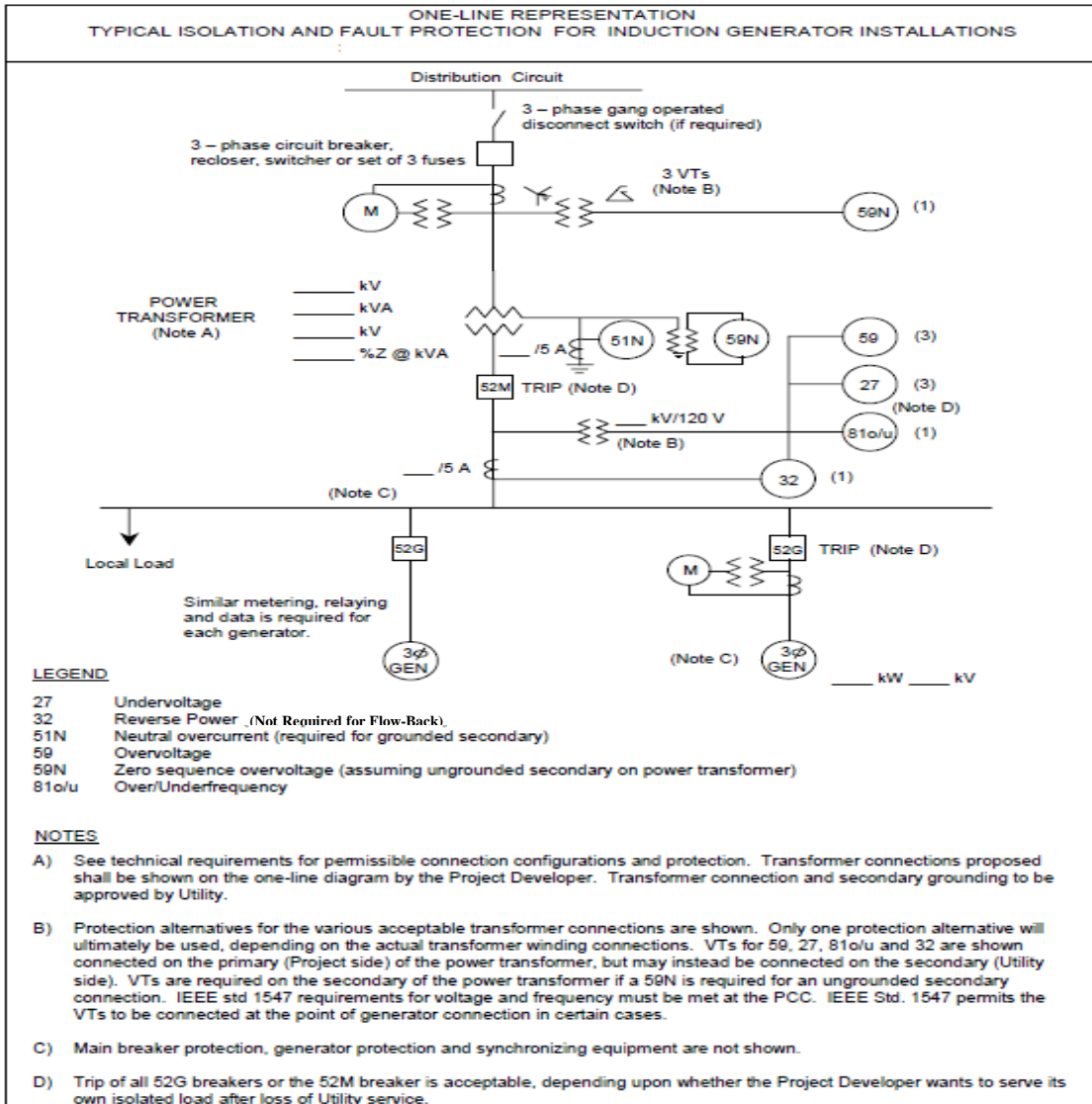
Licensed Professional Engineer Name (If applicable): _____

Licensed Professional Engineer Signature: _____

Electrical Contractor License Number: _____

Date: _____

Appendix F: Sample One-Line Drawing for Induction Generators



NOTE: One-line diagram 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

Customer Name: _____

Project Site Address: _____

Licensed Professional Engineer Name (If applicable): _____

Licensed Professional Engineer Signature: _____

Electrical Contractor License Number: _____

Date: _____

CATEGORY 2 NET METERING APPLICATION
 FOR ALL PROJECTS WITH AGGREGATE GENERATOR OUTPUT OF
 MORE THAN 20 KW BUT LESS THAN OR EQUAL TO 150 KW
 (Note: Category 2 Net Metering Program only available to Renewable Generator Projects)

Electric Utility Contact Information				
Utility Name Interconnection Coordinator Utility Street Address Utility Street Address Interconnection Hotline: XXX.XXX.XXXX Interconnection Email: XXX@XXXXXX	<table border="1" style="width:100%; border-collapse: collapse;"> <tr style="background-color: #e0e0e0;"> <th align="center">For Office Use Only</th> </tr> <tr> <td style="padding: 2px;">Application No. _____</td> </tr> <tr> <td style="padding: 2px;">Date & Time Application Received _____</td> </tr> </table>	For Office Use Only	Application No. _____	Date & Time Application Received _____
For Office Use Only				
Application No. _____				
Date & Time Application Received _____				

Customer / Account Information

Electric Utility Customer Information: (As shown on utility bill)

Customer Name (Last, First, Middle): _____

Customer Mailing Address: _____

Customer E-Mail Address: (optional) _____

Electric Service Account # _____

Electric Service Meter Number: _____

Are you interested in selling Renewable Energy Credits (REC's) Yes No

Have you completed a Generator Interconnection Application? Yes No

Interconnection Application Number, if known _____

Will you have an Alternative Electric Supplier? Yes No

Notes: Enter name ONLY if your energy is supplied by a 3rd party, not the utility.
 You must apply to both the Distribution Utility and your Alternate Energy Provider (if applicable) for Net Metering

Alternative Electric Supplier Name _____

Generation System Site Information

Physical Site Service Address (if not Billing Address): _____

Annual Site Requirements Without Generation in Kilowatthours _____ kWh/year

Peak Annual Site Demand in Kilowatts (only for customers billed on demand rates) _____ kW/year

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): _____ kW

Total Generator(s) Nameplate AC Rating: _____ kW

Expected Annual Output in Kilowatthours _____ kWh/year

AC Output Operating Voltage: _____

Generator Wiring Configuration (Single Phase, Three Phase): _____

Is the Inverter tested to IEEE 1547.1? Yes No Not Applicable

Inverter Based Systems:

Manufacturer _____

Model (Name / Number) _____

Inverter Output Power Rating (kW) _____

No. of Inverter(s) _____

Induction & Synchronous Based Systems

Manufacturer _____

Model (Name / 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 Professional Engineer Name (If applicable) _____

Licensed Electrical Contractor Name (If applicable) _____

Electrical Contractor/PE Phone #: _____

Electrical Contractor/PE E-Mail: _____

Customer and Contractor Signature and Fees

(Sign and Return complete application with Application Fee to Electric Utility Contact)
To the best of my knowledge, all the information provided in this Application Form is complete and correct.

_____ **Customer** _____ **Project Developer/Contractor (If Applicable)**

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

Page 1 of 1

CATEGORY 2 GENERATOR INTERCONNECTION APPLICATION
 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 Net Metering
 (Note: Category 2 Net Metering Program only available to Renewable Generator Projects)

Electric Utility Contact Information

Utility Name
 Interconnection Coordinator
 Utility Street Address
 Utility Street Address
 Interconnection Hotline: XXX.XXX.XXXX
 Interconnection Email: xxx@xxx.com

For Office Use Only
Application No. _____
Date & Time Application Received

Customer / Account Information

Electric Utility Customer Information: (As shown on utility bill)

Customer Name (Last, First, Middle):
 Customer Mailing Address:

Customer E-Mail Address: (optional)
 Electric Service Account #
 Electric Service Meter Number:

Are you applying for the Net Metering Program ?

Yes No

Are you interested in selling Renewable Energy Credits (REC's)

Yes No

Will you have an Alternative Electric Supplier?

Notes: Enter name ONLY if your energy is supplied by a 3rd party, not the utility.
 You must apply to both the Distribution Utility and your Alternate Energy Provider (if applicable) for Net Metering

Yes No

Alternative Electric Supplier Name

--

Generation System Site Information

Physical Site Service Address (if not Billing Address):

--

Annual Site Requirements Without Generation in Kilowatthours

Peak Annual Site Demand in Kilowatts (only for customers billed on demand rates)

	kWh/year
	kW/year

Attached Site Plan:

Attached Electrical One-Line Drawing (See the Appendix D for a sample Inverter Type Project)
 (Per MPSC Order in Case No. U-15787- The one-line diagram 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 diagram.)

Page #
Page #

Synchronous/Induction Generators: Must fill out Appendix A or B and provide a Detail One-Line Diagram

See Appendix E and F for a sample the Detail One-Line Diagram for Synchronous or Induction projects
 Note: The following information on these system components shall appear on the preliminary Detail One-Line Diagram

Page #

- 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

CATEGORY 2 GENERATOR INTERCONNECTION APPLICATION
 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 Net Metering
 (Note: Category 2 Net Metering Program only available to Renewable Generator Projects)

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):	kW
Total Generator(s) Nameplate AC Rating:	kW
Expected Annual Output in Kilowatthours	kWh/year
AC Output Operating Voltage:	
Generator Wiring Configuration (Single Phase, Three Phase):	
Is the Inverter tested to IEEE1547.1?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Applicable

Inverter Based Systems:

Manufacturer	
Model (Name / Number)	
Inverter Output Power Rating (kW)	
No. of Inverter(s)	

Induction & Synchronous Based Systems

Manufacturer	
Model (Name / 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 Professional Engineer Name (If applicable)	
Licensed Electrical Contractor Name (If applicable)	
Electrical Contractor/PE Phone #:	
Electrical Contractor/PE E-Mail:	

Customer and Contractor Signature and Fees

Attached \$100 Interconnection Application Fee or
 Attached \$100 combined Interconnection & Net Metering Program application fees (Check # / Money Order #)
 (\$75 Interconnection Application Fee plus \$25 fee required if selecting net metering)

(Sign and Return complete application with Application Fee to Electric Utility Contact)
To the best of my knowledge, all the information provided in this Application Form is complete and correct.

Customer

Project Developer/Contractor (If Applicable)

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

APPENDIXES

Appendix A: Technical Information for Synchronous-Type Generators
Appendix B: Technical Information for Induction-Type Generators
Appendix C: Sample Site Plan
Appendix D: Sample One-Line diagram for Inverter Type Project
Appendix E: Sample One-Line diagram for Synchronous Type Project
Appendix F: Sample One-Line diagram for Induction Type Project

Appendix A

Synchronous Generators

Generator Information

- a. Generator Nameplate Voltage
- b. Generator Nameplate Watts or Volt-Amperes
- c. Generator Nameplate Power Factor (pf)
- d. RPM

a.
b.
c.
d.

Technical Information

- e. Minimum and Maximum Acceptable Terminal Voltage
- f. Direct axis reactance (saturated)
- g. Direct axis reactance (unsaturated)
- h. Quadrature axis reactance (unsaturated)
- i. Direct axis transient reactance (saturated)
- j. Direct axis transient reactance (unsaturated)
- k. Quadrature axis transient reactance (unsaturated)
- l. Direct axis sub-transient reactance (saturated)
- m. Direct axis sub-transient reactance (unsaturated)
- n. Leakage Reactance
- o. Direct axis transient open circuit time constant
- p. Quadrature axis transient open circuit time constant
- q. Direct axis subtransient open circuit time constant
- r. Quadrature axis subtransient open circuit time constant
- s. Open Circuit saturation curve
- t. Reactive Capability Curve showing overexcited and underexcited limits (Reactive Information if non-synchronous)
- u. Excitation System Block Diagram with values for gains and time constants (Laplace transforms)
- v. Short Circuit Current contribution from generator at the Point of Common Coupling
- w. Rotating inertia of overall combination generator, prime mover, couplers and gear drives
- x. Station Power load when generator is off-line, Watts, pf
- y. Station Power load during start-up, Watts, pf
- z. Station Power load during operation, Watts, pf

e.
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j.
k.
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p.
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s.
t.
u.
v.
w.
x.
y.
z.

Appendix B

Induction Generators

Generator Information

- a. Generator Nameplate Voltage
- b. Generator Nameplate Watts or Volt-Amperes
- c. Generator Nameplate Power Factor (pf)
- d.RPM

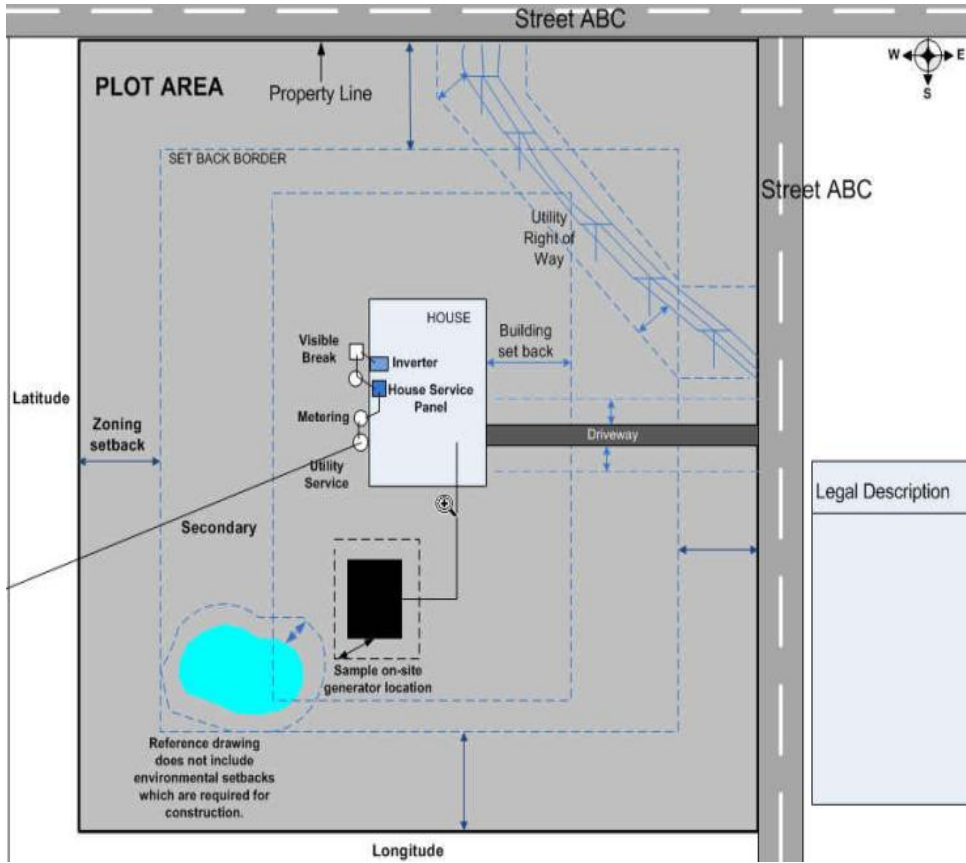
a.
b.
c.
d.

Technical Information

- e. Synchronous Rotational Speed
- f. Rotation Speed at Rated Power
- g. Slip at Rated Power
- h. Minimum and Maximum Acceptable Terminal Voltage
- i. Motoring Power (kW)
- j. Neutral Grounding Resistor (If Applicable)
- k. I_2^2t or K (Heating Time Constant)
- l. Rotor Resistance
- m. Stator Resistance
- n. Stator Reactance
- o. Rotor Reactance
- p. Magnetizing Reactance
- q. Short Circuit Reactance
- r. Exciting Current
- s. Temperature Rise
- t. Frame Size
- u. Design Letter
- v. Reactive Power Required in Vars (No Load)
- w. Reactive Power Required in Vars (Full Load)
- x. Short Circuit Current contribution from generator at the Point of Common Coupling
- y. Rotating inertia, H in Per Unit on kVA Base, of overall combination generator, prime mover, couplers and gear drives
- z. Station Power load when generator is off-line, Watts, pf
- aa. Station Power load during start-up, Watts, pf
- bb. Station Power load during operation, Watts, pf

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u.
v.
w.
x.
y.
z.
aa.
bb.

Appendix C: Sample Site Plan - Provided for Reference Only



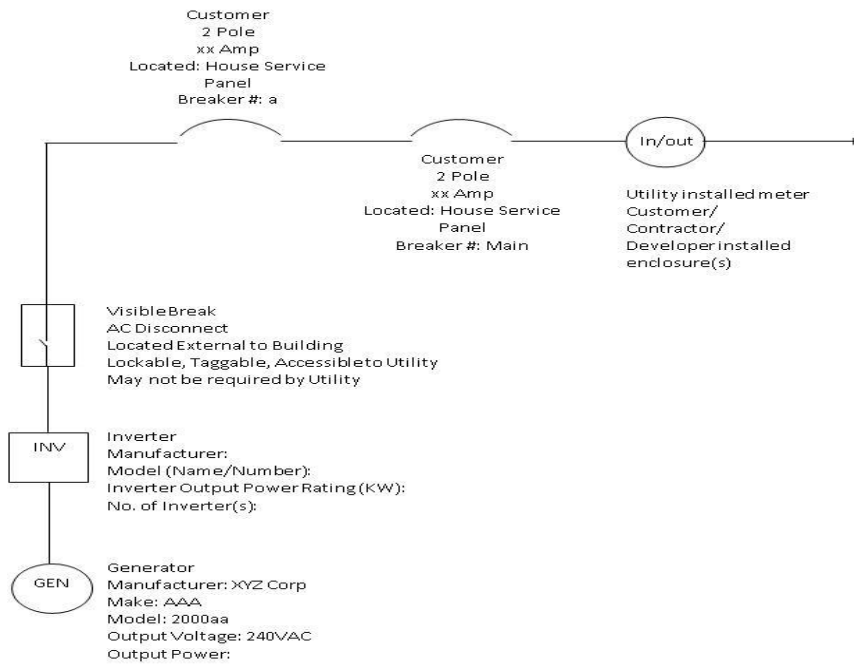
Customer Name: _____

Project Site Address: _____

Site Plan Prepared By: _____

Prepared Date: _____

Appendix D - Sample One Line Drawing for Net Metering Inverter Based Generators



NOTE: One-line diagram 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

Customer Name: _____

Project Site Address: _____

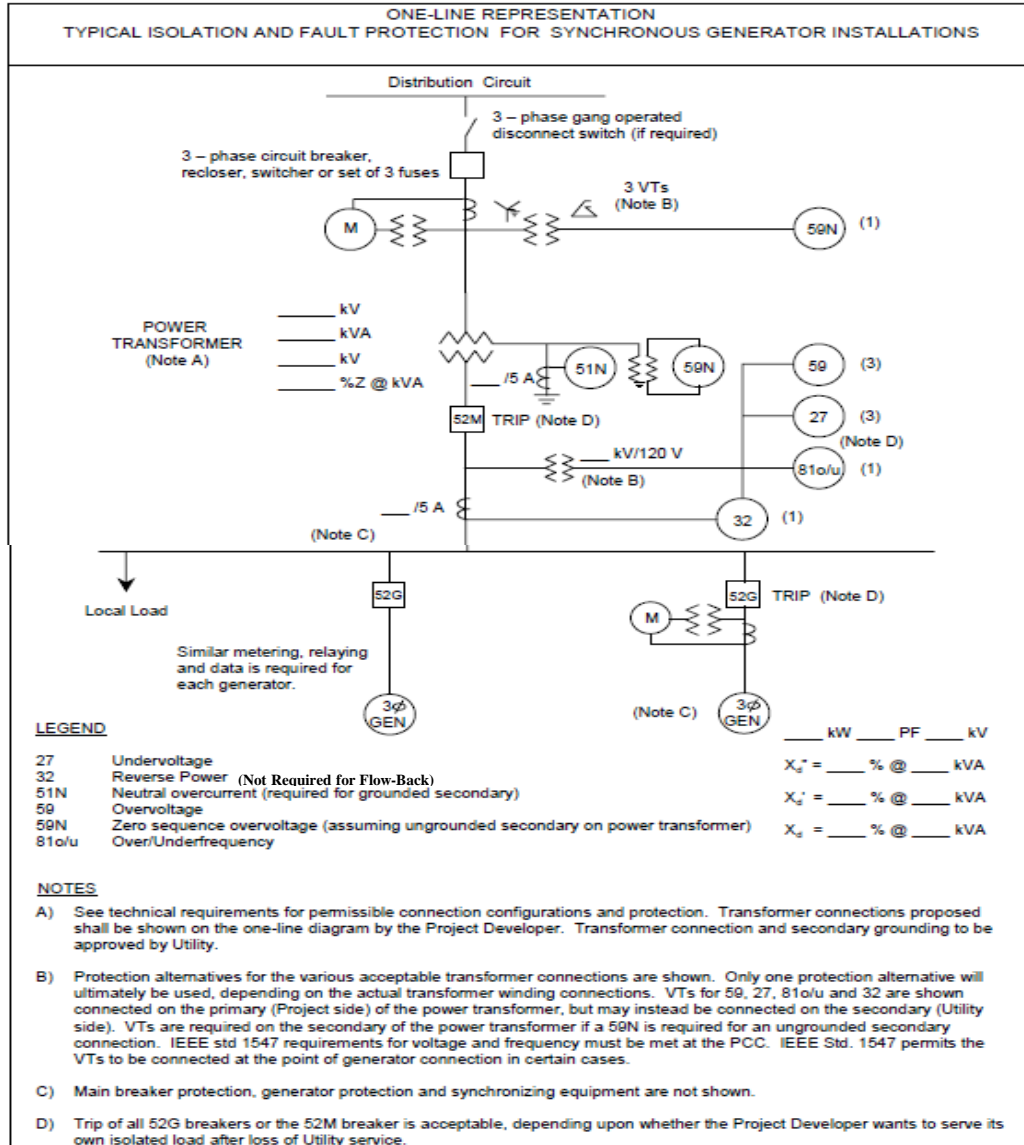
Licensed Professional Engineer Name (If applicable): _____

Licensed Professional Engineer Signature: _____

Electrical Contractor License Number: _____

Date: _____

Appendix E: Sample One-Line Drawing for Synchronous Generators



NOTE: One-line diagram 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

Customer Name: _____

Project Site Address: _____

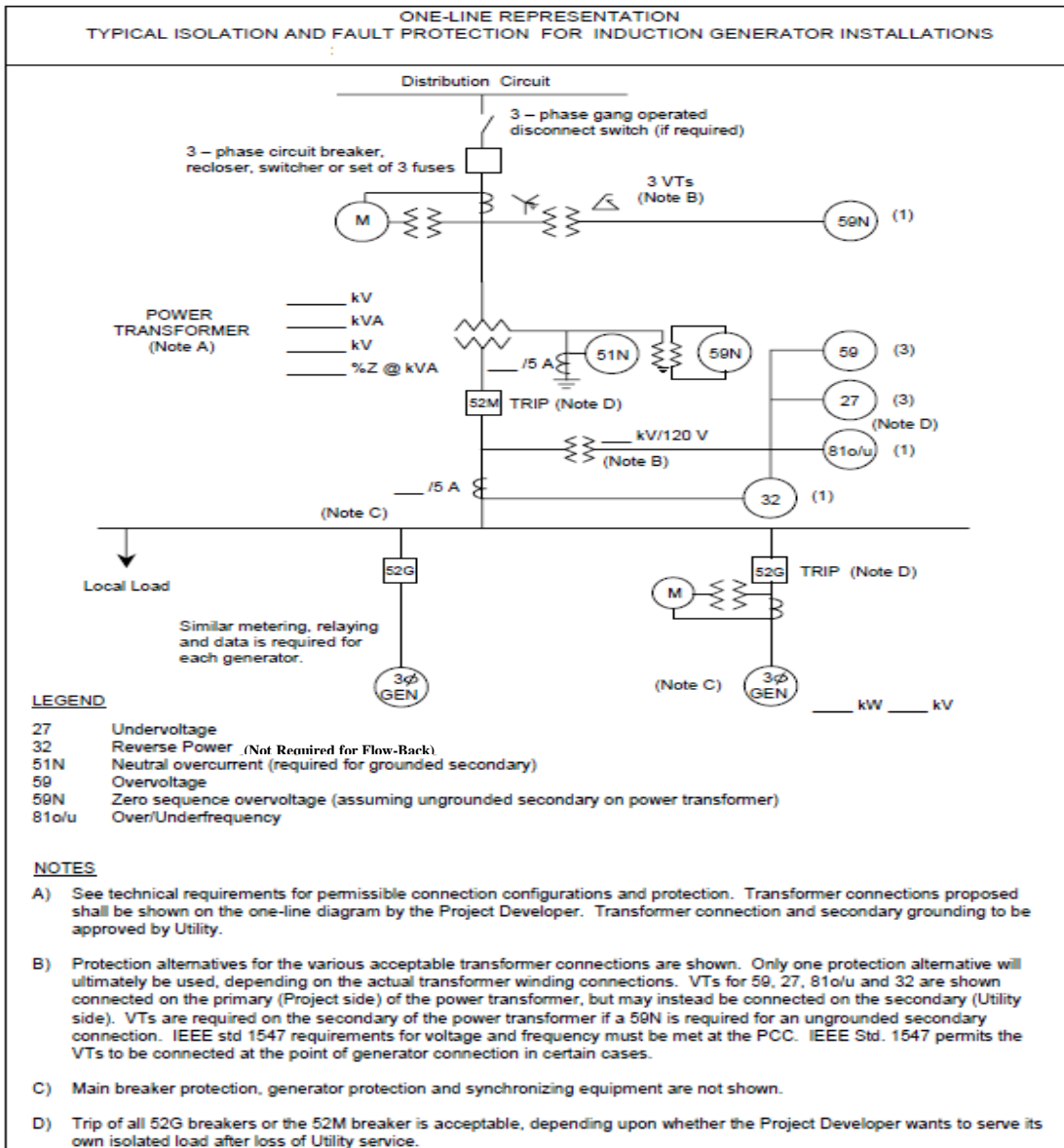
Licensed Professional Engineer Name (If applicable): _____

Licensed Professional Engineer Signature: _____

Electrical Contractor License Number: _____

Date: _____

Appendix F: Sample One-Line Drawing for Induction Generators



NOTE: One-line diagram 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

Customer Name: _____

Project Site Address: _____

Licensed Professional Engineer Name (If applicable): _____

Licensed Professional Engineer Signature: _____

Electrical Contractor License Number: _____

Date: _____

**INTERCONNECTION AND PARALLEL OPERATING AGREEMENT
FOR CATEGORY 1 AND CATEGORY 2 PROJECTS
(PROJECTS UP TO 150 kW)**

This Interconnection and Parallel Operating Agreement (“Agreement”) is entered into on _____ (insert last date from page 10) by _____ (the “Utility”), _____ (the “Applicant”), and (if applicable under Paragraph 5) _____ (the “Property Owner”). Utility and Applicant are sometimes also referred to in this Agreement collectively as “Parties” or individually as “Party.” Applicant shall be the “Project Developer” as used in and for purposes of the applicable Michigan Electric Utility Generator Interconnection Procedures (“Interconnection Procedures”) approved by the Michigan Public Service Commission (“Commission”).

I. RECITALS

- A. Applicant is an electric service customer of Utility in good standing and has submitted a Generator Interconnection Application (“Application”) to Utility.
- B. Applicant desires to interconnect an electric generating facility with a maximum capacity of 150 kW kilowatts (“kW”) or less (the “Applicant Facility”) with Utility’s electric distribution system and operate Applicant Facility in parallel with Utility’s distribution system, under the Utility’s Interconnection Procedures for Category 1 or 2 projects, as defined in the Electric Interconnection and Net Metering Standards approved by the Commission (the “Standards”), as applicable.
- C. For purposes of this Agreement, “interconnect” means establishing a connection between a non-utility generating resource (in this case, the “Applicant Facility”) and Utility’s distribution system. “Operate in parallel” means generating electricity from a non-utility resource (in this case, the Applicant Facility) that is connected to Utility’s system. In all cases, terms shall have the meaning as defined in the Standards.
- D. Interconnection of the Applicant Facility with Utility’s distribution system is subject to this Agreement, the Application, the Interconnection Procedures, the Standards and utility tariffs approved by the MPSC, as applicable.
- E. This Agreement does not address any purchase or sale of electricity between Utility and Applicant nor does it create any agency, partnership, joint venture or other business arrangement between or among Utility, Applicant and/or Property Owner.

II. AGREEMENT

NOW THEREFORE, in consideration of the above recitals, the mutual covenants contained herein and for good and valuable consideration, the Parties agree as follows:

1. Description of Applicant Facility

1.1 The Applicant Facility must be built with the following ratings, which shall not be changed without thirty (30) days advance written notice to Utility according to the notice requirements herein and as depicted in Exhibit 1 – Interconnection Diagram:

Photovoltaic/Solar (“PV”) Array Rating: _____ (AC) kW
Photovoltaic/Solar (“PV”) Array Rating: _____ (DC) kW
Wind Turbine (WT) Rating: _____ kW
Hydroelectric Turbine (HT) Rating: _____ kW
Fuel Cell (FC) Rating: _____ kW
Other (specify type and rating): _____ kW
Service Type (circle one): Single Phase / Three Phase
Voltage Level: _____
Equipment Specifications: Make: _____ Model: _____

1.2 Applicant Facility Location:

(Street Address, City, State, ZIP)

If Applicant is not the owner of the property identified above, the Property Owner must sign this Agreement for the purposes indicated in Paragraph 5.

1.3 Applicant’s Utility service account number: _____

Property Owner’s Utility service account number (if applicable): _____

1.4 The Applicant Facility is planned to be ready for parallel operation on or about:

2. **Interconnection Facilities**

If it is necessary for Utility to install certain interconnection facilities (“Interconnection Facilities”) and make certain system modifications in order to establish an interconnection between the Applicant Facility and Utility’s distribution system, the Interconnection Facilities and modifications shall be described to the Applicant in writing.

3. **Design Requirements, Testing and Maintenance of Applicant Facility**

- 3.1 Applicant shall be responsible for the design and installation of the Applicant Facility and obtaining and maintaining any required governmental authorizations and/or permits, which may include, but shall not be limited to, easements to clear trees, and necessary rights-of-way for installation and maintenance of the Utility Interconnection Facilities.
- 3.2 Applicant shall, at its sole expense, install and properly maintain protective relay equipment and devices to protect its equipment and service, and the equipment and system of Utility, from damage, injury or interruptions, and will assume any loss, liability or damage to the Applicant Facility caused by lack of or failure of such protection. Such protective equipment specifications and design shall be consistent with the applicable Interconnection Procedures. Prior to the Applicant Facility operating in parallel with Utility distribution system, Applicant shall provide satisfactory evidence to Utility that it has met the Interconnection Procedures, including but not limited to the receipt of approval from the local building/electrical code inspector. The Utility’s approval, or failure to approve, under this section shall in no way act as a waiver or otherwise relieve the Applicant of its obligations under this section.
- 3.3 At its own expense, Applicant shall perform operational testing at least five (5) days prior to the installation of any Interconnection Facilities by Utility. Utility may, but is not required to, send qualified personnel to the Applicant Facility to inspect the facility and observe the testing. Upon completion of such testing and inspection, and prior to interconnection, Applicant shall provide Utility with a written report explaining all test results, including a copy of the generator commissioning test report.

Applicant shall test protective relay equipment in accordance with manufacturer’s specifications, unless no testing interval is provided, in which case testing shall occur every two years (unless an extension is agreed to by Utility) to verify the calibration indicated on the latest relay setting document issued by Utility. The results of such tests shall be provided to Utility upon request. Utility may, at any time and at its sole expense, inspect and test the Applicant Facility to verify that the required protective equipment is in service,

properly maintained, and calibrated to provide the intended protection. This inspection may also include a review of Applicant's pertinent records. Inspection, testing and/or approval by Utility or the omission of any inspection, testing and/or approval by Utility pursuant to this Agreement shall not relieve the Applicant of any obligations or responsibility assumed under this Agreement.

- 3.4 Applicant shall operate and maintain the Applicant Facility in a safe and prudent manner and in conformance with all applicable laws and regulations. Applicant shall obtain or maintain any governmental authorizations and permits required for construction and operation of the Applicant Facility.

4. **Disconnection**

Utility shall be entitled to disconnect the Applicant Facility from Utility's distribution system, or otherwise refuse to connect the Applicant Facility, if: (a) Applicant has not complied with any one of the technical requirements contained in the applicable Interconnection Procedures, (b) the electrical characteristics of the Applicant Facility are not compatible with the electrical characteristics of Utility's distribution system, (c) an emergency condition exists on Utility's distribution system, (d) Applicant's protective relay equipment fails, (e) Utility determines that the Applicant Facility is disrupting service to any other Utility Customer, (f) disconnection is required to allow for construction, installation, maintenance, repair, replacement, removal, investigation, inspection or testing of any part of Utility's facilities, (g) if a required installation fails or becomes incapacitated and is not repaired in a timely manner, as determined by Utility, or (h) Applicant commits a material breach of this Agreement. When reasonable and appropriate, the Utility will attempt to notify Applicant and coordinate its actions under this Paragraph with Applicant. This paragraph applies only to Utility actions with respect to Applicant Facility. Utility shall promptly re-connect the Applicant Facility to the Utility's distribution system as soon as the reason for disconnection has been remedied.

5. **Access to Property**

- 5.1 At its own expense, Applicant shall make the Applicant Facility site available to Utility. The site shall be free from hazards and shall be adequate for the operation and construction of the Interconnection Facilities. Utility, its agents and employees, shall have full right and authority of ingress and egress at all reasonable times on and across the property at which the Applicant Facility is located, for the purpose of installing, operating, maintaining, inspecting, replacing, repairing, and removing the Interconnection Facilities. The right of ingress and egress shall not unreasonably interfere with Applicant's or (if different) Property Owner's use of the property and does not include the right to enter applicant's residence or other enclosed structure on the property where the

Applicant Facility is located, except on reasonable notice where the Interconnection Facilities are located within the residence or other enclosed structure.

- 5.2 Utility may enter the property on which the Applicant Facility is located to inspect, at reasonable hours, Applicant's protective devices and read or test meters. Utility will use reasonable efforts to provide Applicant or Property Owner, if applicable, at least 24 hours' notice prior to entering said property, in order to afford Applicant or Property Owner the opportunity to remove any locks or other encumbrances to entry; *provided, however*, that Utility may enter the property without notice (removing, at Applicant's expense, any lock or other encumbrance to entry) and disconnect the Interconnection Facilities if Utility believes that disconnection is necessary to address a hazardous condition and/or to protect persons, Utility's facilities, or the property of others from damage or interference caused by Applicant Facility.
- 5.3 By executing this Agreement, Applicant and Property Owner consent to and agree to provide access to its property, including all rights of ingress and egress, on which the Applicant Facility is located to Utility as described in this section, but does not assume or guarantee other performance obligations of the Applicant under this Agreement.

6. **Liability**

- 6.1 As between the Parties, unless caused by the sole negligence or intentional wrongdoing of the other Party, each Party to this Agreement shall at all times assume all liability for, any and all damages, losses, claims, demands, suits, recoveries, costs, legal fees, and expenses to the extent caused by its directors, officers, employees, and agents: (a) for injury to or death of any person or persons whomsoever occurring on its own system, and/or (b) for any loss, destruction of or damage to any property of third persons, firms, corporations or other entities occurring on its own system, including environmental harm or damage arising out of or resulting from, either directly or indirectly, the Interconnection Facilities or the Applicant Facilities, or arising out of or resulting from, either directly or indirectly, any electric energy furnished to it hereunder after such energy has been delivered to it by such other Party.
- 6.2 The provisions of this Section 6 shall not be construed to relieve any insurer of its obligations to pay any insurance claims in accordance with the provisions of any valid insurance policy.
- 6.3 Notwithstanding anything in this Section, or any other provision of this Agreement to the contrary, any liability of a Party to the other Party shall be limited to direct actual damages, and all other damages at law or in

equity are hereby waived. Under no circumstances shall a Party be liable to the other Party, whether in tort, contract or other basis in law or equity for any special, indirect, punitive, exemplary or consequential damages, including lost profits.

- 6.4 The obligations and limits on liability in this Section 6 shall continue in full force and effect notwithstanding the expiration or termination of this Agreement, with respect to any event or condition giving rise to an obligation that occurred prior to such expiration or termination.
- 6.5 Nothing in this Section 6 waives or limits, or shall be construed to waive or limit, the governmental immunity of a Party.
- 6.6 Nothing in this Section 6 shall imply, or be construed to imply indemnification of any Party by the State of Michigan, its department, and agencies, or by other governmental customers that are restricted from entering into indemnification provisions by law.

7. **Subcontractors**

Either Party may contract with a subcontractor to perform its obligations under this Agreement and shall incorporate the obligations of this Agreement into its respective subcontracts, agreements and purchase orders. Each Party shall remain liable to the other Party for the performance of such subcontractor under this Agreement subject to the provisions of Section 6.

8. **Force Majeure**

Neither Party shall be liable for failure to perform any of its obligations hereunder, to the extent due to fire, flood, storm, other natural disaster, national emergency or war (referred to collectively as “Force Majeure”), and not due to labor problems, inability to obtain financing, negligence or other similar condition of such party, provided that either party has given the other prompt notice of such occurrence. The Party affected shall exercise due diligence to remove such Force Majeure with reasonable dispatch, but shall not be required to accede or agree to any provision not satisfactory to it in order to settle and terminate a strike or other labor disturbance.

9. **Breach and Default**

A breach of this Agreement (“Breach”) shall occur upon the failure of a Party to perform or observe any material term or condition of this Agreement. Upon a Breach by one Party, the non-breaching Party shall give written notice of such Breach to the breaching Party. The Party in Breach shall have thirty (30) days from the date of the written notice to cure the Breach. If a Breach is not cured within the

thirty (30) day period provided for herein, the party in Breach shall be deemed in default (“Default”). The non-defaulting Party shall then have the right to terminate this Agreement by written notice, shall be relieved of any further obligations hereunder, and may pursue any and all remedies available to it at law or in equity.

10. **Retirement**

Upon termination or cancellation of this Agreement or at such time after any of the Interconnection Facilities described herein are no longer required, the Parties shall mutually agree upon the retirement of the Interconnection Facilities, which may include without limitation (i) dismantling, demolition, and removal of equipment, facilities, and structures, (ii) security, (iii) maintenance and (iv) disposing of debris. The cost of such removal shall be borne by the Utility.

11. **Governing Law**

This Agreement shall be interpreted, governed, and construed under the laws of Michigan.

12. **Amendment, Modification or Waiver**

Any amendments or modifications to this Agreement shall be in writing and agreed to by both Parties. The failure of any Party at any time to require performance of any provision hereof shall in no manner affect its right at a later time to enforce the same. No waiver by any Party of the breach of any term or covenant contained in this Agreement, whether by conduct or otherwise, shall be deemed to be construed as a further or continuing waiver of any such breach or a waiver of the breach of any other term or covenant unless such waiver is in writing.

13. **Notices**

Any notice required under this Agreement shall be in writing and mailed or personally delivered to the Party at the address below. Written notice is effective within 3 days of depositing the notice in the United States mail, first class postage prepaid. Personal notice is effective upon delivery. Written notice of any address changes shall be provided. All written notices shall refer to the Applicant's Utility account number, as provided in Section 1 of this Agreement. All written notices shall be directed as follows:

Notice to Utility:

Notice to Applicant:

Notice to Property Owner (if different than Applicant):

14. **Term of Agreement and Termination**

This Agreement shall become effective upon execution by all Parties and, if applicable, the Property Owner, and it shall continue in full force and effect until terminated upon thirty (30) days' prior notice by the Applicant, upon Default of either Party as set forth in Section 9, or upon mutual agreement of the Parties. The Utility may terminate the agreement on reasonable notice for reasons consistent with existing law, regulations and tariffs.

15. **Entire Agreement**

This Agreement supersedes all prior discussions and agreements between the Parties with respect to the subject matter hereof and constitutes the entire agreement between the Parties hereto.

16. **No Third Party Beneficiary**

The terms and provisions of this Agreement are intended solely for the benefit of each Party, and it is not the intention of the Parties to confer third-party beneficiary rights upon any other person or entity.

17. **Assignment and Binding Effect**

This Agreement shall not be assigned by a Party without the prior written consent of the other Party, which shall not be unreasonably withheld. Any attempt to assign this Agreement without consent will be void. Subject to the preceding, this Agreement is binding upon, inures to the benefit of, and is enforceable by the Parties and their respective successors and assigns. Applicant agrees to notify Utility in writing upon the sale or transfer of the Applicant Facility. This Agreement shall terminate upon such notice unless Utility consents to an assignment in writing.

18. **Severability**

If any provision of this Agreement is determined to be partially or wholly invalid, illegal, or unenforceable, then such provision shall be deemed to be modified or restricted to the extent necessary to make such provision valid, binding, and enforceable; or, if such provision cannot be modified or restricted in a manner so as to make such provision valid, binding or enforceable, then such provision shall be deemed to be excised from this Agreement and the validity, binding effect, and enforceability of the remaining provisions of this Agreement shall not be affected or impaired in any manner.

19. **Signatures**

The Parties to this Agreement hereby agree to have two originals of this Agreement executed by their duly authorized representatives (three originals are necessary if the Property Owner signs this Agreement). This Agreement is effective as of the later (or latest) of the dates set forth below.

20. Counterparts and Electronic Documents

This Agreement may be executed and delivered in counterparts, including by a facsimile or an electronic transmission thereof, each of which shall be deemed an original. Any document generated by the parties with respect to this Agreement, including this Agreement, may be imaged and stored electronically and introduced as evidence in any proceeding as if original business records. Neither party will object to the admissibility of such images as evidence in any proceeding on account of having been stored electronically.

UTILITY

(Applicant)

By: _____
(Duly Authorized Signature)

By: _____
(Duly Authorized Signature)

(Print or Type Name)

(Print or Type Name)

Title: _____

Title: _____

Date: _____

Date: _____

(Property Owner, if applicable)

By: _____
(Duly Authorized Signature)

(Print or Type Name)

Title: _____

Date: _____

EXHIBIT 1
INTERCONNECTION DIAGRAM

(Insert one of the eighteen One-Line Diagrams (PDF file) for the various size and type of generator that will be installed.)

MICHIGAN ELECTRIC UTILITY

Generator Interconnection Procedures

***Category 1 Inverter Based
Projects with
Aggregate Generator Output
20 kW or Less certified for anti-islanding in
compliance with IEEE 1547 standards et seq***

December 2012

Introduction

Category 1

This Generator Interconnection Procedure document outlines the process & requirements used to install or modify certified inverter based generation projects with aggregate generator output capacity ratings less than or equal to 20kW and designed to operate in parallel with the Utility electric system. Technical requirements are defined according to type of generation, location of the interconnection, and mode of operation (Flow-back or Non-Flow-back). The process is designed to allow for a reasonably expeditious interconnection to the Utility electric system that is both safe and reliable.

This document has been filed with the Michigan Public Service Commission (MPSC) and complies with rules established for the interconnection of parallel generation to the Utility electric system in the MPSC Order in Case No. U-15787.

The term “Project” will be used throughout this document to refer to electric generating equipment and associated facilities that are not owned or operated by an Electric Utility. The term “Project Developer” means a person that owns, operates, or proposes to construct, own, or operate, a Project. Project Developer may be also be the Applicant.

This document does not address other Project concerns such as environmental permitting, local ordinances, or fuel supply. Nor does it address agreements that may be required with the Utility, an Alternate Electric Supplier, and/or the transmission provider, or state or federal licensing, to market the Project’s energy. An interconnection request does not constitute a request for transmission or establishment/modification of existing electrical lines or electric service.

When requested by the Project Developer, it may be possible for the Utility to adjust requirements stated herein on a case-by-case basis. The review necessary to support such adjustments, however, may be extensive and may exceed the ordinary costs and timeframes addressed in these requirements. Therefore, if requested by the Project Developer, adjustments to these requirements will only be considered if the Project Developer agrees in advance to compensate the Utility for the actual and reasonably and prudently incurred added costs that are not otherwise recovered, if any, of the additional reviews, and to also allow the utility a reasonable amount of additional time for the additional reviews.

The Utility may apply for a technical waiver from one or more provisions of these rules and the MPSC may grant a waiver.

Non-Certified Inverter based, synchronous, or induction generation projects less than or equal to 20kW will be implemented under the Category 2 procedures and applications.

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Interconnection Procedures

Interconnection Process

Customer Project Planning Phase

An applicant may contact the Utility before or during the application process regarding the project. The Utility can be reached by phone, e-mail, or by the external website to access information, forms, rates, and agreements. A Utility will provide up to 2 hours of technical consultation at no additional cost to the applicant. Consultation may be limited to providing information concerning the Utility system operating characteristics and location of system components.

Application

The Project Developer must first submit an Interconnection application or a Combined Interconnection and Net Metering application to the Utility. A separate application is required for each Project or Project site. The blank Interconnection Application or Combined Interconnection and Net Metering application can be found on the Electric Utility's website (insert link) .

An applicant shall complete a submittal of required interconnection application and Interconnection filing fee per the table in Appendix B. The Utility will notify the Project Developer within 10 business days of receipt of an Interconnection Application. If any portion of the Interconnection Application, data submittal (a site plan and the one-line diagrams), or filing fee is incomplete and/or missing, the Utility will return the application, data, and filing fee to the Project developer with explanations. Project Developer will need to resubmit the application with all the missing items.

Once the Utility has accepted the combined Interconnection and Net Metering Application, an identifying number will be assigned to the Project. The Utility will then advise the applicant that the application is complete and provide the customer with the identifying number.

Application Review

Upon receipt of payment of the Category 1 Interconnection Application fee of \$75, the Utility will review the complete application for interconnection to determine if additional Study(ies)^{1,2}

Engineering Review¹

The Utility shall study the project to determine the suitability of the interconnection equipment including safety and reliability complications arising from equipment saturation, multiple technologies, and proximity to synchronous motor loads. The electric utility shall provide in writing the results of the engineering study within the time indicated in the notification. The customer is exempt from the cost of the study except with respect to any study costs that may be included in and applicable to the customer through the Company's general tariff rates for the relevant customer class. If an engineering review determines that a distribution study is not required, the project will advance to the Meter Install, Testing, & Inspection phase of the process.

are required. The Utility will notify the Project Developer within 10 business days of receipt of a complete application and if additional study(ies) are required. The applicant shall provide any changes or updates to the application before additional Study(ies) begin. The Utility may request additional data be submitted as necessary during the review phase to clarify the operation of the Project. If the additional study(ies) are not required, the Utility will notify the Project Developer of its preliminary approval or disapproval of the interconnection. If approved, the project will advance to the Meter Install, Testing, & Inspection phase of the process. If the interconnection is disapproved, the utility shall notify the applicant of the necessary corrective actions required for approval. The applicant, after taking corrective action, may request the electric utility to reconsider the interconnection request.

Customer Install & Parallel Operating Agreement (POA)

The applicant shall notify the Electric Utility when an installation and any required local code inspection and approval is complete. The Parallel Operating Agreement for customer owned generation which operates in parallel with the Electric Utility may be accessed on the Electric Utility's website. The Parallel Operating Agreement will cover matters customarily addressed in such agreements in accordance with Good Utility Practice, including, without limitation, system operation, interconnection rate, defaults and remedies, and liability. The applicant shall complete, sign and return the POA to the Utility. Any delay in the applicant's execution of the Interconnection and Operating Agreement will not toll the interconnection deadlines.

Meter Install, Testing, & Inspection

Upon receipt of the local code inspection approval and POA executed by the applicant, the Utility will schedule the meter install, testing, and inspection³. The Utility shall have an opportunity to schedule a visit to witness and perform commissioning tests required by IEEE 1547 et seq. and inspect the project. The Electric Utility may provide a waiver of its right to visit the site to inspect the project and witness or perform the commissioning tests. The Utility shall notify the applicant of its intent to visit the site, inspect the project, witness or perform the commissioning tests, or of its intent to waive inspection within 10 working days after notification that the installation and local code inspections have passed. Within 5 working days from receipt of the completed commissioning test report (if applicable), the Utility will notify the applicant of

Distribution Study²

The Utility shall study the project to determine if a distribution system upgrade is needed to accommodate the proposed project and determine the cost of an upgrade if required. The applicant is exempt from the cost of the study and upgrades if required, except with respect to any distribution study costs that may be included in and applicable to the customer through the Company's general tariff rates for the relevant customer class. The electric utility shall provide in writing the results of the distribution study including estimated completion timeframe for the upgrades, if required, to the applicant, within the timeframe indicated in the notification. If a distribution study determines that a distribution upgrades are not required, the project will advance to the Meter Install, Testing, & Inspection phase of the process.

³ If the Distribution Study determines that distribution upgrades are required, the meter install will follow the completion of the distribution upgrades. The applicant is exempt from the cost of the upgrades if required, except with respect to any distribution costs that may be included in and applicable to the customer through the Company's general tariff rates for the relevant customer class.

its final approval or disapproval of the interconnection. The utility's review is limited to determining whether the project was constructed consistent with the previously approved application and satisfactory completion of the commissioning test (as applicable). If the project was constructed consistent with the application and passes the commissioning test, then the project shall be awarded final approval for parallel operation and the Utility will execute the POA or otherwise approve operation. If the project was not constructed consistent with the application or does not pass the commissioning test, the utility may deny final approval for parallel operation. If the electric utility does not award final approval for the interconnection, the utility shall notify the applicant of the necessary corrective actions required for approval. The applicant, after taking corrective action, may request the electric utility to reconsider the interconnection request.

Operation in Parallel

Upon Utility approval of the interconnection, the Electric Utility shall install required metering, provide to the applicant a written statement of final approval, and a fully executed POA authorizing parallel operation.

Operational Provisions

Disconnection

An Electric Utility may refuse to connect or may disconnect a project from its distribution system if any of the following conditions apply:

- a. Applicant has not complied with any one of the technical requirements contained in the applicable Interconnection Procedures,
- b. The electrical characteristics of the Applicant Facility are not compatible with the electrical characteristics of Utility's distribution system,
- c. An emergency condition exists on Utility's distribution system,
- d. Applicant's protective relay equipment fails,
- e. Utility determines that the Applicant Facility is disrupting service to any Utility Customer,
- f. Disconnection is required to allow for construction, installation, maintenance, repair, replacement, removal, investigation, inspection or testing of any part of Utility's facilities,
- g. If a required installation fails or becomes incapacitated and is not repaired in a timely manner, as determined by Utility
- h. Applicant commits a material breach of the POA

Maintenance and Testing

The Utility reserves the right to test the relaying and control equipment that involves protection of the Utility's electric system, at its sole expense, whenever the Utility determines a need for such testing exists.

The applicant is solely responsible for conducting and documenting proper periodic maintenance on the generating equipment and its associated control, protective equipment, interrupting devices, and main Isolation Device⁴, per manufacturer recommendations.

Routine and maintenance checks of the relaying and control equipment must be conducted in accordance with provided written test procedures which are required by IEEE Std. 1547, and test reports of such testing shall be maintained by the applicant and made available for Utility inspection upon request. [NOTE – IEEE 1547 requires that testing be conducted in accordance with written test procedures, and the nationally recognized testing laboratory providing certification will require that such test procedures be available before certification of the equipment.]

Technical Requirements

The following discussion details the technical requirements for interconnection of Category 1 IEEE 1547 et seq Certified Inverter Based generation Projects 20 kW or less. For Projects within this capacity rating range, the Utility has made a significant effort to simplify the technical requirements. This effort has resulted in adoption of IEEE Standard 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems, being incorporated herein by reference. All protective functions are compliant with IEEE Standard 1547 et seq.

Certain requirements, as specified by this document, must be met to provide compatibility between the Project and the Utility's electric system, and to assure that the safety and reliability of the electric system is not degraded by the interconnection. The Utility reserves the right to evaluate and apply newly developed protection and/or operation schemes at its discretion. In addition, the Utility reserves the right to evaluate Projects on an ongoing basis as system conditions change, such as circuit loading, additional generation placed online, etc. The Utility shall bear the full cost of any changes to its distribution system resulting from such evaluations and applications.

Upgraded revenue metering may be required for the Project.

Major Component Design Requirements

The data requested in Appendix E, or F for all major equipment and relaying proposed by the Project Developer, must be submitted as part of the initial application for review and approval by the Utility. The Utility may request additional data be submitted as necessary during the Engineering Review and/or Distribution Study phase to clarify the operation of the Project.

Once installed, the interconnection equipment must be reviewed and approved by the Utility prior to being connected to the Utility's electric system and before Parallel Operation is allowed.

Data

The data that the Utility requires to evaluate the proposed interconnection is documented on a one-line diagram by generator type in Appendices E, or F.

⁴ Main Isolation Device – When required by the Electric Utility operating practices, a readily accessible, lockable, visible-break isolation device located between the Electric Utility and the Project.

A site plan, one-line diagrams, and interconnection protection system details of the Project are required as part of the application data. The generator manufacturer supplied data package should also be supplied.

Isolation Device

After review, the isolation device may not be required by the Utility. If required and/or installed, this device⁵ would be placed at the Point of Common Coupling (PCC) and must meet all of the requirements of Appendix H.

Interconnection Lines

Any new distribution service line construction to connect the Project to the Utility's electric system will be undertaken by the Utility at the Project Developer's expense. The new line(s) will terminate on a utility approved structure provided by and paid for by the Project Developer.

The physically closest available system voltage, as well as equipment and operational constraints influence the chosen point of interconnection. The Utility has the ultimate authority to determine the acceptability of a particular PCC.

Relaying Design Requirements

Regardless of the technology of the interconnection, for simplicity for all Projects in this capacity rating range, the interconnection relaying system must be certified by a nationally recognized testing laboratory to meet IEEE Std. 1547 et seq. The data submitted for review must include information from the manufacturer indicating such certification, and the manufacturer must placard the equipment such that a field inspection can verify the certification. A copy of this standard may be obtained (for a fee) from the Institute of Electrical and Electronics Engineers (www.ieee.org).

If the protective system uses AC power as the control voltage, it must be designed to disconnect the generation from the Utility electric system if the AC control power is lost. Utility will work with Project Developer for system design for this requirement.

Momentary Paralleling

For situations where the Project will only be operated in parallel with the Utility's electric system for a short duration (100 milliseconds or less), as in a make-before-break automatic transfer scheme, no additional relaying is required. Such momentary paralleling requires a modern integrated Automatic Transfer Switch (ATS) system, which is incapable of paralleling the Project with the Utility's electric system. The ATS must be tested, verified, and documented by the Project Developer for proper operation at least every 2 years. The Utility may be present during this testing.

⁵ Isolation Device -A rackable circuit breaker, circuit switcher, pole top switch, load-break disconnect, etc., depending on the electrical system configuration.

Automatic Reclosing

The Utility employs automatic multiple-shot reclosing on most of the Utility's circuit breakers and circuit reclosers to increase the reliability of service to its customers. Automatic single-phase overhead reclosers are regularly installed on distribution circuits to isolate faulted segments of these circuits.

The Project Developer is advised to consider the effects of Automatic Reclosing (both single phase and three phase) to assure that the Project's internal equipment will not be damaged. In addition to the risk of damage to the Project, an out-of-phase reclosing operation may also present a hazard to Utility equipment since this equipment may not be rated or built to withstand this type of reclosing. The Utility will determine relaying and control equipment that needs to be installed to protect its own equipment from out-of-phase reclosing. Installation of this protection will be undertaken by the Utility at the Utility's expense. The Utility shall not be liable to the customer with respect to damage(s) to the Project arising as a result of Automatic Reclosing.

Single-Phase Sectionalizing

The Utility also installs single-phase fuses and/or reclosers on its distribution circuits to increase the reliability of service to its customers. Three-phase generator installations may require replacement of fuses and/or single-phase reclosers with three-phase circuit breakers or circuit reclosers at the Utility's expense.

Requirements for Inverter Projects

Inverter Projects

No isolation transformer is required between the generator and the secondary distribution connection. If an isolation transformer is used, refer to Appendix I for specific requirements.

Synchronous, Induction, Non-Certified Inverter Projects

Non-IEEE 1547 et seq Certified Inverter, Synchronous, or Induction generation projects with an Aggregate Generation output of 20kW or less operating in parallel with the Electric Utility shall apply for interconnection under the Category 2 Procedures and Applications.

Relay Setting Criteria

The relay settings for Projects 20 kW or less must conform to the values specified in IEEE Std. 1547 et seq.

Maintenance and Testing

The Utility reserves the right to test the relaying and control equipment that involves protection of the Utility's electric system whenever the Utility determines a reasonable need for such testing exists.

The Project Developer is solely responsible for conducting and documenting proper periodic maintenance on the generating equipment and its associated control, protective equipment, interrupting devices, and main Isolation Device, per manufacturer recommendations.

The Project Developer is solely responsible for routine and maintenance checks of the relaying and control equipment that must be conducted in accordance with provided written test procedures which are required by IEEE Std. 1547 et seq, and test reports of such testing shall be maintained by the Project Developer and made available for Utility inspection upon request.

[NOTE – IEEE 1547 requires that testing be conducted in accordance with written test procedures, and the nationally recognized testing laboratory providing certification will require that such test procedures be available before certification of the equipment.]

Periodic test reports or a log for inspection shall be maintained and provided to the Utility upon written request. See Appendix G ‘Periodic Interconnection Test Log’

Installation Approval

The Project Developer must provide the Utility with at least 5 business days advance written notice of when the Project will be ready for inspection, testing, and approval.

Prior to final approval for Parallel Operation, the Utility reserves the right to inspect the Project and require action to assure conformance to the requirements stated herein.

Miscellaneous Operational Requirements

Miscellaneous requirements include synchronizing equipment for Parallel Operation, reactive requirements, and system stability limitations.

Operating in Parallel

The Project Developer will be solely responsible for the required synchronizing equipment and for properly synchronizing the Project with the Utility’s electric system.

Voltage fluctuation at the Point of Common Coupling (PCC) during synchronization is limited per IEEE Std. 1547 et seq.

These requirements are directly concerned with the actual operation of the Project with the Utility:

- The Project may not commence parallel operation until final approval has been given by the Utility. The completed installation is subject to inspection by the Utility prior to final approval. Preceding this inspection, all contractual agreements must be executed by the Project Developer.
- The Project must be designed to prevent the Project from energizing into a de-energized Utility line. The Project’s circuit breaker or contactor must be blocked from closing in on a de-energized Electric Utility’s distribution system.

- The Project shall discontinue parallel operation with a particular service and perform necessary switching when requested by the Utility for any of the following reasons:
 1. When public safety is being jeopardized.
 2. During voltage or loading problems, system emergencies, or when abnormal sectionalizing or circuit configuration occurs on the Utility system.
 3. During scheduled shutdowns of Utility equipment that are necessary to facilitate maintenance or repairs.
 4. In the event there is demonstrated electrical interference (i.e. Voltage Flicker, Harmonic Distortion, etc.) to the Utility's customers, suspected to be caused by the Project, and such interference exceeds then current system standards, the Utility reserves the right, to install special test equipment as may be required to perform a disturbance analysis and monitor the operation and control of the Project to evaluate the quality of power produced by the Project. In the event that no standards exist, then the applicable tariffs and rules governing electric service shall apply. If the Project is the source of the interference, and that interference exceeds the Utility's standards or generally accepted industry standards, then it shall be the responsibility of the Project Developer to eliminate the interference problem.
 5. When either the Project or its associated synchronizing and protective equipment is demonstrated by the Utility to be improperly maintained, so as to present a hazard to the Utility system or its customers.
 6. Whenever the Project is operating isolated with other Utility customers, for whatever reason.
 7. Whenever the Utility notifies the Project Developer in writing of a non-safety related violation of the Interconnection Agreement and the Project Developer fails to remedy the violation within ten working days of notification.

If the Project has shown an unsatisfactory response to requests to separate the generation from the Utility system, the Utility reserves the right to disconnect the Project from parallel operation with the Utility electric system until all operational issues are satisfactorily resolved.

Reactive Power Control

Inverter- Projects that will operate in the Flow-back Mode must provide for their own reactive needs (steady state unity power factor at the Point of Receipt). To obtain unity power factor, the Inverter Project can:

1. Install a switchable Volt-Ampere reactive (VAR) supply source to maintain unity power factor at the Point of Receipt; or
2. Provide the Utility with funds to install a VAR supply source equivalent to that required for the Project to attain unity power factor at the Point of Receipt at full output.

There are no interconnection reactive power capability requirements for Inverter Projects that will operate in the Non-Flow-back Mode. The Utility's existing rate schedules, incorporated herein by reference, contain power factor adjustments based on the power factor of the metered load at these facilities.

Site Limitations

The Project Developer is responsible for evaluating the consequences of unstable generator operation or voltage transients on the Project equipment and determining, designing, and applying any relaying which may be necessary to protect that equipment. This type of protection is typically applied on individual generators to protect the generator facilities.

The Utility will determine if operation of the Project will create objectionable voltage flicker and/or disturbances to other Utility customers and develop any required mitigation measures at the Project Developer's expense.

Revenue Metering Requirements

The Utility will own, operate, and maintain all required billing metering equipment. An electric provider serving over 1,000,000 customers shall provide a meter or meters capable of measuring the flow of energy in both directions at the Electric Utility's cost. If the customer's meter is not capable of reverse registration, an electric provider serving less than 1,000,000 customers shall provide a meter or meters capable of measuring the flow of energy in both directions at the customer's cost.

Non Flow-back Projects

A Utility meter will be installed that only records energy deliveries to the Project.

Flow-back Projects

The Project Developer shall provide the Utility access to the premises at reasonable times to install, turn on, disconnect, inspect, test, read, repair, or remove the metering equipment. The Project Developer may, at its option, have a representative witness this work.

The metering installations shall be constructed in accordance with the practices, which normally apply to the construction of metering installations for residential, commercial, or industrial customers. For Projects with multiple generators, metering of each generator may be required. When practical, multiple generators may be metered at a common point provided the metered quantity represents only the gross generator output.

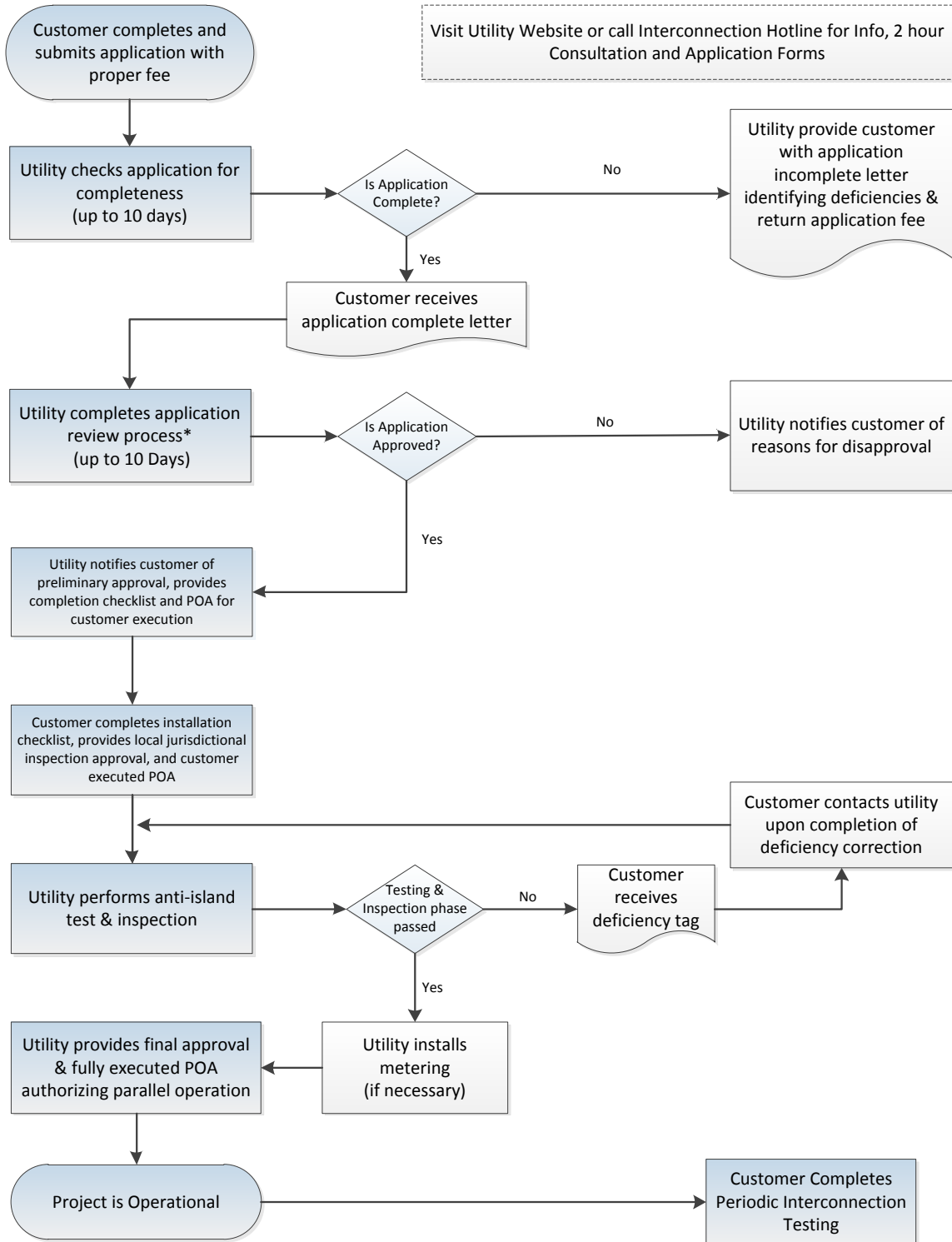
The Utility shall supply to the Project Developer all required metering equipment and the standard detailed specifications and requirements relating to the location, construction, and access of the metering installation and will provide consultation pertaining to the meter installation as required. The Utility will endeavor to coordinate the delivery of these materials with the Project Developer's installation schedule during normal scheduled business hours.

The Project Developer may be required to provide a mounting surface for the metering equipment. The mounting surface and location must meet the Utility's specifications and requirements.

The Project Developer may be required to install some of the metering equipment on its side of the PCC, including instrument transformers, cabinets, conduits, and mounting surfaces. The Utility shall install the meters and appropriate communication links. The Utility will endeavor to coordinate the installation of these items with the Project Developer's schedule during normal scheduled business hours.

Appendix A-Interconnection Process Flow Diagram

**Category 1 Inverter Based 20 kW and Under Projects
Interconnection Process Flow Diagram**



*Application Review Process includes a review for Equipment Saturation or Project Proximity to synchronous motor loads. Remediation may result in additional study time and may result in changes to the distribution system.

Interconnection timeline is provided in Appendix B

Appendix B-Interconnection & Net Metering Costs and Timeline

Interconnection Table – Applicant Costs

	Application Review	Engineering Review	Distribution Study	Distribution Upgrades	Testing & Inspection
Category 1	\$75	\$0	\$0	\$0	\$0

Combined Net Metering / Interconnection Table - Applicant Costs

	Net Meter Program Fee	Application Review	Engineering Review	Distribution Study	Distribution Upgrades	Testing & Inspection
Category 1	\$25	\$75	\$0	\$0	\$0	\$0

Interconnection Timeline – Working Days

	Application Complete	Application Review	Engineering Study Completion	Distribution Study Completion	Distribution Upgrades	Testing & Inspection
Category 1	10	10	Often not applicable / site dependent	Often not applicable / site dependent	Often not applicable / site dependent	10

Appendix C-Definitions

Aggregate Generator Output: The total nameplate generation stated in AC kW for a given application.

Alternative electric supplier (AES): as defined in section 10g of 2000 PA 141, MCL 460.10g

Alternative electric supplier net metering program plan: document supplied by an AES that provides detailed information to an applicant about the AES's net metering program.

Applicant: Legally responsible person applying to an Electric Utility to interconnect a project with the Electric Utility's distribution system or a person applying for a net metering program. An applicant shall be a customer of an Electric Utility and may be a customer of an AES.

Application Review: Review by the Electric Utility of the completed application for interconnection to determine if an engineering review is required.

Area Network: A location on the distribution system served by multiple transformers interconnected in an electrical network circuit.

Category 1: An inverter based project of 20kW or less that uses equipment certified by a nationally recognized testing laboratory to IEEE 1547.1 testing standards et seq.

Category 2: A project of greater than 20 kW and not more than 150 kW, and projects less than or equal to 20kW which do not meet the criteria for Category 1 projects.

Category 3: A project of greater than 150 kW and not more than 550 kW.

Category 4: A project of greater than 550 kW and not more than 2 MW.

Category 5: A project of greater than 2 MW.

Certified equipment: A generating, control, or protective system that has been certified as meeting acceptable safety and reliability standards by a nationally recognized testing laboratory in conformance IEEE1547.1 et seq.

Commission: The Michigan Public Service Commission

Commissioning test: The procedure, performed in compliance with IEEE 1547.1, for documenting and verifying the performance of a project to confirm that the project operates in conformity with its design specifications.

Customer: A person who receives electric service from an Electric Utility's distribution system or a person who participates in a net metering program through an AES or Electric Utility.

Customer-generator: A person that uses a project on-site that is interconnected to an Electric Utility distribution system.

Distribution system: The structures, equipment, and facilities owned and operated by an Electric Utility to deliver electricity to end users,

Distribution system study: A study to determine if a distribution system upgrade is needed to accommodate the proposed project and to determine the cost of an upgrade if required.

Electric provider: Any person or entity whose rates are regulated by the commission for selling electricity to retail customers in the state.

Electric Utility: Term as defined in section 2 of 1995 PA 30, MCL 460.562.

Engineering Review: A study to determine the suitability of the interconnection equipment including any safety and reliability complications arising from equipment saturation, multiple technologies, and proximity to synchronous motor loads.

Flow-back: An installed electric generation project which operates in parallel with an Electric Utility which is capable of providing energy flow to the Utility without an installed relay protection scheme and isolating device preventing energy flow to the Utility.

IEEE: Institute of Electrical and Electronics Engineers

IEEE 1547 et seq: IEEE ‘Standard for Interconnecting Distributed Resources with Electric Power Systems,’ dated January 1, 2003.

IEEE 1547.1 et seq: IEEE ‘Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems,’ dated January 1, 2005.

Interconnection: The process undertaken by an Electric Utility to construct the electrical facilities necessary to connect a project with a distribution system so that parallel operation can occur.

Interconnection procedures: The requirements that govern project interconnection.

kW: kilowatt

kWh: kilowatt-hours

Material modification: A modification that changes the maximum electrical output of a project or changes the interconnection equipment including but not limited to the following:
Changing from certified to non certified equipment or replacing a component with a component of different functionality or UL listing.

MW: megawatt

Nationally recognized testing laboratory: A testing laboratory recognized by the accreditation program of the U.S. department of labor occupational safety and health administration.

Non-Flow Back: An installed electric generation project which operates in parallel with the Electric Utility with a relay protection scheme and isolation device preventing power flow back to the Utility.

Parallel Operating Agreement: An agreement between the Utility and the Customer governing the parallel operation of the generation equipment. Parallel Operating Agreement will cover matters customarily addressed in such agreements in accordance with Good Utility Practice, including, without limitation, system operation, interconnection rate, defaults and remedies, and liability

Parallel operation: The operation, for longer than 100 milliseconds, of a project while connected to the energized distribution system.

Point of Common Coupling (PCC): The point where the facilities that deliver electric power to the load (Electric Utility) meets the facility contained within a single premises or group of premises that deliver electric power to the load (Electric Utility customer).

Project: Inverter Based Projects with Aggregate Generator Output 20 kW or Less certified for anti-islanding in compliance with IEEE 1547 standards et seq Electrical generating equipment and associated facilities which are eligible for interconnection to the Electric Utility that are not owned or operated by an Electric Utility.

Project Developer: Single point of contact for the Applicant. The Project Developer may also be the Applicant and/or Customer.

Renewable energy resource: Term as defined in section 11(i) of 2008 PA 295, MCL 460.1011(i)

Renewable energy system: Term as defined in section 11(k) of 2008 PA 295, MCL 460.1011(k).

Spot network: A location on the distribution system that uses 2 or more inter-tied transformers to supply an electrical network circuit.

UL 1741: The ‘Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources’, November 7, 2005 revision.

UL 1741 scope 1.1A: Paragraph 1.1A contained in chapter 1, section 1 of UL 1741, effective May 7, 2007.

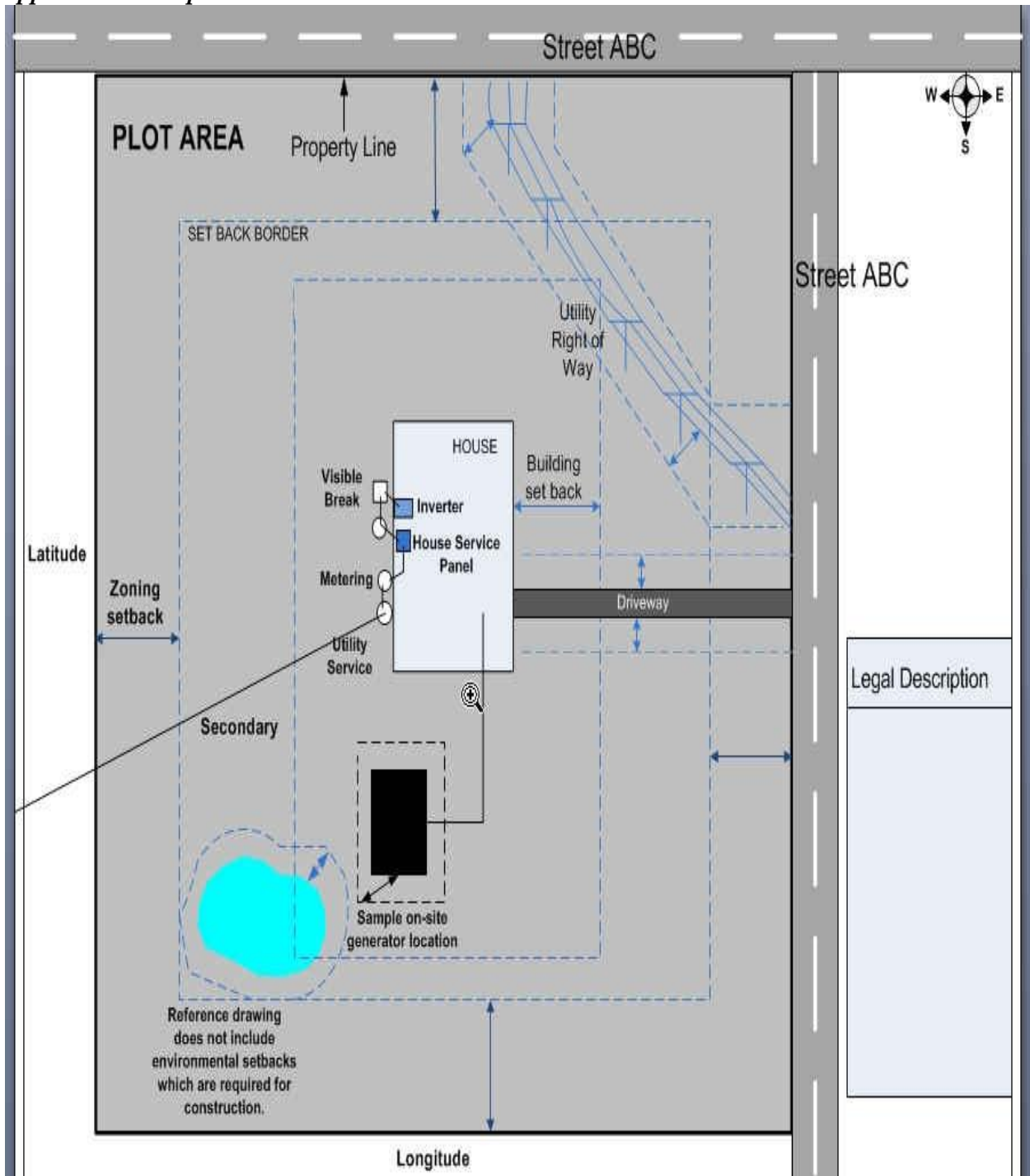
Uniform interconnection application form: The standard application forms approved used for category 1, category 2, category 3, category 4, and category 5 projects.

Uniform interconnection agreement: The standard interconnection agreements used for category 1, category 2, category 3, category 4, and category 5 projects.

Uniform net metering application: The net metering application form approved used by all electric utilities and AES.

Working days: Days excluding Saturdays, Sundays, Holidays and other days when the offices of the Electric Utility are not open to the public.

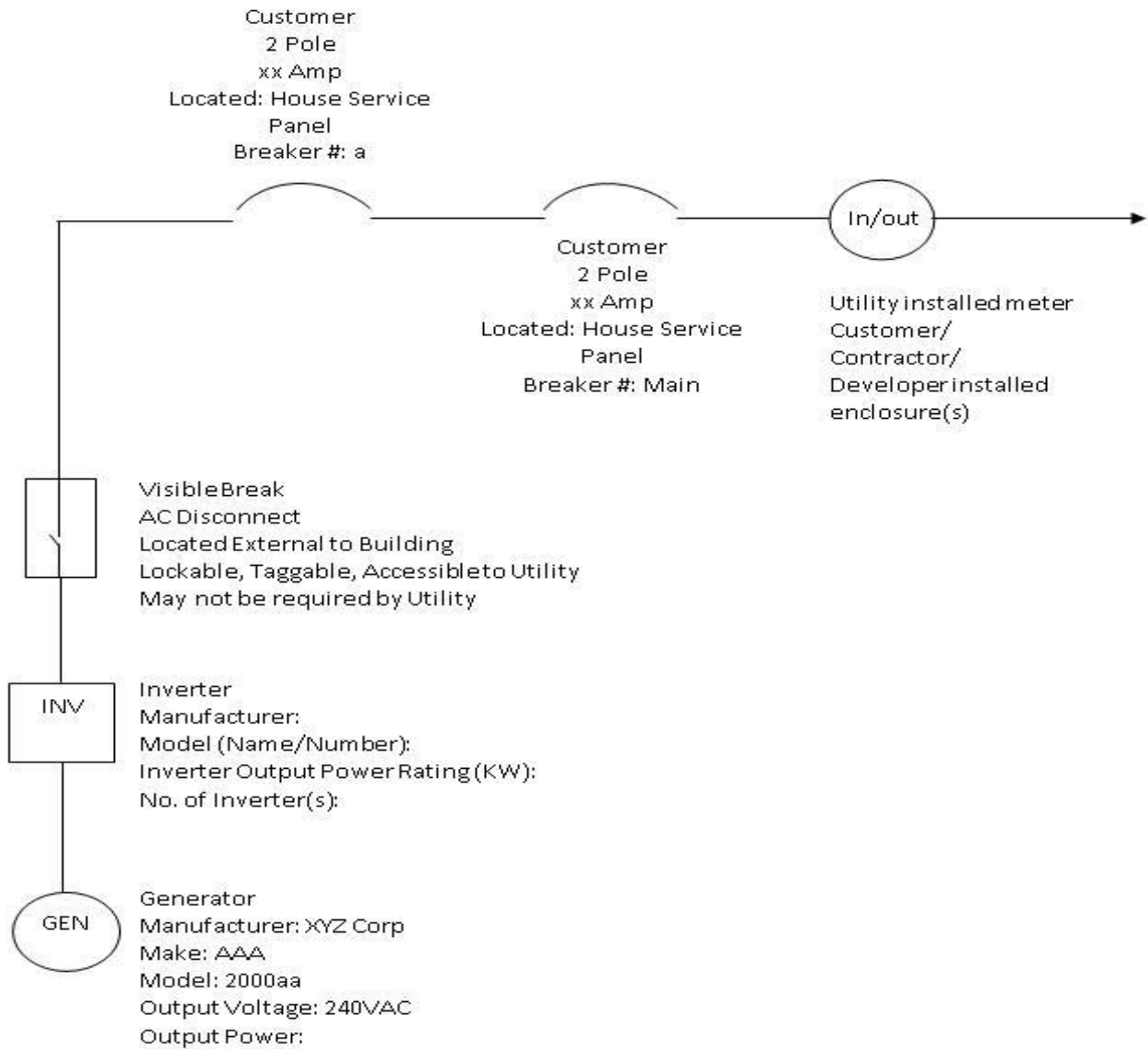
Appendix D-Sample Site Plan



Appendix E-Sample One-Line Diagram For Flow-Back Inverter Based Projects

**Sample One-Line Diagram for Flow-Back Inverter Based Projects
With Aggregate Generator Output of 20 kW or Less certified for anti-islanding in
compliance with IEEE 1547 standards et seq.**

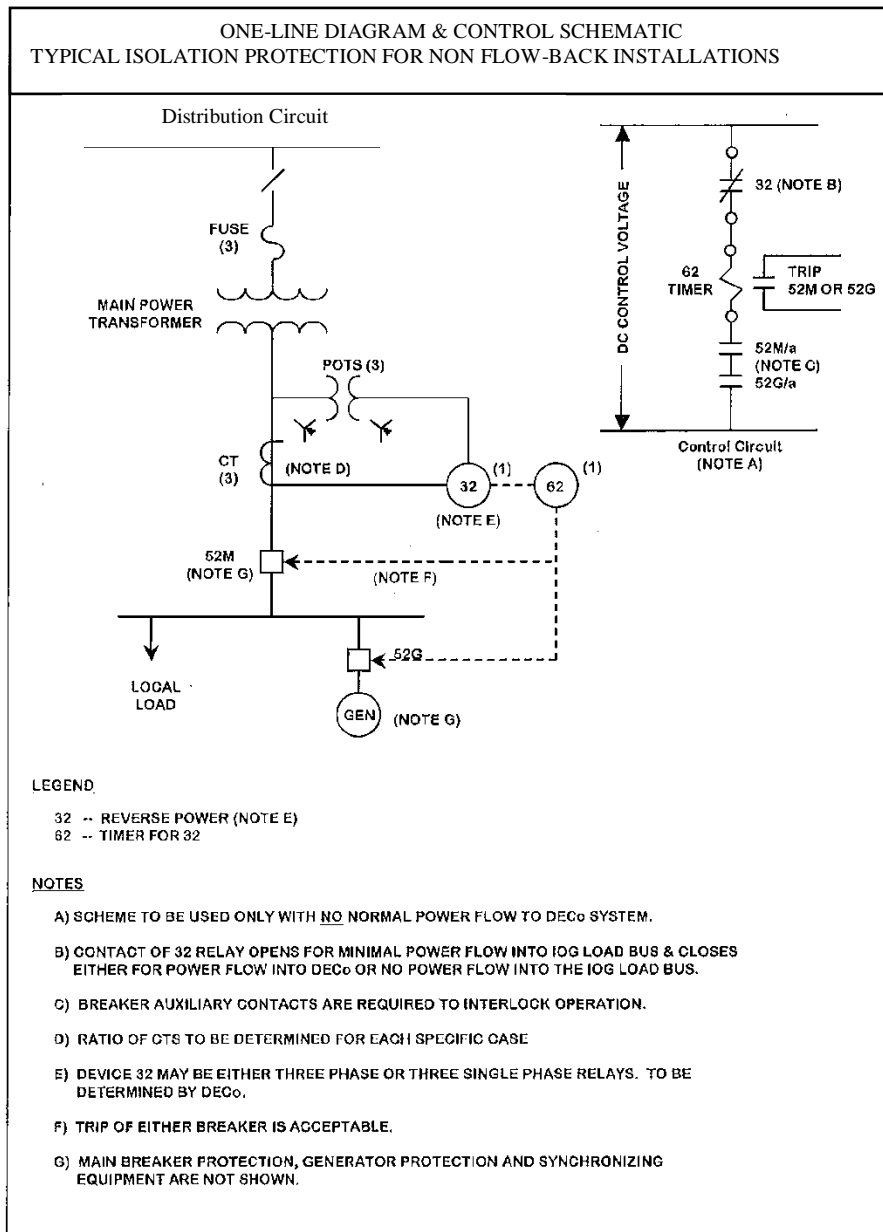
IEEE 1547 et seq Compliant



Legible Hand Drawn One-Line is Acceptable.

Appendix F-Sample One-Line Diagram for Non-Flow Back Projects

**Sample One Line Diagram for Non-Flow Back Projects
With Aggregate Generator Output of 20 kW or Less certified for anti-islanding in
compliance with IEEE 1547 standards et seq.**



Appendix G-Sample Periodic Test Log

Sample Periodic Interconnection Test Log

IEEE 1547 5.5 Periodic Interconnection tests: All interconnection-related protective functions and associated batteries shall be periodically tested at intervals specified by the manufacturer, system integrator, or the authority who has jurisdiction over the DR interconnection. Periodic test reports or a log for inspection shall be maintained.

IEEE 1547 5.4.2 Cease to energize functionality test: Check the cease to energize functionality by operating a load interrupting device and verify the equipment ceases to energize its output terminals and does not restart/reconnect for the required time delay. The test shall be performed on each phase individually.

The electric utility recommends periodic interconnection tests but not less than the periodic interval specified by the manufacturer. If no testing interval is provided, testing shall occur every two years. The output terminals should cease to energize within 2 seconds of operation (electrically opening) of the load interrupting device during the Cease to energize functionality test. Please refer to the manufacturer for more specific information as it relates to the manufacturer recommendations for periodic interconnection tests, and reconnect time upon restoration of the load interrupting device (electronically closing).

Date	Time	Cease to Energize Functionality Test: Pass/Fail	Person Performing Test

Appendix H-Isolation Device

After review, the isolation device may not be required by the Utility. If required and/or installed, this device⁵ would be placed at the Point of Common Coupling (PCC) and must meet all of the requirements of Appendix H.

- Must be approved for use on the Utility system.
- Must comply with relevant ANSI and/or IEEE Standards.
- Must have load break capability, unless used in series with a three-phase interrupting device.
- Must be rated for the application.
- If used as part of a protective relaying scheme, it must have adequate interrupting capability. The Utility will provide maximum short circuit currents and X/R ratios available at the PCC upon request.
- Must be operable and accessible by the Utility at all times (24 hours a day, 7 days a week)
- The Utility will determine if the isolation device will be used as a protective tagging point. If the determination is so made, the device must have a visible open break, provisions for padlocking in the open position and it must be gang operated. If the device has automatic operation, the controls must be located remote from the device.

⁵ Isolation Device -A rackable circuit breaker, circuit switcher, pole top switch, load-break disconnect, etc., depending on the electrical system configuration.

Appendix I-Isolation Transformer

No isolation transformer is required between the generator and the secondary distribution connection. If an isolation transformer is used for three-phase installations, any isolation transformer connection is acceptable except grounded-wye (Utility side), delta (Project side). Protection must be provided for internal faults in the isolating transformer; fuses are acceptable. The Utility does not require the Project Developer to provide any protection for Utility system ground faults.

If a Project Developer installs an isolating transformer, the transformer must comply with the ANSI Standard C57.12 – 1999, unless a more recent standard is agreed to by the Project Developer and the Utility.

The type of generation and electrical location of the interconnection will determine the isolating transformer connections. Allowable connections are detailed in the “Specific Requirements by Generator Type” section. Note: Some Utilities do not allow an isolation transformer to be connected to a grounded Utility system with an ungrounded secondary (Utility side) winding configuration, regardless of the Project type. Therefore, the Project Developer is encouraged to consult with the Utility prior to submitting an application.

For a sample One-Line Diagram of this type of facility, see Appendix E.

MICHIGAN ELECTRIC UTILITY

Generator Interconnection Procedures

Category 2

Projects with

Aggregate Generator Output

***Greater Than 20 kW, but Less Than or Equal to
150 kW¹***

December 2012

¹ Additionally, Non-Certified, Non-Compliant IEEE 1547 et seq inverter, synchronous or induction projects with an Aggregate Generator Output of 20kW or Less.

Introduction

Category 2 – Greater than 20kW but less than or equal to 150kW¹

This Generator Interconnection Procedure document outlines the process & requirements used to install or modify generation projects with aggregate generator output capacity ratings greater than 20kW but less than or equal to 150kW¹ and designed to operate in parallel with the Utility electric system. Technical requirements are defined according to type of generation, location of the interconnection, and mode of operation (Flow-back or Non-Flow-back). The process is designed to allow for a reasonably expeditious interconnection to the Utility electric system that is both safe and reliable.

This document has been filed with the Michigan Public Service Commission (MPSC) and complies with rules established for the interconnection of parallel generation to the Utility electric system in the MPSC Order in Case No. U-15787.

The term “Project” will be used throughout this document to refer to electric generating equipment and associated facilities that are not owned or operated by an Electric Utility. The term “Project Developer” means a person that owns, operates, or proposes to construct, own, or operate, a Project.

This document does not address other Project concerns such as environmental permitting, local ordinances, or fuel supply. Nor does it address agreements that may be required with the Utility, an Alternate Electric Supplier, and/or the transmission provider, or state or federal licensing, to market the Project’s energy. An interconnection request does not constitute a request for transmission or establishment / modification of existing electrical lines or electric service.

When requested by the Project Developer, it may be possible for the Utility to adjust requirements stated herein on a case-by-case basis. The review necessary to support such adjustments, however, may be extensive and may exceed the ordinary costs and timeframes addressed in these requirements. Therefore, if requested by the Project Developer, adjustments to these requirements will only be considered if the Project Developer agrees in advance to compensate the Utility for the actual and reasonably and prudently incurred added costs that are not otherwise recovered, if any, of the additional reviews, and to also allow the utility a reasonable amount of additional time for the additional reviews.

The Utility may apply for a technical waiver from one or more provisions of these rules and the MPSC may grant a waiver.

Non Certified Inverter based generation projects, synchronous and induction projects less than or equal to 20kW are defined as Category 2 projects and are implemented under the Category 2 procedures and applications.

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Interconnection Procedures

Interconnection Process

Customer Project Planning Phase

An applicant may contact the Utility before or during the application process regarding the project. The Utility can be reached by phone, e-mail, or by the external website to access information, forms, rates, and agreements. A Utility will provide up to 2 hours of technical consultation at no additional cost to the applicant. Consultation may be limited to providing information concerning the Utility system operating characteristics and location of system components.

Application

The Project Developer must first submit an Interconnection application or a Combined Interconnection and Net Metering application to the Utility. A separate application is required for each Project or Project site. The blank Interconnection Application or Combined Interconnection and Net Metering application can be found on the Electric Utility's website (insert link).

An applicant shall complete a submittal of required interconnection application and Interconnection filing fee per the table in Appendix B. The Utility will notify the Project Developer within 10 business days of receipt of an Interconnection Application. If any portion of the Interconnection Application, data submittal (a site plan and the one-line diagrams), or filing fee is incomplete and/or missing, the Utility will return the application, data, and filing fee to the Project developer with explanations. Project Developer will need to resubmit the application with all the missing items.

Once the Utility has accepted the combined Interconnection and Net Metering Application, an identifying number will be assigned to the Project. The Utility will then advise the applicant that the application is complete and provide the customer with the identifying number.

Application Review

The Utility will review the complete application for interconnection to determine if additional Study(ies)² are required. The Utility will notify the Project Developer within 10 business days of receipt of a complete application and if additional study(ies) are required. The applicant shall provide any changes or updates to the application before additional Study(ies) begin. The Utility may request additional data be submitted as necessary during the review phase to clarify the operation of the Project. If the additional study(ies) are not required and the interconnection is

² Affected System Studies, Engineering Review, and/or Distribution Studies.

approved, the project will advance to the Customer Install, & POA phase of the process. If the interconnection is disapproved, the utility shall notify the applicant of the necessary corrective actions required for approval. The applicant, after taking corrective action, may request the electric utility to reconsider the interconnection request.

Engineering Review

Upon receipt of the executed Engineering Review Agreement, the Utility will study the project to determine the suitability of the interconnection equipment including safety and reliability complications arising from equipment saturation, multiple technologies, and proximity to synchronous motor loads. The electric utility shall provide in writing the results of the engineering study within the time indicated per table Appendix B. If the engineering review indicates that a Distribution Study is necessary, the Electric Utility shall notify the applicant of the requirements for the Distribution Study. If an Engineering Review determines that a Distribution Study is not required, the project will advance to the **Project Developer Install & POA phase**.

Distribution Study

Upon receipt of the executed Distribution Study Agreement and submission of the Distribution Study Fee (per table Appendix B), the Utility shall study the project to determine if a Distribution System upgrade is needed to accommodate the proposed project and determine the cost of the upgrade as required. The Project Developer is responsible for the actual cost for the Distribution Study & Distribution Upgrades as required. The electric utility shall provide in writing the results of the Distribution Study including estimated completion timeframe for the upgrades, if required, to the applicant, within the timeframe per table Appendix B. Additionally the Utility will provide a letter outlining the actual cost to perform the Distribution Study and require a cost true up with the applicant. If a Distribution Study determines that distribution upgrades are not required, the project will advance to the **Project Developer Install & POA**.

Distribution Upgrades & Construction Agreement

Upon the applicants acceptance of the Distribution Study results, and if Distribution System upgrades are required, the Electric Utility will provide the applicant a Distribution System Construction Agreement³. The applicant shall submit an executed Distribution System Construction Agreement and full Payment for the estimated construction cost with 10% contingency fee. The Distribution System construction agreement will include a construction completion time estimate within a mutually agreed upon construction schedule. Design and Build of the Distribution System Upgrades will commence with a fully executed Distribution System Construction Agreement and full payment.

³ Additional agreements may be required to address Affected System issues associated with the project.

Project Developer Install & Parallel Operating Agreement (POA)

The applicant shall notify the Electric Utility when the Project Developer installation and any required local code inspection and approval is complete. The Parallel Operating Agreement will cover matters customarily addressed in such agreements in accordance with Good Utility Practice, including, without limitation, system operation, interconnection rate, defaults and remedies, and liability. The applicant shall complete, sign and return the POA to the Utility. Any delay in the applicant's execution of the Interconnection and Operating Agreement will not toll the interconnection deadlines. The applicant's project will advance to the Meter Install, Testing, & Inspection phase upon the completion of the Distribution System Upgrades.

Meter Install, Testing, & Inspection

Upon receipt of the local code inspection approval and POA executed by the applicant, the Utility will schedule the meter install, testing, and inspection. The Utility shall have an opportunity to schedule a visit to witness and perform commissioning tests required by IEEE 1547 et seq., and inspect the project. The Electric Utility may provide a waiver of its right to visit the site to inspect the project and witness or perform the commissioning tests. The Utility shall notify the applicant of its intent to visit the site, inspect the project, witness or perform the commissioning tests, or of its intent to waive inspection within 10 working days after notification that the installation and local code inspections have passed. Within 5 working days from receipt of the completed commissioning test report (if applicable), the Utility will notify the applicant of its final approval or disapproval of the interconnection. The utility's review is limited to determining whether the project was constructed consistent with the previously approved application and satisfactory completion of the commissioning tests (as applicable). If the project was constructed consistent with the application and passes the commissioning test, then the project shall be awarded final approval for parallel operation and the Utility will execute the POA or otherwise approve operation. If the project was not constructed consistent with the application or does not pass the commissioning test, the utility may deny final approval for parallel operation. If the electric utility does not award final approval for the interconnection, the utility shall notify the applicant of the necessary corrective actions required for approval. The applicant, after taking corrective action, may request the electric utility to reconsider the interconnection request.

Operation in Parallel

Upon Utility approval of the interconnection, the Electric Utility shall install required metering, provide to the applicant a written statement of final approval, and letter identifying the actual cost of the Distribution System upgrades. Upon completion of the cost true up of the actual cost for the Distribution System upgrades the Utility will provide a fully executed POA authorizing parallel operation.

Operational Provisions

Disconnection

An Electric Utility may refuse to connect or may disconnect a project from its distribution system if any of the following conditions apply:

- a. Applicant has not complied with any one of the technical requirements contained in the applicable Interconnection Procedures,
- b. The electrical characteristics of the Applicant Facility are not compatible with the electrical characteristics of Utility's distribution system,
- c. An emergency condition exists on Utility's distribution system,
- d. Applicant's protective relay equipment fails,
- e. Utility determines that the Applicant Facility is disrupting service to any Utility Customer,
- f. Disconnection is required to allow for construction, installation, maintenance, repair, replacement, removal, investigation, inspection or testing of any part of Utility's facilities,
- g. If a required installation fails or becomes incapacitated and is not repaired in a timely manner, as determined by Utility
- h. Applicant commits a material breach of the POA or otherwise fails to make payment for services rendered by Utility or violates Utility's tariff(s)

Maintenance and Testing

The Utility reserves the right to test the relaying and control equipment that involves protection of the Utility's electric system, at its sole expense, whenever the Utility determines a need for such testing exists.

The applicant is solely responsible for conducting and documenting proper periodic maintenance on the generating equipment and its associated control, protective equipment, interrupting devices, and main Isolation Device⁴, per manufacturer recommendations.

Routine and maintenance checks of the relaying and control equipment must be conducted in accordance with provided written test procedures which are required by IEEE Std. 1547, and test reports of such testing shall be maintained by the applicant and made available for Utility inspection upon request. [NOTE – IEEE 1547 requires that testing be conducted in accordance with written test procedures, and the nationally recognized testing laboratory providing certification will require that such test procedures be available before certification of the equipment.]

⁴ Main Isolation Device - When required by the Electric Utility operating practices, a readily accessible, lockable, visible-break isolation device located between the Electric Utility and the Project

Operating in Parallel

The Project Developer will be solely responsible for the required synchronizing equipment and for properly synchronizing the Project with the Utility's electric system.

Voltage fluctuation at the Point of Common Coupling (PCC) during synchronization is limited per IEEE Std. 1547 et seq.

These requirements are directly concerned with the actual operation of the Project with the Utility:

- The Project may not commence parallel operation until approval has been given by the Utility. The completed installation is subject to inspection by the Utility prior to approval. Preceding this inspection, all contractual agreements must be executed by the Project Developer.
- The Project must be designed to prevent the Project from energizing into a de-energized Utility line. The Project's circuit breaker or contactor must be blocked from closing in on a de-energized Electric Utility's distribution system.
- The Project shall discontinue parallel operation with a particular service and perform necessary switching when requested by the Utility for any of the following reasons:
 1. When public safety is being jeopardized.
 2. During voltage or loading problems, system emergencies, or when abnormal sectionalizing or circuit configuration occurs on the Utility system.
 3. During scheduled shutdowns of Utility equipment that are necessary to facilitate maintenance or repairs.
 4. In the event there is demonstrated electrical interference (i.e. Voltage Flicker, Harmonic Distortion, etc.) to the Utility's customers, suspected to be caused by the Project, and such interference exceeds then current system standards, the Utility reserves the right, to install special test equipment as may be required to perform a disturbance analysis and monitor the operation and control of the Project to evaluate the quality of power produced by the Project. In the event that no standards exist, then the applicable tariffs and rules governing electric service shall apply. If the Project is the source of the interference, and that interference exceeds the Utility's standards or generally accepted industry standards, then it shall be the responsibility of the Project Developer to eliminate the interference problem.
 5. When either the Project or its associated synchronizing and protective equipment is demonstrated by the Utility to be improperly maintained, so as to present a hazard to the Utility system or its customers.

6. Whenever the Project is operating isolated with other Utility customers, for whatever reason.
7. Whenever the Utility notifies the Project Developer in writing of a non-safety related violation of the Interconnection Agreement and the Project Developer fails to remedy the violation within ten working days of notification.

If the Project has shown an unsatisfactory response to requests to separate the generation from the Utility system, the Utility reserves the right to disconnect the Project from parallel operation with the Utility electric system until all operational issues are satisfactorily resolved.

Momentary Paralleling

For situations where the Project will only be operated in parallel with the Utility's electric system for a short duration (100 milliseconds or less), as in a make-before-break automatic transfer scheme, no additional relaying is required. Such momentary paralleling requires a modern integrated Automatic Transfer Switch (ATS) system, which is incapable of paralleling the Project with the Utility's electric system. The ATS must be tested, verified, and documented by the Project Developer for proper operation at least every 2 years. The Utility may be present during this testing.

Technical Requirements

The following discussion details the technical requirements for interconnection of Category 2 Projects. For Projects within this capacity rating range, the Utility has made a significant effort to simplify the technical requirements. This effort has resulted in adoption of IEEE Standard 1547, Standard for Interconnecting Distributed Resources with Electric Power Systems, being incorporated herein by reference. All protective functions are compliant with IEEE Standard 1547 et seq.

Certain requirements, as specified by this document, must be met to provide compatibility between the Project and the Utility's electric system, and to assure that the safety and reliability of the electric system is not degraded by the interconnection. The Utility reserves the right to evaluate and apply newly developed protection and/or operation schemes at its discretion. In addition, the Utility reserves the right to evaluate Projects on an ongoing basis as system conditions change, such as circuit loading, additional generation placed online, etc. Upgraded revenue metering may be required for the Project.

Major Component Design Requirements

The data requested in Appendix E, F, or G for all major equipment and relaying proposed by the Project Developer, must be submitted as part of the initial application for review and approval by the Utility. The Utility may request additional data be submitted as necessary during the Engineering Review and/or Distribution Study phase to clarify the operation of the Project.

Once installed, the interconnection equipment must be reviewed and approved by the Utility prior to being connected to the Utility's electric system and before Parallel Operation is allowed.

Data

The data that the Utility requires to evaluate the proposed interconnection is documented on a one-line diagram and "fill in the blank" table by generator type in Appendices E, F, or G. A site plan, one-line diagrams, and interconnection protection system details of the Project are required as part of the application data. The generator manufacturer supplied data package should also be supplied.

Isolating Transformer(s)

If a Project Developer installs an isolating transformer, the transformer must comply with the ANSI Standard C57.12 – 1999, unless a more recent standard is agreed to by the Project Developer and the Utility.

The transformer should have high and/or low voltage windings sufficient to assure satisfactory generator operation over the range of voltage variation expected on the Utility electric system. The type of generation and electrical location of the interconnection will determine the isolating transformer connections. Allowable connections are detailed in the “Specific Requirements by Generator Type” section. Note: Some Utilities do not allow an isolation transformer to be connected to a grounded Utility system with an ungrounded secondary (Utility side) winding configuration, regardless of the Project type. Therefore, the Project Developer is encouraged to consult with the Utility prior to submitting an application.

Isolation Device

When required by the Electric Utility operating practices, a readily accessible, lockable, visible-break isolation device will be located between the Electric Utility and the Project. It can be a rackable circuit breaker, circuit switcher, pole top switch, load-break disconnect, etc., depending on the electrical system configuration. The following are required of the isolation device:

- Must be approved for use on the Utility system.
- Must comply with relevant ANSI and/or IEEE Standards.
- Must have load break capability, unless used in series with a three-phase interrupting device.
- Must be rated for the application.
- If used as part of a protective relaying scheme, it must have adequate interrupting capability. The Utility will provide maximum short circuit currents and X/R ratios available at the PCC, upon request.
- Must be operable and accessible by the Utility at all times (24 hours a day, 7 days a week).
- The Utility will determine if the isolation device will be used as a protective tagging point. If the determination is so made, the device must have a visible open break provisions for padlocking in the open position and it must be gang operated. If the device has automatic operation, the controls must be located remote from the device.

Interconnection Lines

Any new line construction to connect the Project to the Utility’s electric system will be undertaken by the Utility at the Project Developer's expense. The new line(s) will terminate on a utility approved structure provided by and paid for by the Project Developer.

The physically closest available system voltage, as well as equipment and operational constraints influence the chosen point of interconnection. The Utility has the ultimate authority to determine the acceptability of a particular PCC.

Relaying Design Requirements

Regardless of the technology of the interconnection, for simplicity for all projects in this capacity rating range, the interconnection relaying system must be certified by a nationally recognized testing laboratory to meet IEEE Std. 1547. The data submitted for review must include information from the manufacturer indicating such certification, and the manufacturer must placard the equipment such that a field inspection can verify the certification. A copy of this standard may be obtained (for a fee) from the Institute of Electrical and Electronics Engineers (www.ieee.org).

If the protective system uses AC power as the control voltage, it must be designed to disconnect the generation from the Utility electric system if the AC control power is lost. Utility will work with Project Developer for system design for this requirement.

Automatic Reclosing

The Utility employs automatic multiple-shot reclosing on most of the Utility's circuit breakers and circuit reclosers to increase the reliability of service to its customers. Automatic single-phase overhead reclosers are regularly installed on distribution circuits to isolate faulted segments of these circuits.

The Project Developer is advised to consider the effects of Automatic Reclosing (both single-phase and three-phase) to assure that the Project's internal equipment will not be damaged. In addition to the risk of damage to the Project, an out-of-phase reclosing operation may also present a hazard to Utility equipment since this equipment may not be rated or built to withstand this type of reclosing. The Utility will determine relaying and control equipment that needs to be installed to protect its own equipment from out-of-phase reclosing. Installation of this protection will be undertaken by the Utility at the Project Developer's expense.

In some cases, recloser settings can be modified to prevent out-of-phase reclosing. This could delay reclosing until the parallel generation is separated and the line is "de-energized". Hydraulic single-phase overhead recloser settings cannot be modified; therefore, these devices will have to be either replaced with three-phase overhead reclosers whose settings can be changed, or relocated beyond the Project location - depending upon the sectionalizing and protection requirements of the distribution circuit. If the Project can be connected to more than one circuit, these revisions may be required on the alternate circuit(s) as well. The Utility shall not be liable to the customer with respect to damage(s) to the Project arising as a result of Automatic Reclosing.

Single-Phase Sectionalizing

The Utility also installs single-phase fuses and/or reclosers on its distribution circuits to increase the reliability of service to its customers. Three-phase generator installations may require replacement of fuses and/or single-phase reclosers with three-phase circuit breakers or circuit reclosers at the Project Developer's expense.

Synchronous Projects

An isolation transformer will be required for three-phase Synchronous Projects. Except as noted below, the isolation transformer must be incapable of producing ground fault current to the Utility system; any connection except delta primary (Project side), grounded-wye secondary (Utility side) is acceptable. A grounded-wye - grounded-wye transformer connection is acceptable only if the Project's single line-to-ground fault current contribution is less than the Project's three-phase fault current contribution at the PCC. Protection must be provided for internal faults in the isolating transformer; fuses are acceptable.

For a sample One-Line Diagram of this type of facility, see Appendix E.

Induction Projects

For three-phase installations, any isolation transformer connection is acceptable except grounded-wye (Utility side), delta (Project side). Protection must be provided for internal faults in the isolating transformer; fuses are acceptable. In cases where it can be shown that self excitation of the induction generator cannot occur when isolated from the Utility, the Utility may waive the requirement that the generator provide protection for Utility system ground faults. For a sample One-Line Diagram of this type of facility, see Appendix F.

Inverter Projects

No isolation transformer is required between the generator and the secondary distribution connection. If an isolation transformer is used for three-phase installations, any isolation transformer connection is acceptable except grounded-wye (Utility side), delta (Project side). Protection must be provided for internal faults in the isolating transformer; fuses are acceptable. Utility may waive the requirement that the Project Developer provide protection for the Utility system ground faults.

For a sample One-Line Diagram of this type of facility, see Appendix G.

Dynamometer Projects

No isolation transformer is required between the generator and the secondary distribution connection. If an isolation transformer is used for three-phase installations, any isolation transformer connection is acceptable except grounded-wye (Utility side), delta (Project side). Protection must be provided for internal faults in the isolating transformer; fuses are acceptable.

If an inverter is used and has passed a certified anti-island test, the Utility may waive the requirement that the Project Developer provide protection for the Utility system ground faults.

Relay Setting Criteria

The relay settings for Projects greater than 20 kW but less than or equal to 150 kW must conform to the values specified in IEEE Std. 1547.

Maintenance and Testing

The Utility reserves the right to test the relaying and control equipment that involves protection of the Utility electric system whenever the Utility determines a reasonable need for such testing exists.

The Project Developer is solely responsible for conducting proper periodic maintenance on the generating equipment and its associated control, protective equipment, interrupting devices, and main Isolation Device, per manufacturer recommendations.

Routine Maintenance checks of the relaying and control equipment must be conducted in accordance with provided written test procedures which are required by IEEE Std. 1547, and test reports of such testing shall be maintained by the Project Developer and made available for Utility inspection upon request. [NOTE – IEEE 1547 requires that testing be conducted in accordance with written test procedures, and the nationally recognized testing laboratory providing certification will require that such test procedures be available before certification of the equipment.]

Installation Approval

The Project Developer must provide the Utility with 5 business days advance written notice of when the Project will be ready for inspection, testing, and approval.

Prior to final approval for Parallel Operation, the Utility reserves the right to inspect the Project and receive action to assure conformance to the requirements stated herein.

Miscellaneous Operational Requirements

Miscellaneous requirements include synchronizing equipment for Parallel Operation, reactive requirements, and system stability limitations.

Reactive Power Control

Synchronous generators that will operate in the Flow-back Mode must be dynamically capable of providing 0.90 power factor lagging (delivering reactive power to the Utility) and 0.95 power factor leading (absorbing reactive power from the Utility) at the Point of Receipt. The Point of Receipt is the location where the Utility accepts delivery of the output of the Project. The Point of Receipt can be the physical location of the billing meters or a location where the billing meters are not located, but adjusted for line and transformation losses.

Induction and Inverter Projects that will operate in the Flow-back Mode must provide for their own reactive needs (steady state unity power factor at the Point of Receipt). To obtain unity power factor, the Induction or Inverter Project can:

1. Install a switchable Volt-Ampere reactive VAR supply source to maintain unity power factor at the Point of Receipt; or
2. Provide the Utility with funds to install a VAR supply source equivalent to that required for the Project to attain unity power factor at the Point of Receipt at full output.

There are no interconnection reactive power capability requirements for Synchronous, Induction, and Inverter Projects that will operate in the Non-Flow-back Mode. The Utility's existing rate schedules, incorporated herein by reference, contain power factor adjustments based on the power factor of the metered load at these facilities.

Site Limitations

The Project Developer is responsible for evaluating the consequences of unstable generator operation or voltage transients on the Project equipment, and determining, designing, and applying any relaying which may be necessary to protect that equipment. This type of protection is typically applied on individual generators to protect the generator facilities

The Utility will determine if operation of the Project will create objectionable voltage flicker and/or disturbances to other Utility customers and develop any required mitigation measures at the Project Developer's expense.

Revenue Metering Requirements

The Utility will own, operate, and maintain all required billing metering equipment . An electric provider serving over 1,000,000 customers shall provide a meter or meters capable of measuring the flow of energy in both directions at the Electric Utility's cost. An electric provider serving less than 1,000,000 customers shall provide a meter or meters capable of measuring the flow of energy in both directions at the Project Developer's expense.

Non Flow-back Projects

A Utility meter will be installed that only records energy deliveries to the Project.

Flow-back Projects

Special billing metering will be required. The Project Developer may be required to provide, at no cost to the Utility, a dedicated dial-up voice-grade circuit (POTS line) to allow remote access to the billing meter by the Utility. This circuit shall be terminated within ten feet of the meter involved.

The Project Developer shall provide the Utility access to the premises reasonable times to install, turn on, disconnect, inspect, test, read, repair, or remove the metering equipment. The Project Developer may, at its option, have a representative witness this work.

The metering installations shall be constructed in accordance with the practices, which normally apply to the construction of metering installations for residential, commercial, or industrial customers. For Projects with multiple generators, metering of each generator may be required. When practical, multiple generators may be metered at a common point provided the metered quantity represents only the gross generator output.

The Utility shall supply to the Project Developer all required metering equipment and the standard detailed specifications and requirements relating to the location, construction, and access of the metering installation and will provide consultation pertaining to the meter installation as required. The Utility will endeavor to coordinate the delivery of these materials with the Project Developer's installation schedule during normal scheduled business hours.

The Project Developer may be required to provide a mounting surface for the metering equipment. The mounting surface and location must meet the Utility's specifications and requirements.

The responsibility for installation of the equipment is shared between the Utility and the Project Developer. The Project Developer may be required to install some of the metering equipment on

its side of the PCC, including instrument transformers, cabinets, conduits, and mounting surfaces. The Utility shall install the meters and appropriate communication links. The Utility will endeavor to coordinate the installation of these items with the Project Developer's schedule during normal scheduled business hours.

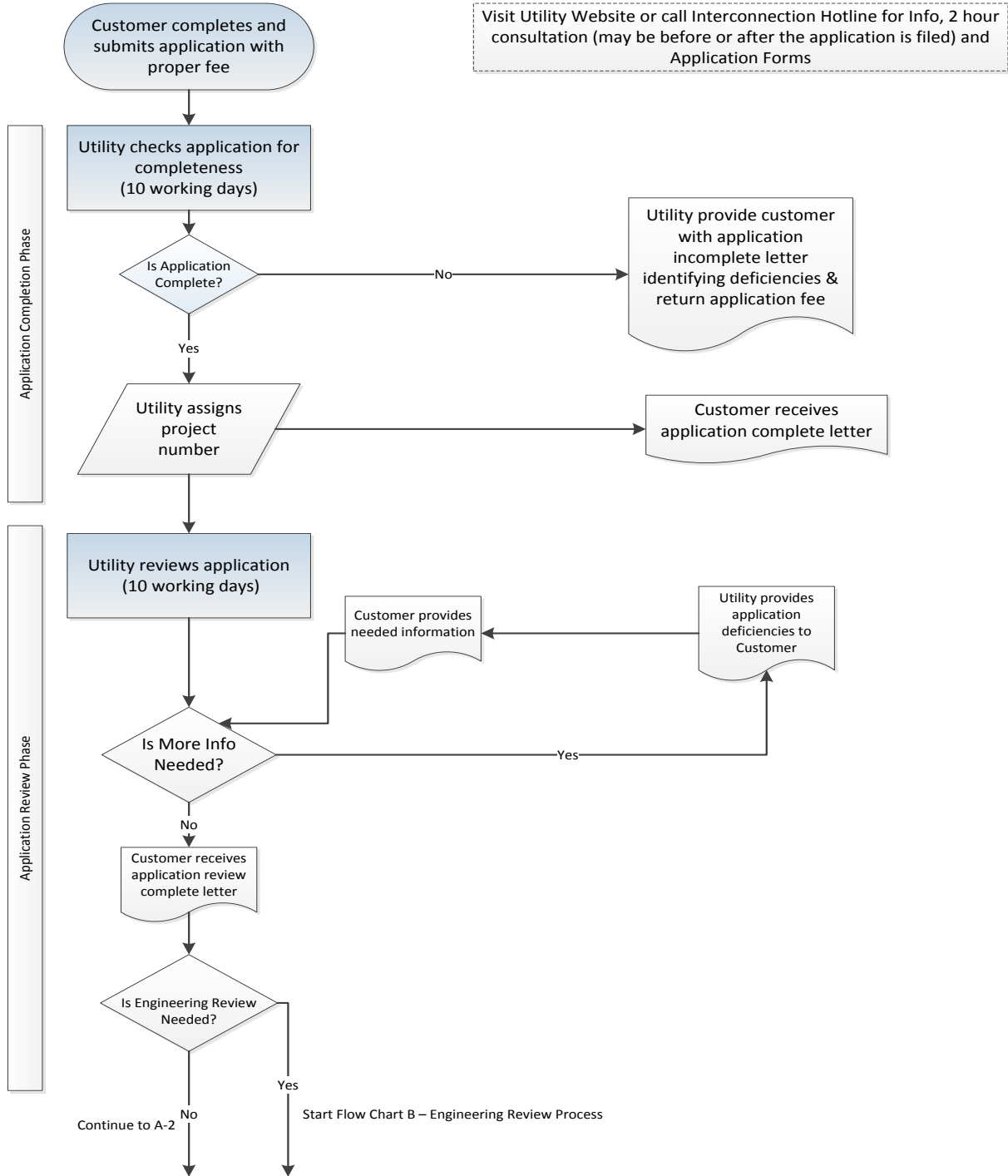
Communication Circuits

The Project Developer is responsible for ordering and acquiring the telephone circuit required for the Project Interconnection. The Project Developer will assume all installation, operating, and maintenance costs associated with the telephone circuits, including the monthly charges for the telephone lines and any rental equipment required by the local telephone provider. However, at the Utility's discretion, the Utility may select an alternative communication method, such as wireless communications. The Utility will reasonably consider wireless communication or other communication methods if they are less costly than traditional telephone circuits. Regardless of the method, the Project Developer will be responsible for all costs associated with the material, installation and maintenance, whereas the Utility will be responsible to define the specific communication requirements.

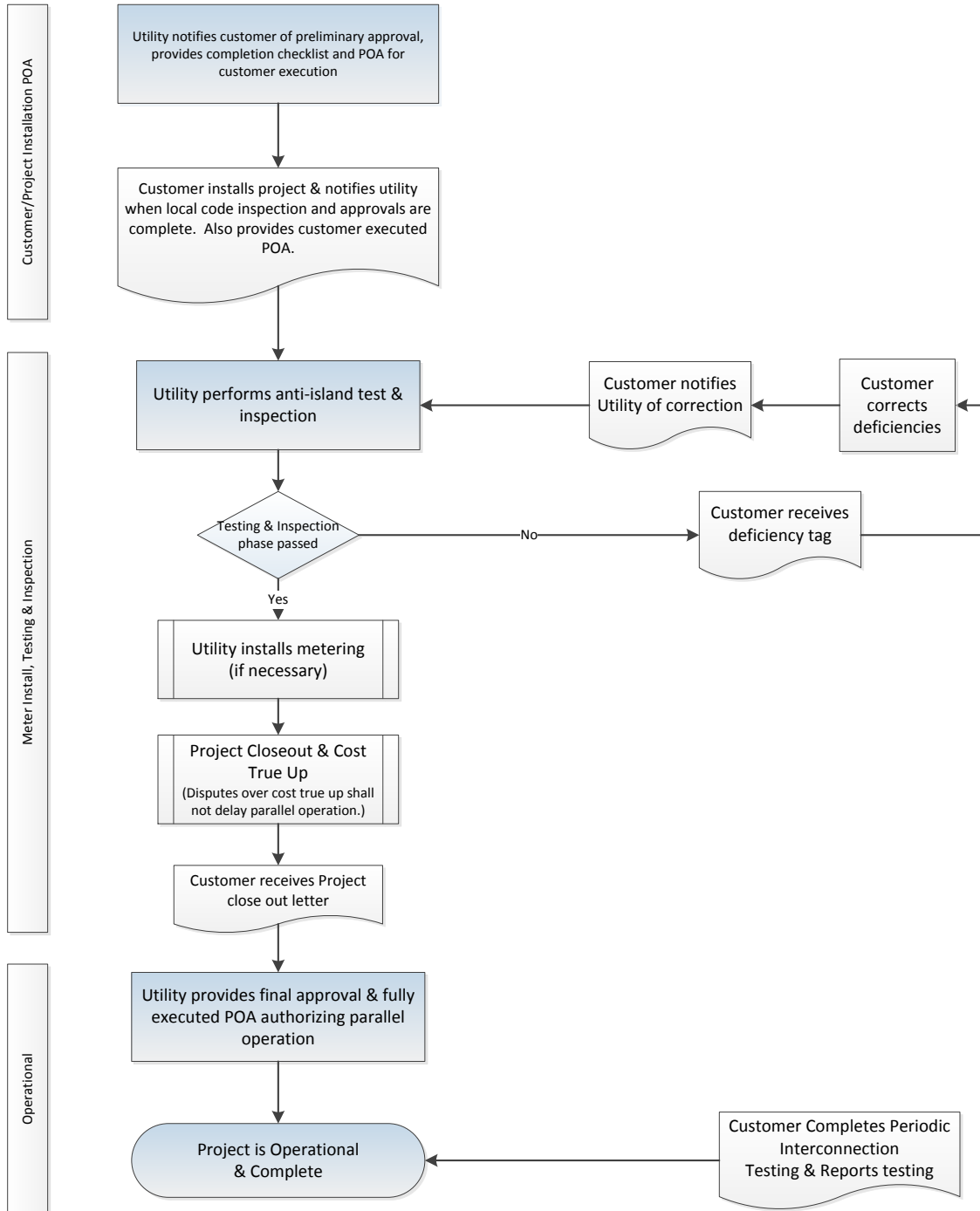
The Utility will cooperate and provide Utility information necessary for proper installation of the telephone (or alternate) circuits upon written request.

Appendix A-Interconnection Process Flow Diagram

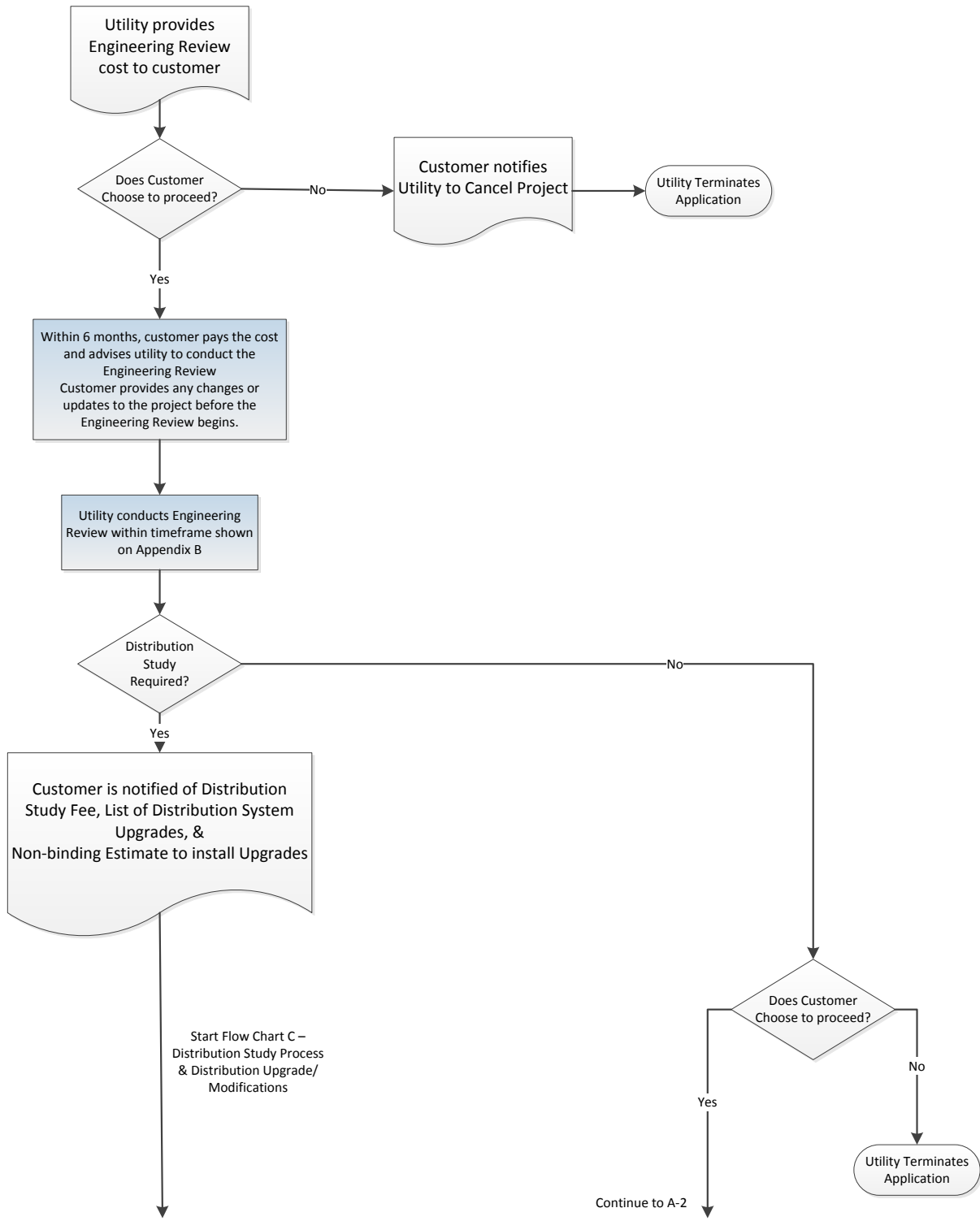
Category 2 Projects – Non Affected System
 (Interconnection projects greater than 20 kW but less than or equal to 150 kW and non-inverter based 20 kW and less that do not impact another electric utility system.)
 Interconnection Process Flow Diagram



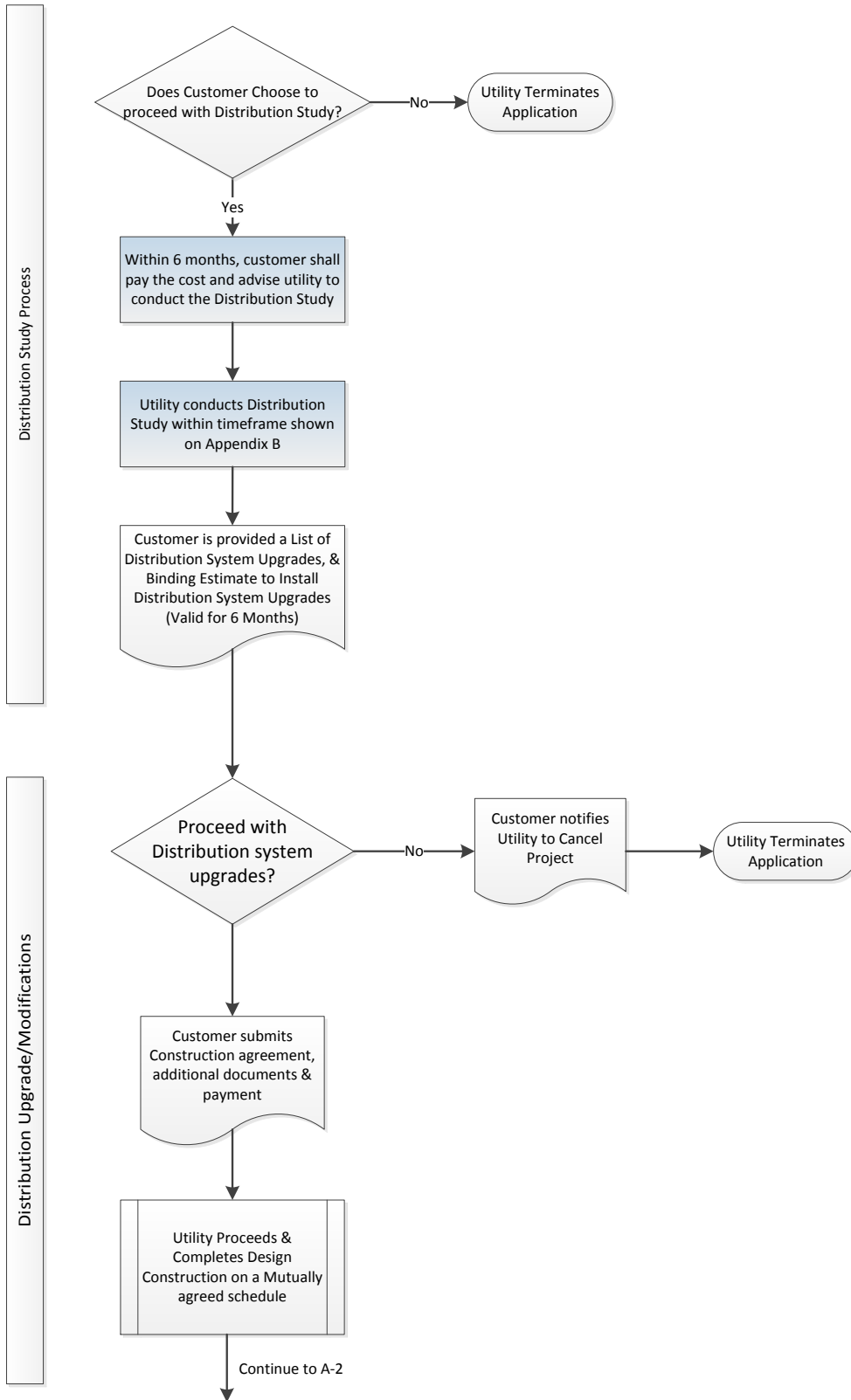
FLOW CHART A-2
Category 2 Projects – Non Affected System



**FLOW CHART B (Engineering Review Process)
Category 2 Projects – Non Affected System**



**FLOW CHART C (Distribution Study Process & Distribution Upgrade/Modifications)
Category 2 Projects – Non Affected System**



Appendix B-Interconnection & Net Metering Costs and Timelines

Interconnection Table – Applicant Costs

	Application Review	Engineering Review	Distribution Study	Distribution Upgrades	Testing & Inspection
Category 2	\$100	\$0	Propose fixed fee	Actual or Max Approved by Commission	Proposed Fixed fee

Combined Net Metering / Interconnection Table - Applicant Costs

	Net Meter Program Fee	Application Review	Engineering Review	Distribution Study	Distribution Upgrades	Testing & Inspection
Category 2	\$25	\$75	\$0	Propose fixed fee	Actual or Max Approved by Commission	\$0

Interconnection Timeline – Working Days

	Application Complete	Application Review	Engineering Study Completion	Distribution Study Completion	Distribution Upgrades	Testing & Inspection
Category 2	10 days	10 days	10 days	10 days	Mutually Agreed	10 days to notify of scheduled visit

Appendix C- Definitions

Aggregate Generator Output: The total nameplate generation stated in AC kW for a given application.

Alternative electric supplier (AES): as defined in section 10g of 2000 PA 141, MCL 460.10g

Alternative electric supplier net metering program plan: document supplied by an AES that provides detailed information to an applicant about the AES's net metering program.

Applicant: Legally responsible person applying to an Electric Utility to interconnect a project with the Electric Utility's distribution system or a person applying for a net metering program. An applicant shall be a customer of an Electric Utility and may be a customer of an AES.

Application Review: Review by the Electric Utility of the completed application for interconnection to determine if an engineering review is required.

Area Network: A location on the distribution system served by multiple transformers interconnected in an electrical network circuit.

Category 1: An inverter based project of 20kW or less that uses equipment certified by a nationally recognized testing laboratory to IEEE 1547.1 testing standards et seq

Category 2: A project of greater than 20 kW and not more than 150 kW, and projects less than or equal to 20kW which do not meet the criteria for Category 1 projects.

Category 3: A project of greater than 150 kW and not more than 550 kW.

Category 4: A project of greater than 550 kW and not more than 2 MW.

Category 5: A project of greater than 2 MW.

Certified equipment: A generating, control, or protective system that has been certified as meeting acceptable safety and reliability standards by a nationally recognized testing laboratory in conformance IEEE1547.1 et seq.

Commission: The Michigan Public Service Commission

Commissioning test: The procedure, performed in compliance with IEEE 1547.1, for documenting and verifying the performance of a project to confirm that the project operates in conformity with its design specifications.

Customer: A person who receives electric service from an Electric Utility's distribution system or a person who participates in a net metering program through an AES or Electric Utility.

Customer-generator: A person that uses a project on-site that is interconnected to an Electric Utility distribution system.

Distribution system: The structures, equipment, and facilities owned and operated by an Electric Utility to deliver electricity to end users, not including transmission facilities that are subject to the jurisdiction of the federal energy regulatory commission.

Distribution system study: A study to determine if a distribution system upgrade is needed to accommodate the proposed project and to determine the cost of an upgrade if required.

Electric provider: Any person or entity whose rates are regulated by the commission for selling electricity to retail customers in the state.

Electric Utility: Term as defined in section 2 of 1995 PA 30, MCL 460.562.

Engineering Review: A study to determine the suitability of the interconnection equipment including any safety and reliability complications arising from equipment saturation, multiple technologies, and proximity to synchronous motor loads.

Flow-back: An installed electric generation project which operates in parallel with an Electric Utility which is capable of providing energy flow to the Utility without an installed relay protection scheme and isolating device preventing energy flow to the Utility.

IEEE: Institute of Electrical and Electronics Engineers

IEEE 1547 et seq: IEEE ‘Standard for Interconnecting Distributed Resources with Electric Power Systems,’ dated January 1, 2003.

IEEE 1547.1 et seq: IEEE ‘Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems,’ dated January 1, 2005.

Interconnection: The process undertaken by an Electric Utility to construct the electrical facilities necessary to connect a project with a distribution system so that parallel operation can occur.

Interconnection procedures: The requirements that govern project interconnection adopted by each electric utility and approved by the commission.

kW: kilowatt

kWh: kilowatt-hours

Material modification: A modification that changes the maximum electrical output of a project or changes the interconnection equipment including but not limited to the following:

- Changing from certified to non certified equipment

- Replacing a component with a component of different functionality or UL listing.

MW: megawatt

Nationally recognized testing laboratory: A testing laboratory recognized by the accreditation program of the U.S. Department of Labor Occupational Safety and Health Administration.

Non-Flow Back: An installed electric generation project which operates in parallel with the Electric Utility with a relay protection scheme and isolation device preventing power flow back to the Utility.

Parallel Operating Agreement: An agreement between the Utility and the Customer governing the parallel operation of the generation equipment. Parallel Operating Agreement will cover matters customarily addressed in such agreements in accordance with Good Utility Practice, including, without limitation, system operation, interconnection rate, defaults and remedies, and liability

Parallel operation: The operation, for longer than 100 milliseconds, of a project while connected to the energized distribution system.

Point of Common Coupling (PCC): The point where the facilities that deliver electric power to the load (Electric Utility) meets the facility contained within a single premises or group of premises that deliver electric power to the load (Electric Utility customer).

Project: Electrical generating equipment and associated facilities which are eligible for interconnection to the Electric Utility that are not owned or operated by an Electric Utility.

Project Developer: Single point of contact for the Applicant. The Project Developer may also be the Applicant and/or Customer.

Renewable energy credit (REC): A credit granted pursuant to the commission's renewable energy credit certification and tracking program in section 41 of 2008 PA 295, MCL 460.1041.

Renewable energy resource: Term as defined in section 11(i) of 2008 PA 295, MCL 460.1011(i)

Renewable energy system: Term as defined in section 11(k) of 2008 PA 295, MCL 460.1011(k).

Spot network: A location on the distribution system that uses 2 or more inter-tied transformers to supply an electrical network circuit.

UL 1741: The 'Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources', November 7, 2005 revision.

UL 1741 scope 1.1A: Paragraph 1.1A contained in chapter 1, section 1 of UL 1741, effective May 7, 2007.

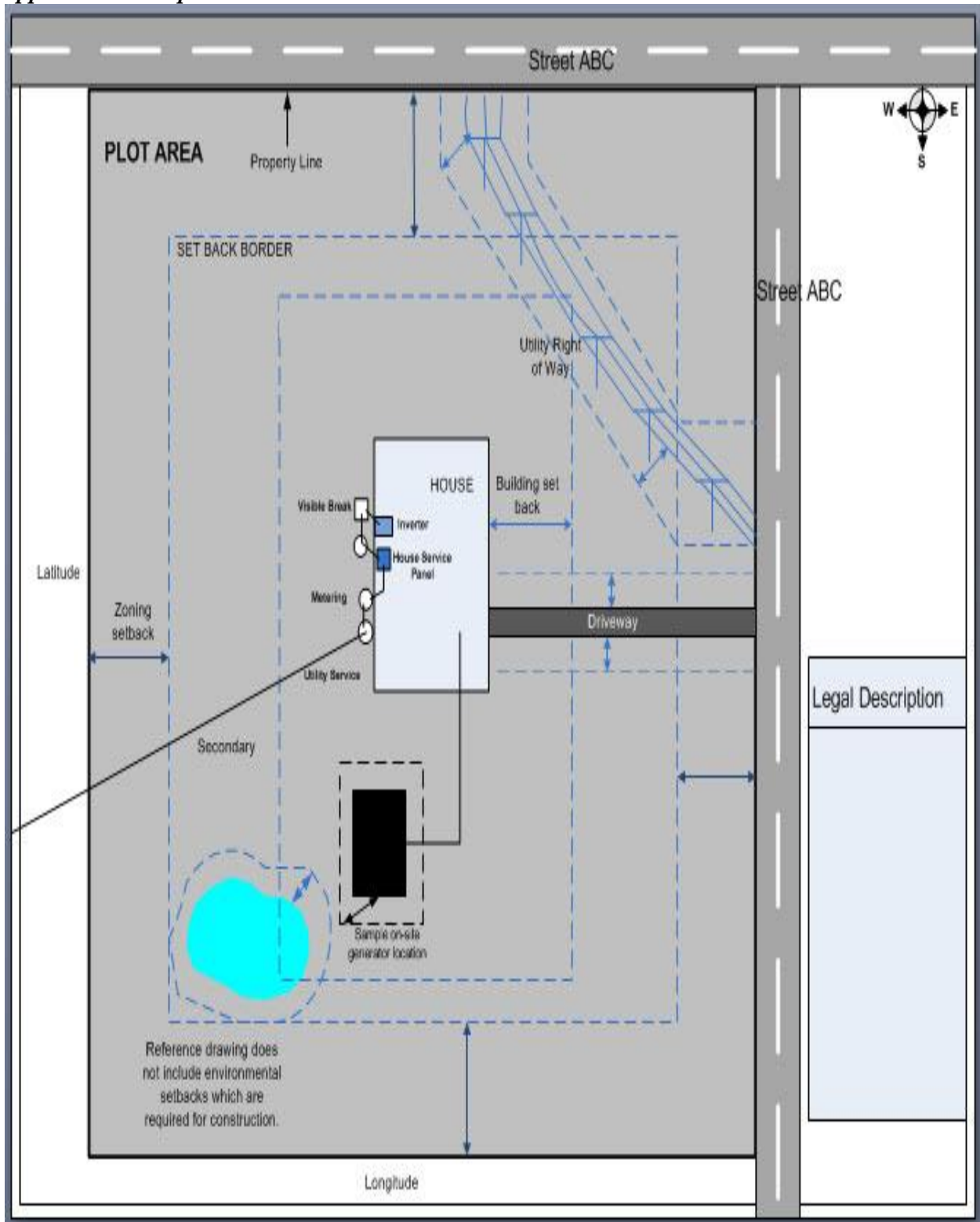
Uniform interconnection application form: The standard application forms, approved by the commission under R 460.615 and used for category 1, category 2, category 3, category 4, and category 5 projects.

Uniform interconnection agreement: The standard interconnection agreements approved by the commission under R 460.615 and used for category 1, category 2, category 3, category 4, and category 5 projects.

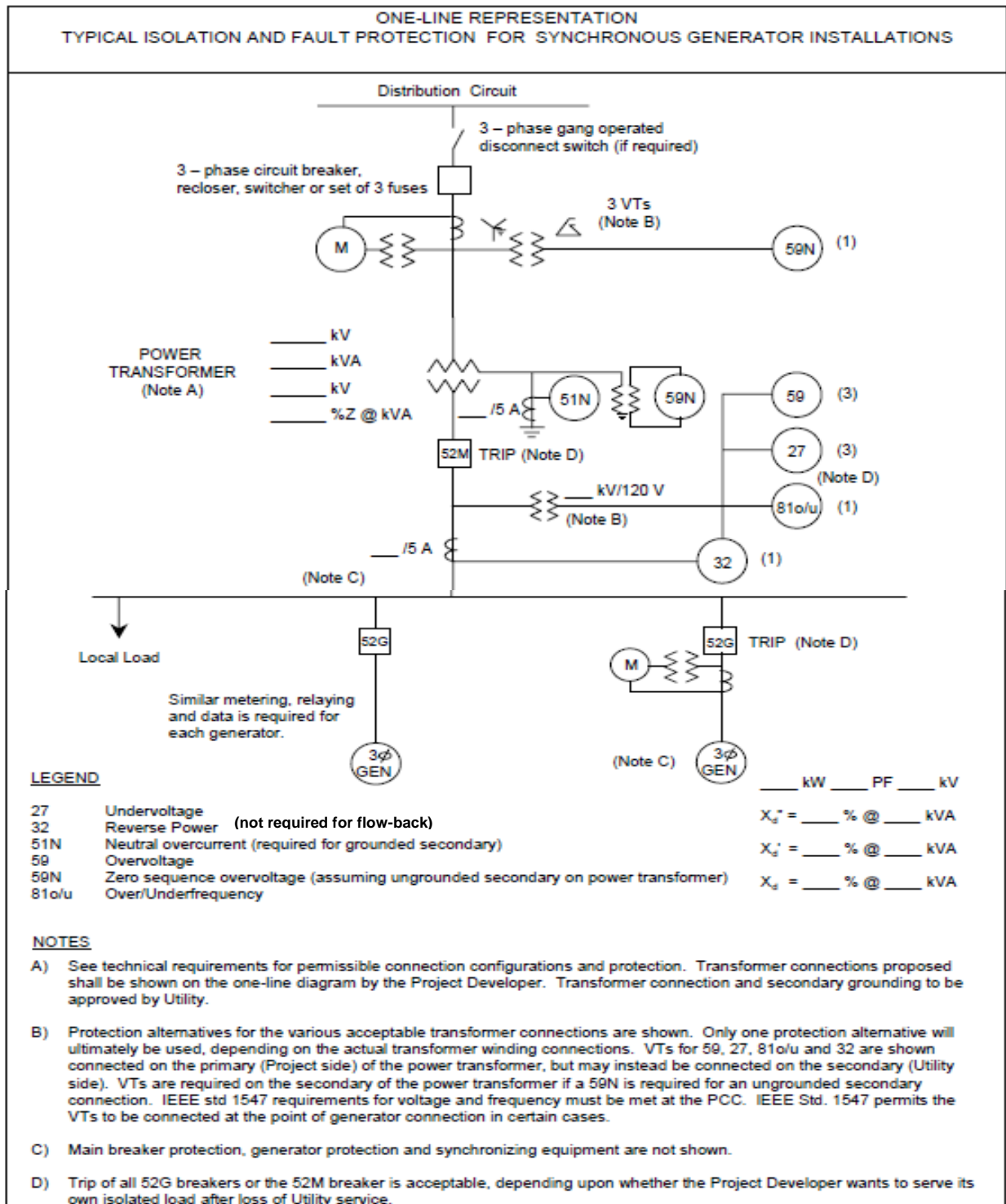
Uniform net metering application: The net metering application form approved by the commission under R 460.642 and used by all electric utilities and AES.

Working days: Days excluding Saturdays, Sundays, Holidays and other days when the offices of the Electric Utility are not open to the public.

Appendix D-Sample Site Plan



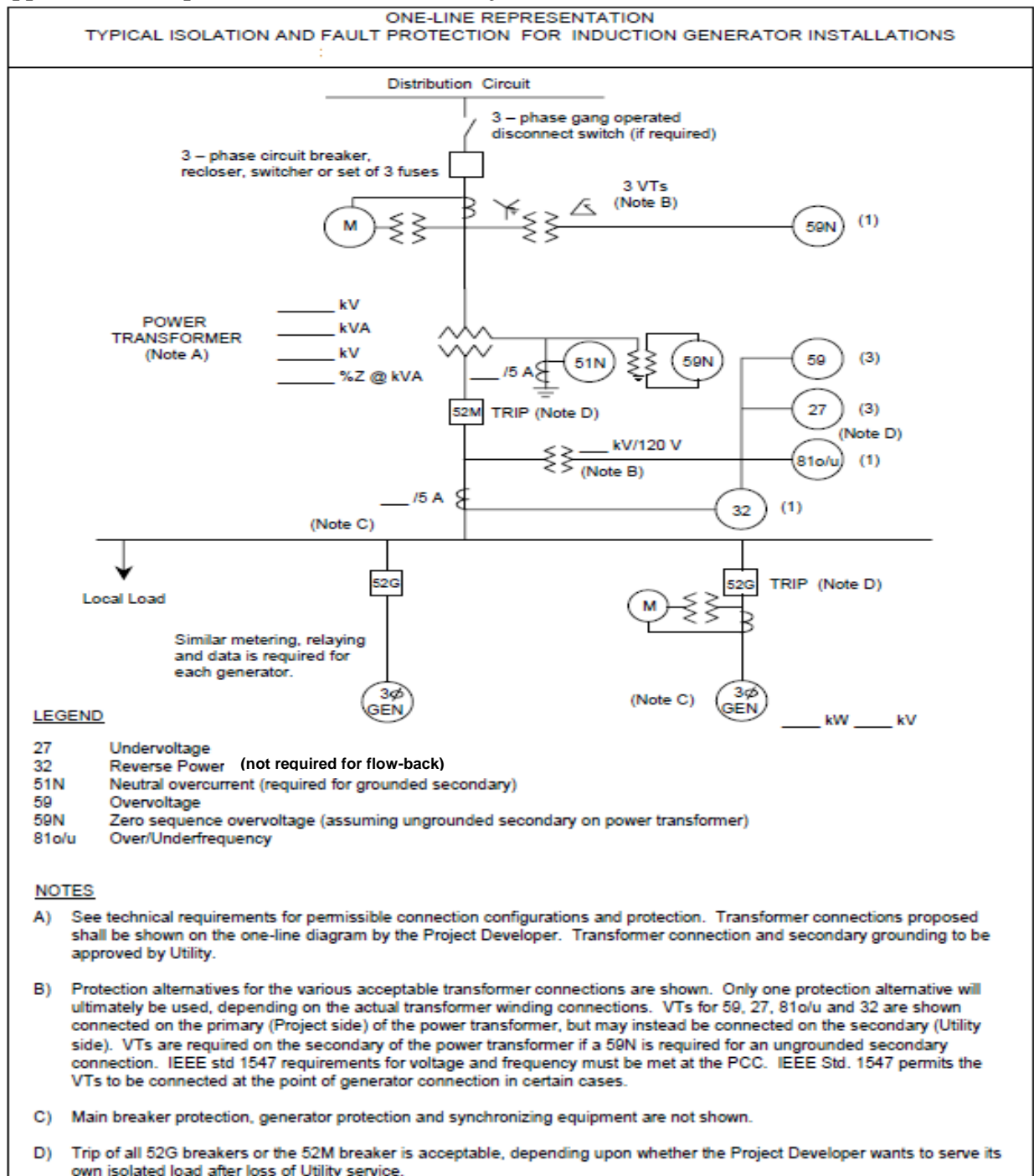
Appendix E-Sample One-Line Synchronous Projects



Instructions: Attach data sheets as required. Indicate in the table below the page number of the attached data (manufacturer's data where appropriate) on which the requested information is provided. Provide one table for each unique generator.

Item No	Data Value	Data Description	Attached Page No
1		Generator Type (synchronous or induction)	
2		Generator Nameplate Voltage	
3		Generator Nameplate Watts or Volt-Amperes	
4		Generator Nameplate Power Factor (pf)	
5		Direct axis reactance (saturated)	
6		Direct axis transient reactance (saturated)	
7		Direct axis sub-transient reactance (saturated)	
8		Short Circuit Current contribution from generator at the Point of Common Coupling (single-phase and three-phase	
9		National Recognized Testing Laboratory Certification	
10		Written Commissioning Test Procedure	

Appendix F-Sample One-Line Induction Projects

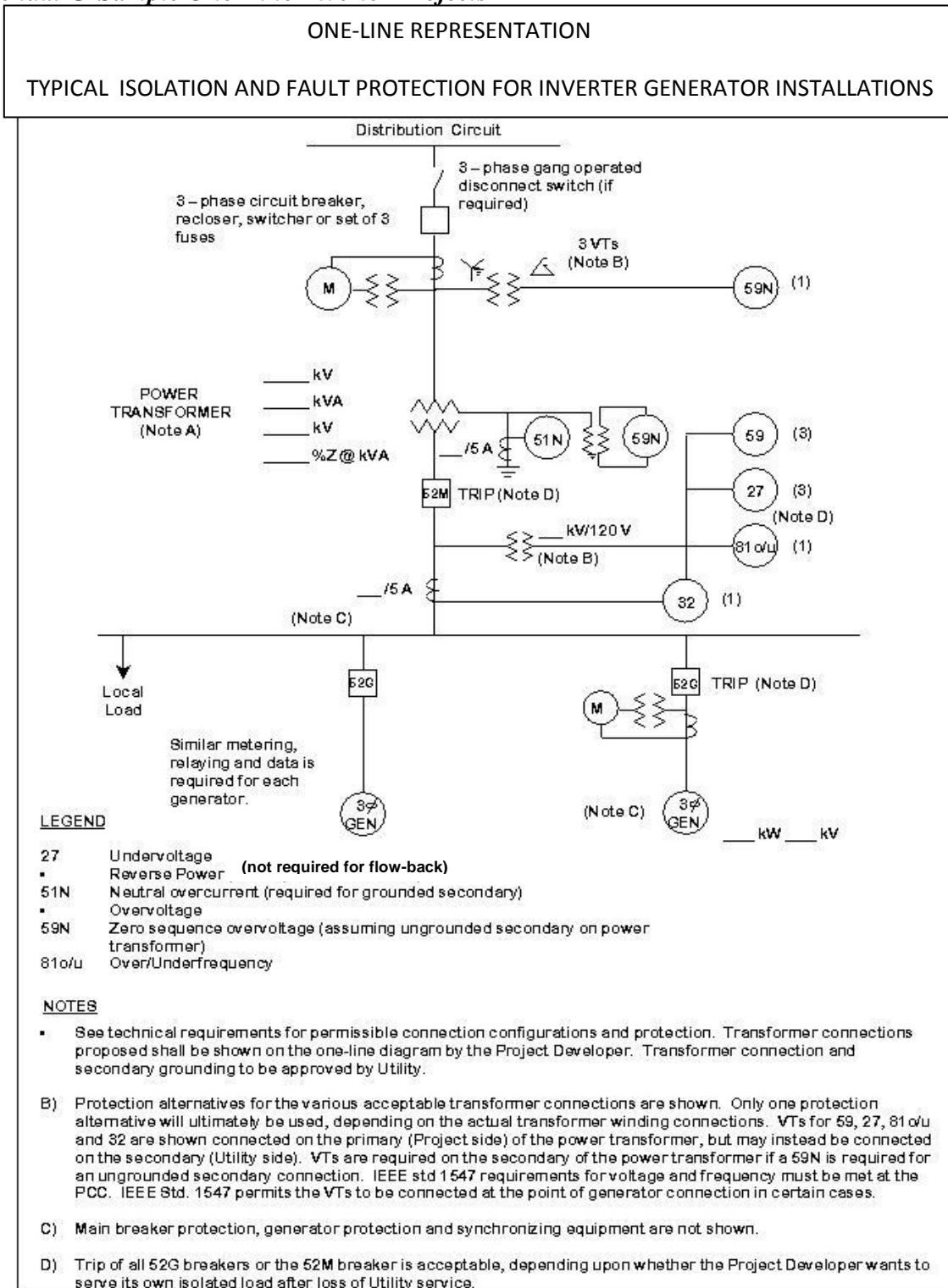


Instructions: Attach data sheets as required. Indicate in the table below the page number of the attached data (manufacturer's data where appropriate) on which the requested information is provided. Provide one table for each unique generator.

Induction Electric Generator(s) at the Project:**Generator No _____**

Item No	Data Description	Attached Page No
1	Generator Type (Inverter)	
2	Generator Nameplate Voltage	
3	Generator Nameplate Watts or Volt-Amperes	
4	Generator Nameplate Power Factor (pf)	
5	Short Circuit Current contribution from generator at the Point of Common Coupling (single-phase and three-phase)	
6	National Recognized Testing Laboratory Certification	
7	Written Commissioning Test Procedure	

Appendix G-Sample One-Line Inverter Projects



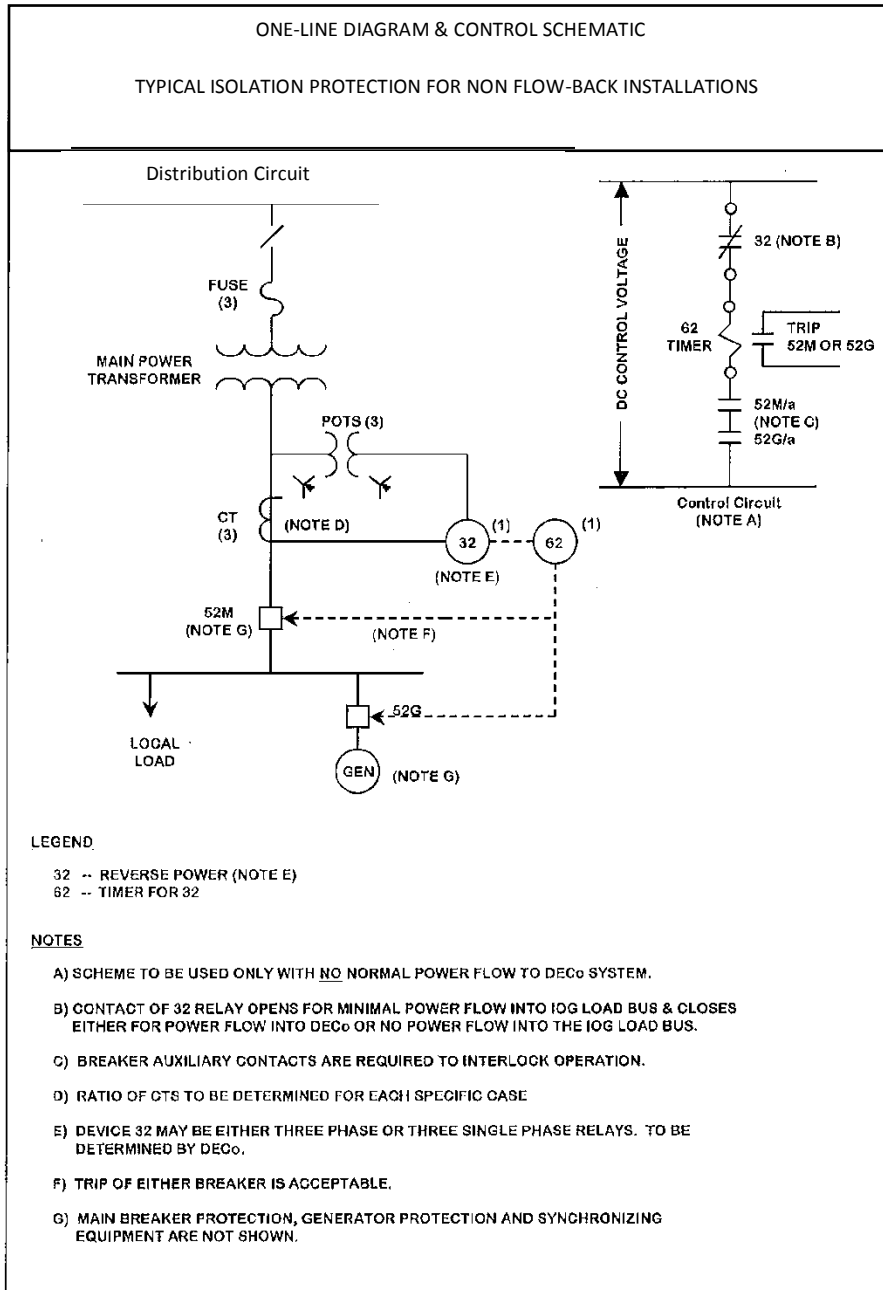
C-1

Instructions: Attach data sheets as required. Indicate in the table below the page number of the attached data (manufacturer's data where appropriate) on which the requested information is provided. Provide one table for each unique generator.

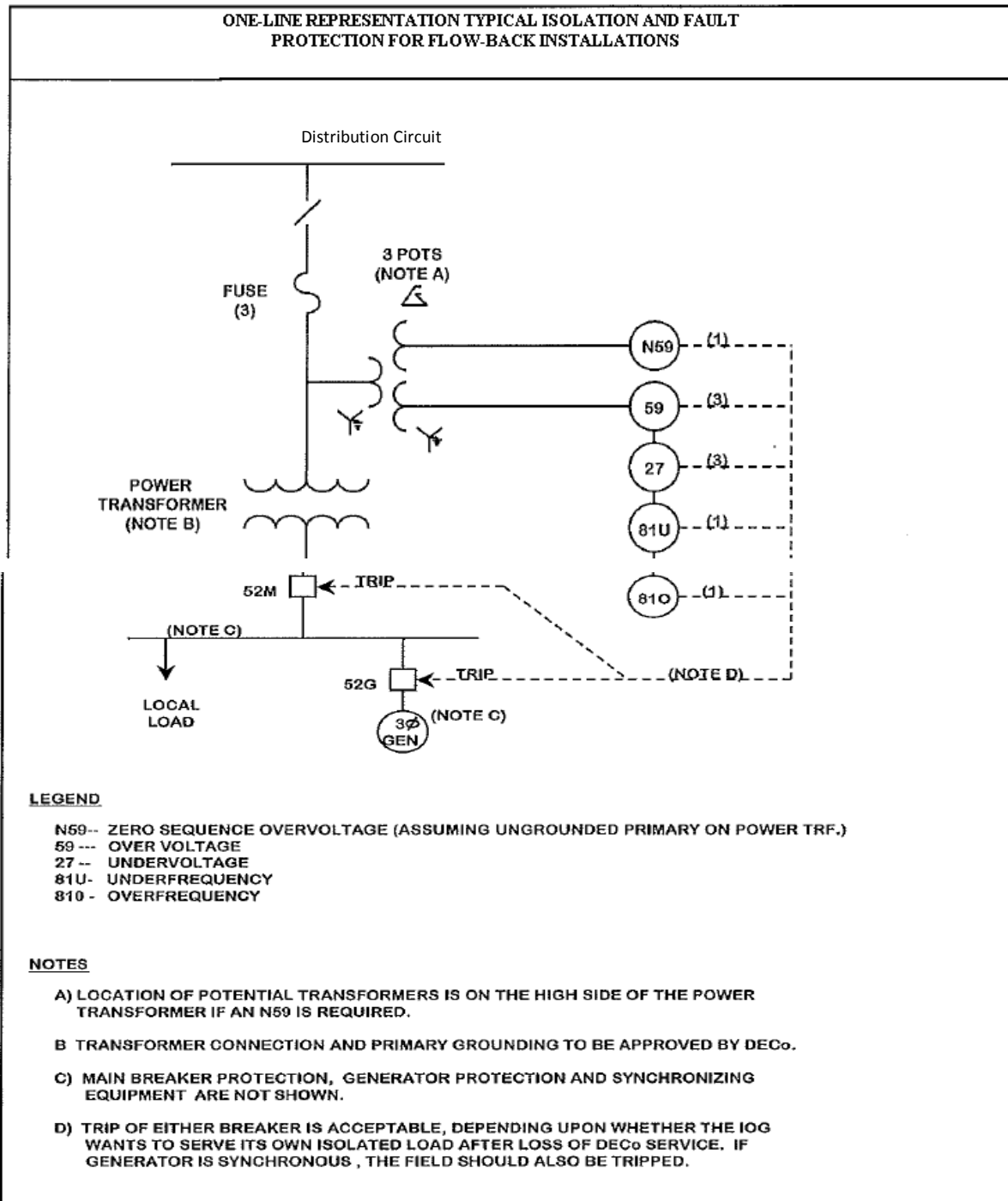
Inverter Electric Generator(s) at the Project:**Generator No _____**

Item No	Data Description	Attached Page No
1	Generator Type (Inverter)	
2	Generator Nameplate Voltage	
3	Generator Nameplate Watts or Volt-Amperes	
4	Generator Nameplate Power Factor (pf)	
5	Short Circuit Current contribution from generator at the Point of Common Coupling (single-phase and three-phase)	
6	National Recognized Testing Laboratory Certification	
7	Written Commissioning Test Procedure	

Appendix H-Sample One-Line Diagram for Non-Flow Back Projects



Appendix I-Sample One-Line Diagram for Flow-Back Projects



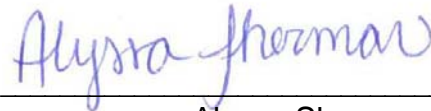
P R O O F O F S E R V I C E

STATE OF MICHIGAN)

Case No. U-15919

County of Ingham)

Alyssa Sherman being duly sworn, deposes and says that on December 20, 2012 A.D. she served a copy of the attached Commission orders by first class mail, postage prepaid, or by inter-departmental mail, to the persons as shown on the attached service list.



Alyssa Sherman

Subscribed and sworn to before me
This 20th day of December 2012

Gloria Pearl Jones
Notary Public, Ingham County, MI
My Commission Expires June 5, 2016
Acting in Eaton County

Service List U-15919

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Michigan Electric & Gas Association
3073 Summergate Lane
Okemos MI 48864

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Dykema Gossett PLLC
Capitol View
201 Townsend St., Suite 900
Lansing MI 48933

Wolverine Power Marketing Cooperative, Inc.
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Detroit MI 48226-1279

The Detroit Edison Company
Sandra K. Ennis
One Energy Plaza
Detroit MI 48226-1279

Arthur J. Levasseur
Fischer Franklin & Ford
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Detroit MI 48226

Spartan Renewable Energy, Inc.
10125 W Watergate Road
P.O. Box 189
Cadillac MI 49601

P R O O F O F S E R V I C E

STATE OF MICHIGAN)

Case No. U-15919

County of Ingham)

Lisa Felice being duly sworn, deposes and says that on December 20, 2012 A.D. she served a copy of the attached **Commission Order (Commission's Own Motion) via e-mail transmission**, to the persons as shown on the attached service list (Listserv Distribution List).

Lisa Felice

Subscribed and sworn to before me
this 20th day of December 2012

Gloria Pearl Jones
Notary Public, Ingham County, MI
As acting in Eaton County
My Commission Expires June 5, 2016

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mhaugh@JUSTENERGY.COM	Just Energy
ksheikh@LAKESHOREENERGY.COM	Lakeshore Energy
vnguyen@MIDAMERICAN.COM	MidAmerican Energy
SGUTHORN@MXENERGY.COM	Mx Energy
rarchiba@FOSTEROIL.COM	My Choice Energy
gbass@NOBLESOLUTIONS.COM	Noble American Energy
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