MICHIGAN ELECTRIC UTILITY

Generator Interconnection Procedures

Level 1 & 2
Certified Inverter Projects with
DER Capacity
Less Than or Equal to 150 kWac [1]

April 7, 2022

[1] Non-Certified Inverter based generation projects, synchronous and induction projects than or equal to 150kWac are defined as Level 3 projects and are implemented under the Level 3 procedures and applications

INTRODUCTION

Level 1 & 2 – Less than or equal to 150kWac

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 150 kWac[1] and designed to operate in parallel with the Consumers Energy Company (Consumers Energy or the Company) electric system. Technical requirements (data, equipment, relaying, telemetry, metering) are defined according to generation type, location of the interconnection, and mode of operation (Export or Non-Export). The process is designed to provide an expeditious interconnection to the Consumers Energy 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 Consumers Energy electric system in the MPSC Order in Case No. XXXXX.

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 Consumers Energy. The term "Applicant" means a person or entity submitting an interconnection application, a legacy net metering program application, or a distributed generation program application. An applicant is not required to be an existing customer of an electric utility. An electric utility is considered an applicant when it submits an interconnection application for a DER that is not a temporary DER.

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 Consumers Energy, 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.

It may be possible for Consumers Energy 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 costs and timeframes established by the MPSC and addressed in these procedures. Therefore, if requested by the Applicant, adjustments to these requirements will only be considered if the Applicant agrees in advance to compensate Consumers Energy for the added of the additional reviews, and to also allow Consumers Energy additional time for the additional reviews.

Consumers Energy may apply for a technical waiver from one or more provisions of these rules and the MPSC may grant a waiver upon a showing of good cause.

[1] Non-Certified Inverter based generation projects, synchronous and induction projects less than or equal to 150 kWac are defined as Level 3 projects and are implemented under the Level 3 procedures and applications.

TABLE OF CONTENTS

INTERCONNECTION PROCEDURES

INTERCONNECTION PROCESS

Customer Project Planning Phase

An Applicant may contact Consumers Energy before or during the application process regarding the project. Consumers Energy can be reached by phone, e-mail, or by the external website to access information, forms, rates, and agreements. Consumers Energy requires a pre-application report to be completed for Level 4 or greater projects.

An interconnection process flow diagram can be found in Appendix A.

Interconnection fees and timelines can be found in ***Appendix B***. Procedure definitions can be found in ***Appendix C***.

Pre-Application Report

An Applicant shall submit a completed pre-application report form (**Appendix J)** for any proposed level 4 or 5 project. A pre-application report fee will be required (**Appendix B**). Consumers Energy provides the following in its pre-application reports:

1. The substation bus, bank, or circuit most likely to serve the proposed point of common coupling (PCC). This identification does not necessarily indicate that this would be the circuit to which the project would ultimately connect.
2. The total capacity, in MW, of the substation bus, bank, or circuit based on normal or operating ratings likely to serve the proposed PCC.
3. The existing aggregate generation capacity, in MW, interconnected to a substation bus, bank, or circuit likely to serve the proposed PCC.
4. The aggregate capacity, in MW, of generation not yet built, but found in previously accepted interconnection applications, for a substation bus, bank, or circuit likely to serve the proposed PCC.
5. The available capacity, in MW, of the substation bus, bank, or circuit likely to serve the proposed PCC.
6. The substation nominal distribution voltage.
7. The nominal distribution circuit voltage as the proposed PCC.
8. The label, name, or identifier of the distribution circuit on which the proposed PCC is located.
9. The approximate circuit distance between the proposed PCC and the substation.
10. The actual or estimated peak load and minimum load data at any relevant line section or sections, including daytime minimum load and absolute minimum load, when available. If not readily available, the report must indicate whether the generator is expected to exceed minimum load on the circuit.
11. Whether the point of common coupling is located behind a line voltage regulator and whether the substation has a load tap changer.
12. Limiting conductor ratings from the proposed point of common coupling to the distribution substation.
13. Number of phases available at the primary voltage level at the proposed point of common coupling, and, if a single phase, distance from the 3-phase circuit.
14. Whether the point of common coupling is located on a spot network, area network, grid network, radial supply, or secondary network.
15. Based on the proposed PCC, whether power quality issues may be present on the circuit.
16. Whether or not the area has been identified as having a prior affected system.

17. Whether or not the site will require a system impact study for high voltage distribution based on size, location, and existing system configuration.

Consumers Energy will process pre-application report requests in the order in which they are received. Pre-application reports will be provided within 25 business days of receipt of the completed request form and payment of the fee. Any pre-application reports produced by Consumers Energy are non-binding and do not confer any rights on the applicant. Pre-application reports will only contain existing and readily available data, though Consumers Energy will note where information is not readily available. A request for a pre-application report does not obligate Consumers Energy to conduct a study or other analysis of the proposed Project if data is not readily available.

An applicant may request additional pre-application reports, including different proposed PCCs for the same project. No more than 10 pre-application reports may be submitted by an applicant and its affiliates during a 1-week period.

Application Review & Track Assignment

The Applicant must first submit an Interconnection Application or a Combined Interconnection and Distributed Generation Application to Consumers Energy. A separate application is required for each Project, or Project site. If a single Project contains multiple types of DER, include all DER in a single application form. The blank Interconnection Application or Combined Interconnection and Distributed Generation Application can be found on the Consumers Energy website (www.consumersenergy.com).

An applicant shall complete a submittal of required interconnection application and interconnection filing fee per the table in Appendix B. Consumers Energy will notify the Applicant within 10 business days of receipt of an Interconnection Application. If any portion of the Interconnection Application, data submittal (site plan and one-line diagrams), or filing fee is incomplete and/or missing; Consumers Energy will return the application and data to the Applicant with explanations. The Applicant will need to resubmit the application with all the missing items. Once Consumers Energy has accepted the application, Consumers Energy will notify the Applicant that the application is complete and whether the Project will be processed following the simplified track, non-export track, fast track, or study track.

Non-Export Track

The non-export track is available to projects under 2 MW requesting to connect to the low voltage distribution system. In order to be eligible for the non-export study process the Project is required to have reverse power (32) relaying as defined within these interconnection requirements. Within 20 business days of providing notice of an approved application, Consumers Energy will perform a study using the initial review screens in Appendix H to determine the suitability of the interconnection equipment and provide the results.

If the results indicate that no interconnection facilities, distribution upgrades, further study, or Project modifications are required, Consumers Energy will provide specifications within 10 business days for any equipment required to be installed to the Applicant. Within 10 business days of receiving the equipment specifications, the Applicant shall notify Consumers Energy whether it will proceed to an Interconnection and Operating Agreement or will withdraw the application. The failure of the Applicant to notify Consumers Energy within the required time period shall result in the application being withdrawn.

If a Project modification is offered by Consumers Energy, the Applicant shall either withdraw the interconnection application or provide a modified application within 60 business days from the date the Applicant was notified by Consumers Energy, with up to 2 resubmissions during this

time period to provide a modified application. After each submission of information, Consumers Energy will notify the applicant within 10 business day that the interconnection application is either accepted or rejected due to continuing deficiencies. If the Applicant does not meet the timelines required, the application may be withdrawn.

If the results indicate further study is required, Consumers Energy will present options and the Applicant shall decide whether to proceed to a supplemental review under the fast track process, the study track, or to withdraw the application. The Applicant shall have 20 business days to decide on a course of action and notify Consumers Energy, otherwise the application may be withdrawn.

When an Applicant changes from a non-exporting system to an exporting system, the Applicant shall submit a new interconnection application.

Fast Track

The fast track is available to Projects up to 5 MWac requesting to connect to the low voltage distribution system. These applications may include applications that provide for the use of an energy storage device so the export of power does not exceed 5 MWac. An Applicant may choose to forgo the fast track for an eligible project and proceed directly to the study track. Consumers Energy may aggregate all existing and proposed generation on a site in determining fast track eligibility.

Within 20 business days of providing notice of an approved application, Consumers Energy will perform a study using the initial review screens in Appendix H to determine the suitability of the interconnection equipment and provide the results. This timeline is reduced to within 10 business days for level 1 and level 2 projects.

If the proposed interconnection passes the initial review screens, or if the proposed interconnection fails the screens but Consumers Energy determines that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and inform the Applicant whether the Project will proceed to Facilities Study or directly to Interconnection and Operating Agreement.

If the proposed interconnection fails any of the initial review screens, and Consumers Energy does not or cannot determine that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and provide the Applicant with the results of the application of the initial review screens. Consumers Energy shall provide the Applicant with the options to attend a customer options meeting, proceed to Supplemental Review, submit a project modification, or withdraw the application. The Applicant shall have 10 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn.

Upon the Applicant's request, Consumers Energy and the Applicant shall schedule a customer options meeting between Consumers Energy and the Applicant to review possible facility modifications, screen analysis, and related results to determine what further steps are needed to permit the DER to be connected safely and reliably to the distribution system. The customer options meeting must take place within 30 business days of the date of notification. Consumers Energy shall provide the Applicant with the options of proceeding to Supplemental Review, proceeding to the Study Track, submitting a project modification, or withdrawing the application. The Applicant shall have 20 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn. The customer options meeting may take place in person or via telecommunications.

If a Project modification is offered by Consumers Energy, the Applicant shall provide a modified application within 60 business days from the date the Applicant was notified by Consumers Energy, with up to 2 resubmissions during this time period to provide a modified application. The application modifications must mitigate or eliminate the factors that caused the interconnection application to fail 1 or more of the initial review screens. After each submission of information, Consumers Energy will notify the applicant within 10 business day that the interconnection application is either accepted or rejected due to continuing deficiencies. If the Applicant does not meet the timelines required, the application may be withdrawn. After the application is accepted, the initial review screen process will be repeated.

Supplemental Review

An applicant shall submit payment of the supplemental review fee (Appendix B) within 20 business days of agreeing to a supplemental review. If payment of the fee has not been received by Consumers Energy within 25 business days, the application shall be withdrawn.

Within 30 business days after the applicant pays the applicable supplemental review fee, Consumers Energy will perform a study using the supplemental review screens in Appendix I and notify the applicant of the results.

If the proposed interconnection passes the supplemental review screens, or if the proposed interconnection fails the screens but Consumers Energy determines that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and inform the Applicant whether the Project will proceed to Facilities Study or directly to Interconnection and Operating Agreement.

If the proposed interconnection fails any of the supplemental review screens, and Consumers Energy does not or cannot determine that the DER may be interconnected consistent with safety, reliability, and power quality standards, Consumers Energy shall notify the Applicant and provide the Applicant with the results of the application of the supplemental review screens. Consumers Energy shall provide the Applicant with the options to proceed to the Study Track or withdraw the application. The Applicant shall have 10 business days to decide on a course of action and notify Consumers Energy, otherwise the application shall be withdrawn.

Study Track

The study track is available to all Projects that are not eligible for the simplified track, the non-export track, or the fast track. Projects that do not pass the initial review screens or supplemental review screens or are otherwise identified to require further study while proceeding through another track may also be evaluated in the study track. A Project that is eligible for the fast track may also elect to be evaluated in the study track.

If a project is ineligible for any other study track, Consumers Energy shall provide either an individual study agreement or a batch study agreement to the Applicant, whichever is applicable as identified below, within 10 business days after the interconnection application has been accepted.

If a project begins in another track and is moved to the study track for any other reason listed above, within 10 business days after the Applicant has notified Consumers Energy to proceed to the study track, Consumers Energy shall provide either an individual study agreement or a batch study agreement to the Applicant, whichever is applicable as identified below

Consumers Energy will study all Projects that qualify for study track through either the Individual Study Process or the Batch Study Process. Consumers Energy shall not study one or more Projects individually and at the same time study one or more different Projects as part of a batch.

Individual Study Process

Should Consumers Energy elect to use an individual study process, it will proceed to study each Project in the order in which the Projects were placed into the study track, taking into account withdrawn interconnection applications and electrically remote Projects. An electrically remote Project in an individual study may be studied on an expedited schedule relative to electrically coincident DERs. Electrically remote DERs will be studied in the order the interconnection applications were deemed complete.

Upon request of the Applicant, a scoping meeting shall be scheduled to discuss the interconnection application and review existing fast track results, if any. The scoping meeting must take place within 20 business days after the interconnection application is considered complete by the electric utility or, if applicable, the fast track has been completed and the Applicant has elected to continue with the system impact study or facilities study

If a Project in an individual study is delayed due to an affected system issue, other Projects that were placed into the study track on a later date may continue to progress.

An individual study will begin in the System Impact Study section and proceed to Facilities Study.

Should Consumers Energy elect to use a batch study process but receive only one interconnection application that qualified for the study track, the Project will be evaluated using the individual study process considering the first day of what would have been the batch process as the day the application was determined to be complete.

Potential Batch Study Process

Should Consumers Energy elect to use a batch study process, the start and end dates for the batch will be published not less than 60 days prior to the start of a batch, and the Company shall process at least one batch per year. The start of a batch shall be considered to be the start of the first study period and the end of a batch shall be considered to be the end of the 45-day Applicant decision period following the date upon which all Applicants in the batch receive the final batch study report from Consumers Energy.

The different phases of the batch study process are shown below with typical time durations shown in business days. Time durations of application and study phases may need to change based on number of applications, Consumers Energy resources, etc. Phase durations or changes to phase durations will be communicated by Consumers Energy to all Applicants.

Application Phase (duration can vary)

- Consumers Energy shall post start and end dates of the batch study at least 60 days prior to batch study start on its website. An application complete cut off date will also be communicated.
- During this phase each Applicant will submit applications per the Application Review section of these procedures and must receive an application complete response from Consumers Energy prior to the application cut-off date in order to be included in the batch study.

- Once an application is deemed complete, a System Impact Study agreement will be provided by Consumers Energy and the Applicant will have the sign, return, and pay the fee for the System Impact Study section of these Procedures.
- Consumers Energy will also offer to hold a scoping meeting, which to the extent feasible would occur within 30 days of the batch start. Scoping meetings are limited to 1 hour per Project. Multiple projects by the same Applicant can be addressed in the same meeting. Consumers Energy may meet with multiple Applicants in the same meeting if agreed to by Consumers Energy and all the Applicants that will attend the meeting. During the scoping meeting, Consumers Energy will communicate to each Applicant the studies that will be performed and the estimated cost of the batch study.

Batch Stabilization Phase (25 business days)

- This phase allows the allotted time for an application deemed complete at the end of the application phase to execute and pay the fee for a System Impact Study agreement.
- During this phase Consumers Energy will confirm all eligible Projects for the batch study, including Projects from previous study cycles that need to be included in the base study conditions for the upcoming batch study

System Impact Study Phase (Typically 75 Business Days)

- The start of this phase is considered the start of the batch.
- Consumers Energy will perform the System Impact Study during this phase and provide written results to each Applicant at the completion of this phase along with a Facilities Study agreement for the next study phase of the batch.
- Consumers Energy shall also offer to hold a conference call with each Applicant to discuss the written results, to occur within 30 days of the end of the study phase to the extent feasible.

First Decision Phase (45 Business Days)

- During this phase the Applicant shall choose to either continue to the next phase of the batch or withdraw.
- The execution of the payment for the Facilities Study agreement for each Applicant choosing to continue to the next phase is due by the end of this 45 business day period. If the Facilities Study agreement and payment is not received by the end of this 45 business day period the application shall be withdrawn and removed from the batch.
- An Applicant that withdraws from the study may reapply with a new interconnection application.

Facilities Study Phase (Typically 75 Business Days)

- Consumers Energy will perform the Facilities Study during this phase and provide written results to each Applicant at the completion of this phase.
- Consumers Energy shall also offer to hold a conference call with each Applicant to discuss the written results, to occur within 30 days of the end of the study phase to the extent feasible.

Second Decision Phase (45 Business Days)

- The end of this phase is considered the end of the batch.
- During this phase the Applicant shall choose to proceed with execution of interconnection agreements or withdraw.
- The notice from the Applicant to proceed with execution of interconnection agreement is due by the end of this 45 business day period. If notice is not received by the end of this 45 business day period the application may be withdrawn by Consumers Energy.

If a Project in a batch study is delayed due to an affected system issue, the rest of the batch study will continue to progress. If feasible, the Project with the affected system study can rejoin the batch once the affected system study is complete. If not, the results of the study will be provided to the applicant once the affected system issue is resolved and incorporated into the study. See the Affected System Study Process section.

Applicants may reduce the capacity of the Project by up to 20% during the decision period between study phases until the conclusion of the system impact study. If the Applicant wants to increase the capacity of the Project, Consumers Energy requires the submission of a new interconnection application and appropriate fees.
If any shared interconnection facilities or shared distribution upgrades are identified during the batch study the cost allocation methodology below will be used to allocate the costs.

System Impact Study

Consumers Energy will provide the Applicant with a system impact study agreement within five business days of entering the study track either directly after an application is deemed complete or after a Project moves to the study track from another track. The Applicant shall return the completed system impact study agreement, provide any technical data requested by Consumers Energy, and pay the required fee (Appendix B) within 20 business days. Consumers Energy may consider the application withdrawn if the system impact study agreement, payment, and required technical data are not returned within 20 business days.

The system impact study report will identify and describe the electric system impacts that would result if the proposed Project was interconnected without electric system modifications. It will also provide a non-binding, good faith list of facilities that are required as a result of the application and non-binding estimates of costs and time to construct these facilities.

Consumers Energy will complete the system impact study and provide both a system impact study and, if necessary, a facilities study agreement within 60 business days of receipt of the signed system impact study agreement, payment of all applicable fees, and any necessary technical data.

For Projects being studied individually, Consumers Energy may request reasonable additional data from the Applicant within 20 business days of beginning the system impact study. Consumers Energy and the Applicant shall work together to resolve the additional data request so that Consumers Energy will be able to complete the system impact study within the aforementioned 60 business day period.

For Projects being studied as part of a batch, Consumers Energy may request reasonable additional data from the Applicant during the system impact study. Consumers Energy and the Applicant shall work together to resolve the additional data request so that Consumers Energy will be able to complete the batch study within one year.

Within 15 business days of receiving the system impact study report, the Applicant shall notify Consumers Energy whether it elects to pursue a system impact study review meeting, proceed to Facilities Study, or withdraw the application. If the Applicant fails to notify Consumers Energy within 15 business days, Consumers Energy may consider the application to be withdrawn.

Upon request by Applicant, a system impact study review meeting shall be scheduled to review system impact study results and determine what further steps are needed to permit the Project to connected safely and reliably to the distribution system. The system impact study review meeting must take place within 25 business days of Consumers Energy receiving notification that the Applicant plans to attend a system impact study review meeting. At the meeting Consumers Energy will offer the Applicant to proceed to Facilities Study, proceed directly to Interconnection & Operating Agreement, or withdraw the application. If an applicant fails to notify Consumers Energy of its selection within 45 business days of the meeting, Consumers Energy may consider the application to be withdrawn.

Facilities Study

If a Project received a system impact study, Consumers Energy will provide the Applicant with a facilities study agreement with the system impact study report. If no system impact study was performed, Consumers Energy will provide a facilities study agreement within 10 business days of proceeding to Facilities Study. The Applicant shall return the signed facilities study agreement and pay the required facilities study fee (Appendix B) within 20 business days. Consumers Energy may withdraw the application if the facilities study agreement and payment are not returned within 20 business days.

The facilities study report will specify and estimate the cost of the required equipment, engineering, procurement, and construction work, including overheads, needed to interconnect the Project, and an estimated timeline for the completion of construction.

Consumers Energy will complete the facilities study and provide a facilities study report to the Applicant within 80 business days of the receipt of the signed facilities study agreement and payment of the facilities study fee.

Within 10 business days of receiving a facilities study report from Consumers Energy, the Applicant shall notify Consumers Energy whether it elects to pursue a facilities study review meeting, proceed to a Interconnection & Operating Agreement, or withdraw the application. If the Applicant fails to notify Consumers Energy within 10 business days, Consumers Energy may consider the application to be withdrawn.

Upon request by Applicant, a facilities study review meeting shall be scheduled to review facilities study results and determine what further steps are needed to permit the Project to connected safely and reliably to the distribution system. The facilities study review meeting must take place within 25 business days of Consumers Energy receiving notification that the Applicant plans to attend a facilities study review meeting. At the meeting Consumers Energy will offer the Applicant to proceed to Interconnection & Operating Agreement or withdraw the application. If an applicant fails to notify Consumers Energy of its selection within 20 business days of the meeting, Consumers Energy may withdraw the application.

Cost Allocation Methodology

Per the Interconnection and Distributed Generation Standards established in Case No. XXXXX:

Rule 70. Costs for interconnection facilities and distribution upgrades must be classified into one of the following categories:
(a) Site-specific costs, which include, but are not limited to, costs of interconnection facilities and distribution upgrades that are caused by one DER, whether that DER is electrically co-incident with other DERs. These costs must be assigned to the cost-causing applicant.
(b) Shared interconnection facilities costs, which are costs caused by DERs which together necessitate the construction of interconnection facilities. The interconnection facilities costs that should be shared must be allocated to each applicant based on a methodology described in the electric utility's interconnection procedures.
(c) Shared distribution upgrade costs, which are costs caused by electrically co-incident DERs that together necessitate a distribution upgrade. The distribution upgrade costs that should be shared must be allocated to each applicant based on a methodology described in the electric utility's interconnection procedures.

Shared interconnection facilities shall be split equally amongst Applicants whose Projects necessitate the shared interconnection facilities. Once an Applicant's Project interconnection facilities are in service, the upfront original cost to install those interconnection facilities can no longer be shared by future Applicants. Costs of ongoing ownership, maintenance, and future

repair/replacement can still be shared by future applicants that share the interconnection facilities in accordance with interconnection agreements.

Shared distribution upgrade costs shall be allocated according to the impact of each applicant's generator on the limits exceeded for the shared distribution facilities. A simple example is shown below for a thermal constraint and the same methodology would be used for voltage, interrupting capability, or other constraints.

Limit Exceeded	**Distribution Upgrade Cost**	**Impact of Project A**	**Impact or Project B**
Loading on line X exceeded limit by 5 MVA	line X upgrade ($1M)	3 MVA	2 MVA
Cost Allocation		=(3/5*$1M)=$0.6M	=(2/5*$1M)=$0.4M

Distribution upgrade costs for higher queued or previous batch study Applicants that have agreed to proceed to interconnection agreements will not be considered for cost allocation to lower queued or current batch study applicants, unless requested and agreed to by all applicants affected.

Distribution upgrade costs and allocations of costs are subject to change due to the potential for an Applicant to withdraw up until an Applicant's Project is in service and costs are reconciled per the interconnection agreements. Consumers Energy shall endeavor to notify an Applicant as soon as possible after the it becomes aware that an Applicant's cost for distribution upgrades changes due to any other Applicant withdrawing a Project or Projects.

Affected System Study Process

If during a System Impact Study or a Facilities Study Consumers Energy determines that another utility's system may be affected by a proposed interconnection project, Consumers Energy shall notify the applicant of such and place the Project in an on hold status in regards to all interconnection study timelines while an affected system study is completed. Consumers Energy shall send notification and information on the project to the affected system owner and request that an affected system study be completed and scope, costs, and lead times of any upgrades required on the affected system be provided. Once Consumers Energy receives the affected system study results from the affected system owner, the results will be incorporated into the Consumers Energy study report, and the hold will be removed from the Project and the interconnection timelines will resume. If the Project is part of a batch study, the rest of the batch study will continue to progress even if a Project is in on hold status due to an affected system study. If feasible the Project with the affected system study can rejoin the batch once the affected system study is complete.

Interconnection and Operating Agreement

A level 1, 2, and 3 interconnection agreement or a level 4 and 5 interconnection agreement will be provided to the Applicant in this stage dependent on Project level. An Applicant shall pay the actual cost of the interconnection facilities and distribution upgrades, subject to R 460.964 (8).

Level 1, 2, or 3 Projects Only

For level 1, 2, or 3 Projects, where no construction of interconnection facilities or distribution upgrades is required, Consumers Energy will provide its standard level 1, 2 and 3

interconnection agreement to the Applicant within 3 business days of reaching this stage. If construction of interconnection facilities or distribution upgrades is required, Consumers Energy will provide its standard level 1, 2 and 3 interconnection agreement with modifications to address required construction activities, construction milestone timing, and cost to the Applicant within 5 business days of reaching this stage. The Applicant and Consumers Energy will mutually agree on the timing of construction milestones.

The applicant shall sign and return the interconnection agreement with payment, if applicable, within 20 business days of receiving the agreement. If this deadline is missed, the Applicant will be informed of the missed deadline and granted an extension of 15 business days. If the interconnection agreement and payment are not received during the 15-business-day extension, Consumers Energy may consider the interconnection application withdrawn.

Consumers Energy will countersign and provided a completed copy of the interconnection agreement within 10 business days of the Applicant returning the signed interconnection agreement.

Level 4 or 5 Projects Only

For level 4 or 5 projects, Consumers Energy will provide its level 4 and 5 interconnection agreement within 10 business days of reaching this stage. When construction interconnection facilities or distribution upgrades is necessary, the level 4 and 5 interconnection agreement will contain either timelines for completion of activities and estimates of construction costs or a timetable when these requirements can be determined. The interconnection agreement will include a payment schedule that corresponds to the milestones established.

The Applicant shall sign and return the interconnection agreement with payment, if applicable, within 30 business days of receiving the agreement. If this deadline is missed, the Applicant will be informed of the missed deadline and granted an extension of 15 business days. If the interconnection agreement and payment are not received during the 15-business-day extension, Consumers Energy may consider the interconnection application withdrawn.

Consumers Energy will countersign and provided a completed copy of the interconnection agreement within 10 business days of the Applicant returning a mutually agreed-upon and signed interconnection agreement.

Inspection, Testing, and Commissioning

The Applicant is required to notify Consumers Energy when the installation of a Project and any required local code inspection and approval is complete. The Applicant is also required to provide any test reports or configuration documents as defined in the standard level 1, 2, and 3 interconnection agreement or level 4 and 5 interconnection agreement.

Consumers Energy will review the Applicant's inspection, test reports, or configuration documents and communicate its intent to perform a witness or commissioning test, or waive its rights to perform a witness test and commissioning test, within 10 business days.

If Consumers Energy intends to witness or perform commissioning test, it must do so within ten business days of receiving the notification from the Applicant for level 1, 2, and 3 projects. For level 4 and 5 projects, the tests must be performed within a mutually agreed upon timeline.

If Consumers Energy waives its right to visit the site and inspect the Project or perform the commissioning tests, it will provide a written waiver to the Applicant within 10 days of receiving notice. The Applicant shall provide Consumers Energy with the completed commissioning test report within 20 business days of receipt of this waiver.

If Consumers Energy attempts to conduct the inspection and testing at the arranged time and is unable to access the Project or complete the testing, the Project must remain disconnected until the Applicant and Consumers Energy can complete the inspection and testing.

If Consumers Energy witnessed or performed commissioning tests and inspected the Project, within 5 business days of receipt of the completed commissioning test report, Consumers Energy will notify the Applicant it has accepted or rejected the commissioning test report and if it has found the site to be satisfactory. If the commissioning test is accepted and the site is found satisfactory, Consumers Energy will notify the Applicant, and the Project will proceed to Authorization to Operate in Parallel.

If Consumers Energy waived its right to witness or perform commissioning tests and inspect the Project, within 5 business days of receipt of the completed commissioning test report, Consumers Energy will notify the Applicant it has accepted or rejected the commissioning test report. If the commissioning test is accepted, Consumers Energy will notify the Applicant, and the Project will proceed to Authorization to Operate in Parallel.

If Consumers Energy rejects a commissioning test or finds a site unsatisfactory, it will provide its reasons for doing so in writing, and the Applicant has 20 business days to implement corrections. The Applicant, after taking corrective action, shall request Consumers Energy to reconsider its findings. Do note that the Applicant may be billed the actual cost of any re-inspections.

If the Applicant does not notify Consumers Energy that the Project is installed and ready to test, Consumers Energy may, in writing, query the status of the Project. If the Applicant does not provide a written response within 10 business days or no progress is evident, Consumers Energy may consider the Project withdrawn.

Authorization to Operate in Parallel

Consumers Energy will provide the Applicant with written authorization to operate in parallel with Consumers Energy within five business days of all of the following conditions being met:
Consumers Energy notified the Applicant that the commissioning test and inspection, where applicable, are accepted.
The Applicant complied with all applicable parallel operation requirements as set forth in these procedures and the applicable interconnection agreement.
The Applicant complied with all applicable local, state, and federal requirements.
Consumers Energy has received payment in full for all outstanding bills.

With this written authorization, the Project is considered approved for parallel operation, the Project may begin operating, and the Applicant is considered an interconnection customer.

The Applicant shall not operate its Project in parallel with Consumers Energy's distribution system without prior written permission to operate from Consumers Energy. Subject to reasonable timing and other conditions, including completion of conditions in the applicable interconnection agreement or these procedures, Consumers Energy will allow for reasonable, but limited, testing before written authorization has occurred.

Material Modification Process

In the event of a change to the Project design any time after receiving notification by Consumers Energy of a complete interconnection application, the Applicant will be required to submit a

revised interconnection application, including the associated fee, detailing the proposed changes to Consumers Energy for review. The Application Review section above details the process by which Consumers Energy will review this application. At such a time when the revised interconnection is deemed complete by Consumers Energy, Consumers Energy will determine whether the proposed changes constitute a Material Modification and, if so, whether any further restudy is required. If further restudy is required, the Applicant shall notify Consumers Energy whether it will withdraw the proposed changes or continue with the restudy, at the associated fee, within 10 business days of being notified of the determination or Consumers Energy may withdraw the application.

A Material Modification is a modification to the DER nameplate rating, electrical size of components, bill of materials, machine data, equipment configuration, or the interconnection site of the DER at any time after receiving notification by the electric utility of a complete interconnection application. Examples of modifications that are not material would be like-for-like equipment changes including inverters with the same nameplate rating and electrical characteristics.

All Material Modifications need to be reviewed by Consumers Energy to determine if they are acceptable without further or additional study as written above. Each Material Modification must be reviewed by Consumers Energy on a case-by-case basis. A non-exhaustive list of example Material Modifications that may or may not require additional study are listed below.

Material Modifications that would be acceptable and typically would not require re-study:

- Inverter Changes
    - DER Capacity remains unchanged (a small change in total output may be allowed depending on connection type and/or previous study results)
    - The number of inverters changes, but the total DER Capacity remains the same
    - A small change in total DER Capacity may be allowed depending on connection type and/or previous study results)
- Small Transformer Changes (base rating remains unchanged)
    - Minor Impedance change (evaluated on a case by case basis, dependent on connection type and/or previous study results)
    - X/R Ratio change only
- Changes to collector system cable lengths (conductor type/size remains unchanged)
    - Small change in lengths (evaluated on a case by case basis, dependent on connection type and/or previous study results)
- Small relocation of the point of interconnection (evaluated on a case by case basis)

Material Modifications that would typically require re-study to determine acceptability:

- Inverter Changes (other than above)
- Collector System Re-Design
    - System Voltage Change
    - Number of Transformation Levels change
- Transformer base rating or impedance change (other than above)
- Collector system cable changes (other than above)
- Relocation of the point of interconnection (other than above)

If a Project must be restudied as a result of a Material Modification, and the Project can remain in the same track, all screens and studies that may need to be reperformed will be completed on an expedited basis where possible.

If a Project in a batch study submits a request for a Material Modification review prior to the conclusion of the system impact study, the rest of the batch study will continue to progress, and Consumers Energy will expedite any required restudy to incorporate the Material Modification to

the Project. If the request for a Material Modification review occurs after the conclusion of the system impact study, and further restudy is required, Consumers Energy may require that the project be moved to the next batch or an individual study as appropriate.

OPERATIONAL PROVISIONS

If a Contact List (Appendix G) is required, the Applicant is required to notify Consumers Energy prior to synchronizing to and prior to scheduled disconnection from the electric system.

The Project may not commence parallel operation until approval has been given by Consumers Energy. The completed installation is subject to inspection by Consumers Energy prior to approval. Preceding this inspection, all contractual agreements must be executed by the Applicant.

Disconnection

Consumers Energy may refuse to connect, or may disconnect, a project from the distribution system if any of the following conditions apply:

a. Lack of written authorization from Consumers Energy to interconnect or fully executed Generator Interconnection and Operating Agreement
b. Termination of interconnection by mutual agreement
c. Noncompliance with technical or contractual requirements in the Generator Interconnection and Operating Agreement, after 30 business days of notification is provided to the Applicant of the technical or contractual deficiency that does not degrade the reliability of the distribution system, electric utility equipment, and electric customers' equipment or presents a safety hazard.
d. Electric distribution system emergency
e. Routine maintenance, repairs, and modifications, performed in a reasonable time with prior notice.
f. Other material noncompliance with technical or contractual requirements in the Generator Interconnection and Operating Agreement.

Consumer Energy may require disconnection of a Project from the distribution system for the above conditions, which may include but is not limited to the following examples:

a. When public safety is being jeopardized.
b. During voltage, frequency, or loading problems.
c. When abnormal sectionalizing or circuit configuration occurs on the Consumers Energy system.
d. During scheduled shutdown of Consumers Energy equipment that are necessary to facilitate maintenance or repairs.
e. In the event there is demonstrated electrical interference (i.e. Voltage Flicker, Harmonic Distortion, etc.) to Consumers Energy customers, suspected to be caused by the Project, and such interference exceeds then current system standards, Consumers Energy 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 Consumers Energy standards

or generally accepted industry standards, then it shall be the responsibility of the Applicant to eliminate the interference problem.

f. When either the Project or its associated synchronizing and protective equipment fails or is demonstrated by Consumers Energy to be improperly maintained, so as to present a hazard to the Consumers Energy system or its customers.
g. Whenever the Project is operating isolated (islanded) with other Consumers Energy customers, for whatever reason.

Consumers Energy may disconnect electric service in order disconnect a Project from the electric system, pursuant to R 460.136.

Maintenance and Testing

Consumers Energy reserves the right to test the relaying and control equipment that involves protection of the Consumers Energy electric systemwhenever Consumers Energy determines a reasonable need for such testing exists.

The Applicant is solely responsible for conducting and documenting periodic maintenance and testing on the generating equipment and its associated control, protective equipment, interrupting devices, and main Isolation Device[1], per manufacturer recommendations.

If protective relaying is required per the technical requirements, the Applicant is responsible for conductingand documenting periodic maintenance and testing every 4 years on relays and the associated interrupting devices, control schemes, and batteries, unless a written extension is provided by Consumers Energy. If testing is required, it shall be conducted in accordance with the test procedures providedby Consumers Energy as part of inspection testing

Consumers Energy reserves the right to witness the testing. The Applicant is responsible for maintaining written reports for the above tests for a period of four years. These written reports shall be made available to Consumers Energy upon request.

[1] Main Isolation Device – When required by Consumers Energy operating practices, a readily accessible, lockable, visible-break isolation device located between Consumers Energy and the Project.

TECHNICAL REQUIREMENTS

The following discussion details the technical requirements for interconnection of Level 1 & 2 Projects less than or equal to 150 kWac of generation[2]. For Projects within this capacity rating range, Consumers Energy has made a significant effort to simplify the technical requirements. This effort has resulted in adoption of IEEE Standard 1547-2018, Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces, being incorporated herein by reference.

Certain requirements, as specified by this document, must be met to provide compatibility between the Project equipment and the Consumers Energy electric system, and to ensure that the safety and reliability of the electric system is not degraded by the interconnection. Consumers Energy reserves the right to evaluate and apply newly developed protection and/or operation schemes at its discretion. All protective schemes and functions are evaluated for compliance to IEEE 1547. In addition, Consumers Energy reserves the right to evaluate Projects on an ongoing basis as system conditions change, such as circuit loading, additional generation placed online, etc.

Major Component Design Requirements

The data requested for all major equipment and relaying proposed by the Applicant, must be submitted as part of the initial interconnection application for review and approval by Consumers Energy. Consumers Energy may request additional data be submitted during the interconnection process to clarify the operation of the Project facilities.

Once installed, the interconnection equipment must be reviewed and approved by Consumers Energy prior to being connected to the Consumers Energy electric system and before parallel operation is allowed.

Data

The data that Consumers Energy requires to evaluate the proposed interconnection is documented on the generator interconnection application (Appendix D). A site plan and one-line diagram showing interconnection protection system details of the Project, are required as part of the application data. For Level 2 projects, the one-line diagram must be sealed by a professional engineer licensed in the state of Michigan or by an electrical contractor licensed in the state of Michigan with the electrical contractor's license number noted on the diagram. The generator manufacturer supplied data package should also be supplied.

Isolating Transformer(s)

No isolation transformer is required between the generator and the secondary distribution connection. If a transformer is utilized, the transformer shall meet the following requirements.

- The transformer shall comply with the current ANSI Standard C57.12.
- The transformer should have voltage taps on the high and/or low voltage windings sufficient to assure satisfactory generator operation over the range of voltage variation expected on the Consumers Energy electric system.

[2] Non-Certified Inverter based generation projects, synchronous and induction projects less than or equal to 150kWac are defined as Level 3 projects and are implemented under the Level 3 procedures and applications

- The transformer utility and Project side winding connections shall be selected using the following table. The transformer may have multiple project side windings.

PCC Voltage	System Configuration	Transformer Winding Connection		Special Requirements
		Utility Side	Project Side	
46 kV	Grounded Wye	Delta	No Preference	
		Grounded Wye	Delta	See Note 1
Below 46 kV	Grounded Wye	Grounded Wye	Ungrounded Wye	See Note 2
			Grounded Wye	See Note 3
	Delta	Delta	No Preference	

Table – Three Phase Transformer Winding Connections

Note 1: Requires the Project to be connected to its own dedicated line exit.

Note 2: Additional transformers connected to the Project side transformer winding cannot in combination with each other be a source of zero sequence current. For example, an ungrounded wye to delta transformer with the neutrals of both ungrounded wye transformer windings connected. The connection of the neutrals would cause the series combination of the grounded wye to ungrounded wye transformer and the ungrounded wye to delta transformer to mimic a grounded wye to delta transformer which is a source of zero sequence current.

Note 3: Additional transformers connected to the Project side transformer winding cannot be a source of zero sequence current. For example, the transformer may not be connected Grounded Wye (utility side) – Delta (Project side).

Isolation Device

When required by Consumers Energy operating practices, a readily accessible, lockable, visible-break isolation device will be located between Consumers Energy 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 Consumers Energy system.
- Must comply with current 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. Consumers Energy will provide maximum short circuit currents and X/R ratios for faults at the PCC, upon request.
- Must be operable and accessible by Consumers Energy at all times (24 hours a day, 7 days a week).

- The isolation device will be used as a protective tagging point. The device must have 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 Facilities

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

Any new interconnection facilities required to connect the Project to the Consumers Energy electric system will be constructed by Consumers Energy at the Applicant's expense. Consumers Energy may require new line construction to be terminated on a structure provided by the Applicant.

Termination Structure

The Applicant is responsible for ensuring that structural material strengths are adequate for all requirements. Upon written request, Consumers Energy will provide maximum dead-end line tension information. The structure shall adhere to the latest edition of the National Electric Safety Code (NESC) as adopted by the Commission..

Electrical clearances shall adhere to the latest edition of the NESC as adopted by the Commission and shall be coordinated with Consumers Energy.

The installation of disconnect switches, bus support insulators, and other equipment shall comply with accepted industry practices.

Surge arresters shall be selected to coordinate with the BIL rating of major equipment and rated for the application.

Inverters

Certified inverter Projects must use inverter(s) that conform to the IEEE 1547-2018 standard. In order to show compliance, a certificate of compliance from an OSHA approved national recognized testing laboratory must be submitted as part of the application and the manufacturer must mark the equipment such that a field inspection can verify the certification. The certification of compliance must clearly state the inverter has been tested to UL 1741 using IEEE 1547-2018 as the functional Source Requirement Document.

The inverters shall be certified to meet the following performance Categories.

1. Normal Operating Performance – Category B
2. Abnormal Operating Performance – Category III *

* The manufacturer is required to mark the abnormal operating category on the equipment.

If the requirements of this section are met, the inverter is deemed "certified" as defined within Appendix C.

Interconection Protection

The installation of a utility grade relaying is not required for certified inverter Projects. Any additional relaying which may be necessary to protect equipment at the Project is solely the responsibility of the Applicant to determine, design, and apply.

Automatic Reclosing

Consumers Energy employs automatic multiple-shot reclosing on most of the 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 Applicant 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 Consumers Energy equipment not rated or built to withstand this type of reclosing.

Consumers Energy will determine relaying and control equipment (e.g. volt check relays) that needs to be installed to protect its own equipment from out-of-phase reclosing. Installation of this protection will be undertaken by Consumers Energy at the expense of the Applicant. Consumers Energy 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

Consumers Energy 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 Applicant's expense.

Interconnection Protection Settings

Relay Setting Criteria

Utility-grade relay settings are generally not required for certified inverter Projects.

Inverter Setting Criteria

The Applicant is required to set the inverter to meet the default IEEE 1547-2018 requirements, including default settings to meet Category III shall trip, ride through, and frequency-droop (Freq-Watt) requirements.

Consumers Energy may request changes to settings, that impact the safety and reliability of the distribution electric system. Consumers Energy and the Project shall work together to implement any proposed setting changes.

Miscellaneous Operational Requirements

Miscellaneous requirements include synchronizing equipment, ramp rates, reclose blocking, reactive requirements, and system stability limitations.

Operating in Parallel

The Applicant will be solely responsible for the required synchronizing equipment and for properly synchronizing the Project with the Consumers Energy electric system. Voltage fluctuation at the PCC during synchronization is limited per IEEE 1547-2018.

The Project must be capable of controlling the output of active power (ramp rates) after synchronization to avoid issues on the Consumers Energy system, which includes but is not limited to voltage fluctuations, harmonics, or oscillations. The Project shall, upon request by Consumers Energy, modify the active power output characteristics to prevent such issues after synchronization.

The Project must be designed to prevent the Project from energizing into a de-energized Consumers Energy line. The Project's circuit breaker or contactor must be blocked from closing in on a de-energized Consumers Energy distribution system.

Voltage and Frequency Ride Through

Certified inverter Projects are required to meet ride through requirements by implementing the inverter setting criteria defined within these procedures.

All under/over voltage and under/over frequency protective functions installed by the Applicant or Consumers Energy are required to coordinate with ride through requirements.

Reactive Power Control Capability and Voltage Control

The Project shall be designed to be capable of maintaining a continuous rated power output for the export portion of the Project, at a power factor within the range of 0.9 (inject) to 0.9 (absorb) for inverter based Projects.

The Applicant shall control voltage at the PCC in accordance with instructions (e.g. voltage or reactive power schedule) provided by Consumers Energy. Inverter based Projects shall be certified, to be capable of controlling the voltage level at the export portion of the Project using the control modes specified in the following table. The Applicant may request measurement data from the Consumers Energy metering in order to control the voltage at the PCC.

Control Mode
Specified Power Factor (SPF)
Voltage-Reactive Power (Volt-VAr)
Active Power- Reactive Power (Watt-Var)
Constant Reactive Power
Voltage-Active Power (Volt-Watt)

Consumers Energy 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 Applicant 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 Project Facilities.

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

Revenue Metering Requirements

Consumers Energy will own, operate, and maintain all required billing metering equipment. If the Applicant is electring to parcipate in the Distributed Generation program, Consumers Energy shall provide a meter or meters capable of measuring the flow of energy in both directions at no additional charge to a distributed generation program customer.

Non-Export Projects

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

Export Projects

The billing metering may need to be replaced. A dedicated data Communication Circuit is required to allow remote access to the billing meter by Consumers Energy.

The Applicant shall provide Consumers Energy access to the premises at reasonable times to install, turn on, disconnect, inspect, test, read, repair, or remove the metering equipment. The Applicant 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 Level 2 Projects, a minimum of two meters will be required; one at the PCC, and one at the generator. 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.

Consumers Energy shall supply to the Applicant 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. Consumers Energy will endeavor to coordinate the delivery of these materials with the Applicant’s installation schedule during normal scheduled business hours.

The Applicant may be required to provide a mounting surface for the metering equipment. The mounting surface and location must meet Consumers Energy specifications and requirements.

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

Communication Requirements

Communication Interface

A Communication Interface allows for the exchange of data between the Consumers Energy and the Project. A Communication Interface is generally not required.

Communication Circuits

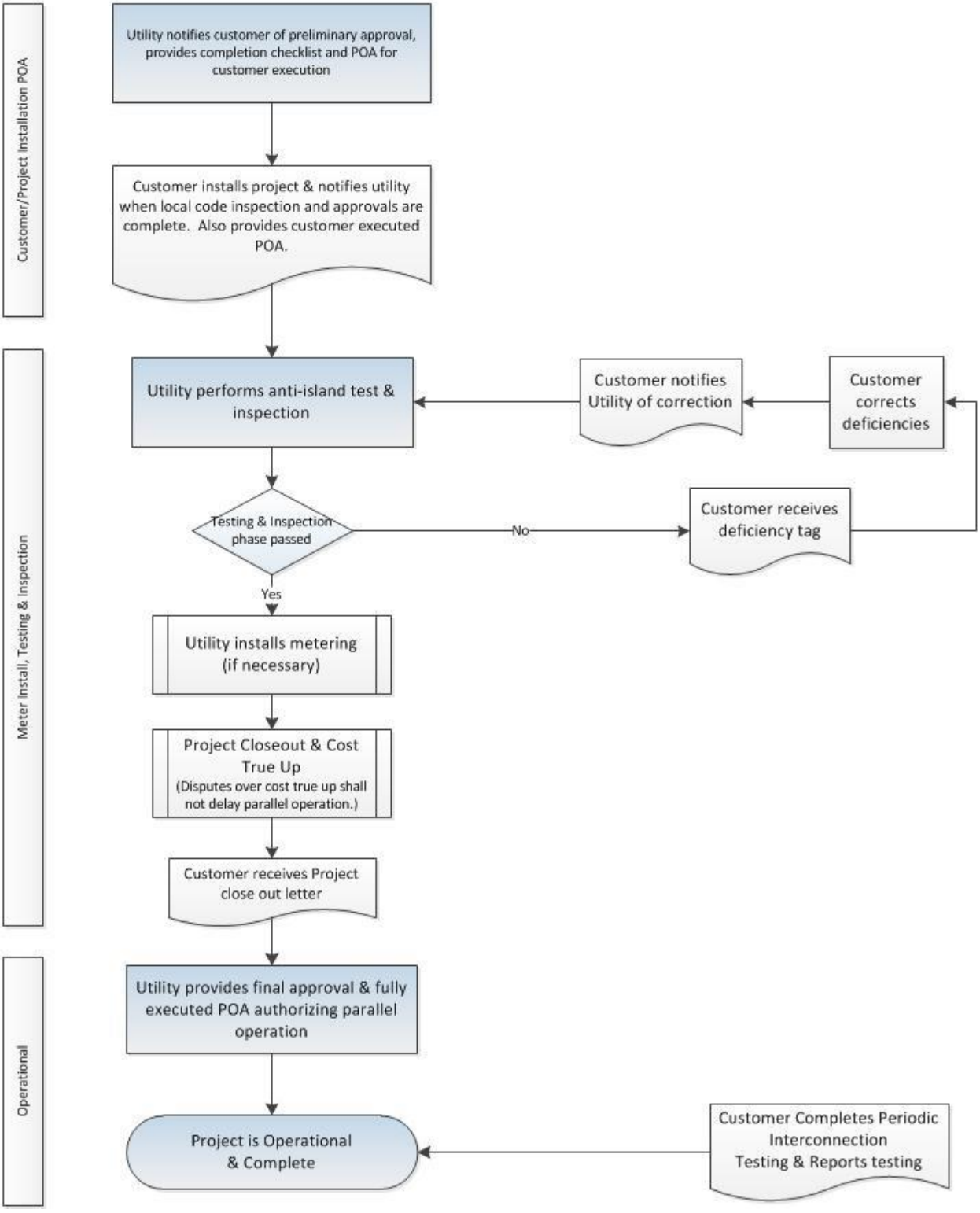
Data Communication Circuits allow for the remote exchange of data between Consumers Energy and equipment located at the Project. Metering generally requires the use of data Communication Circuits. The Applicant is responsible for all costs including but not limited to materials, installation, operating, telecommunication, maintenance, cancellation fees and monthly charges for the data Communication Circuits.

Consumers Energy will determine the quantity and type (e.g. cellular, fiber, copper, radio) of the data Communication Circuits required for the application. Consumers Energy is responsible for ordering and acquiring any leased data Communication Circuits required for the Project. In some cases, the Applicant maybe required by Consumers Energy to order and acquire the leased data Communication Circuits. Consumers Energy will provide information (e.g. costs, availability) regarding leased data Communication Circuits once made available by the telecommunication provider. Consumers Energy is not responsible for any delays caused by the telecommunication provider in providing such information or increased interconnection costs.

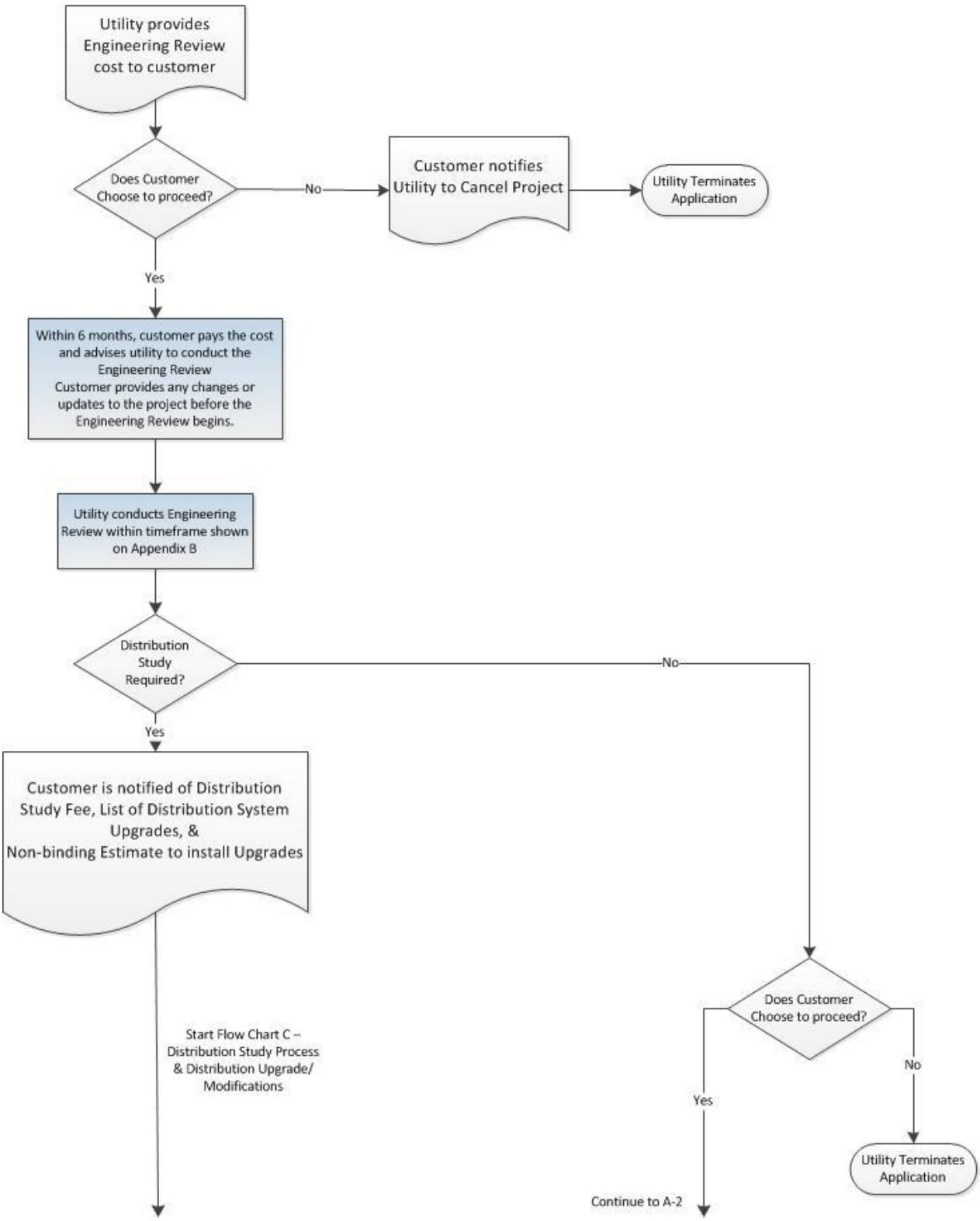
APPENDIX A

INTERCONNECTION PROCESS FLOW DIAGRAM

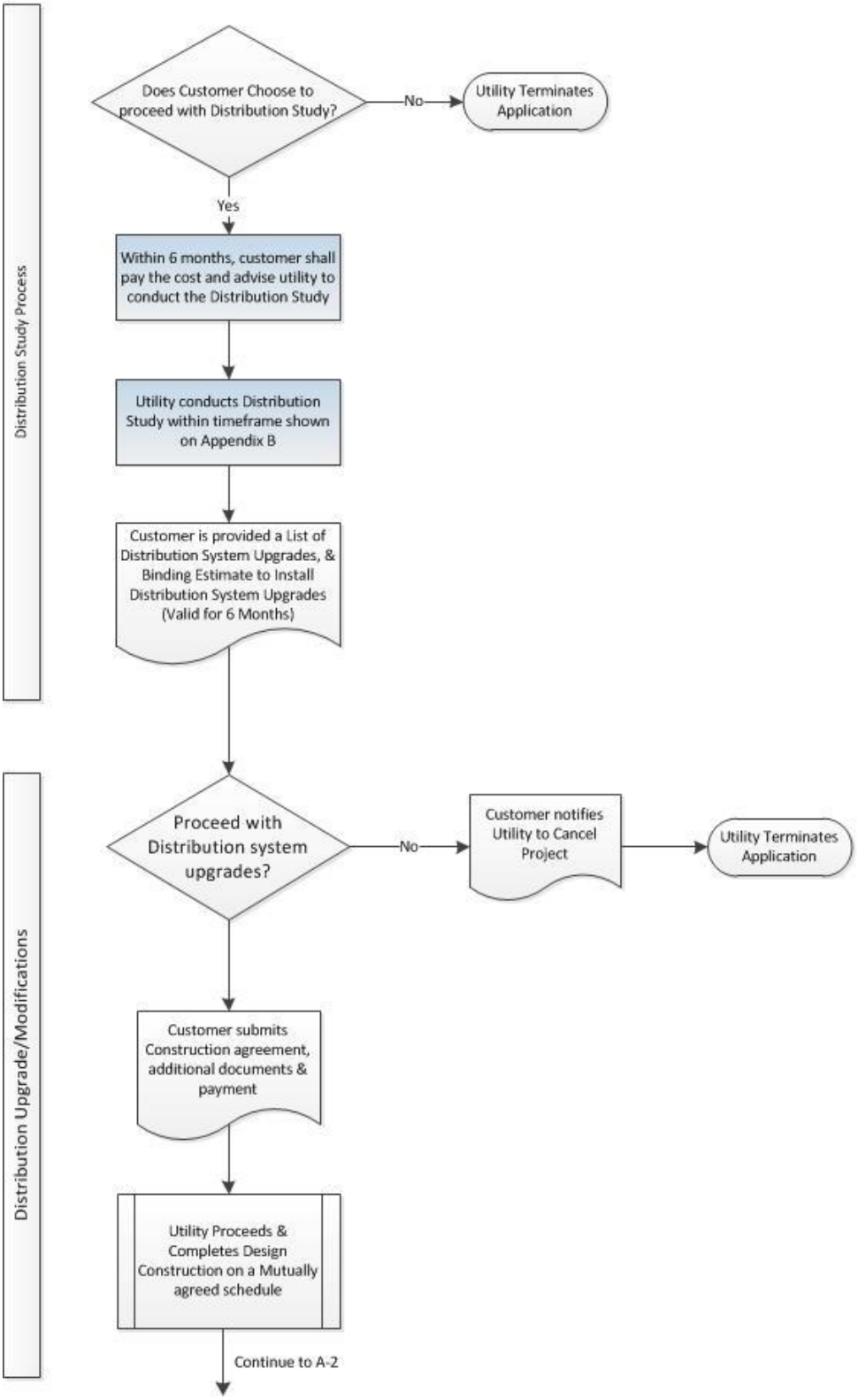
FLOW CHART A-2
Category 2 Projects – Non Affected System



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

COSTS AND TIMELINE

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	Propose 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 Review 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

PROCEDURE DEFINITIONS

Affected System:

AC: means alternating current at 60 Hertz.

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 1939 PA 3, MCL 460.10g.

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

Alternative electric supplier legacy net metering program plan: document supplied by an AES that provides detailed information to an applicant about the AES's legacy 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 legacy net metering program or distributed generation program. An applicant is not required to be an existing customer of an electric utility. An electric utility is considered an applicant when it submits an interconnection application for a DER that is not a temporary DER.

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.

Business days: Monday through Friday, starting at 12:00:00 a.m. and ending at 11:59:59 p.m., excluding the following electric utility holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, Christmas Day, and New Year's Eve, and any day in which electric service is interrupted for 10% or more of an electric utility's customers.
Certified: An inverter-based system has met acceptable safety and reliability standards by a nationally recognized testing laboratory in conformance with IEEE 1547.1-2020 and the UL 1741 2020 edition.

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 legacy net metering program or distributed generation 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.

DER Capacity: The aggregate capacity of the site in real power (W) using the nameplate rating in AC.

Site: A contiguous site, regardless of the number of meters at that site. A site that would be contiguous but for the presence of a street, road, or highway is considered to be contiguous for the purposes of these rules.

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.

Eligible electric generator: A methane digester or renewable energy system with a generation capacity limited to the customer's electrical need and that does not exceed the following:

- 150 kWac of aggregate generation at a single site for a renewable energy system
- 550 kWac of aggregate generation at a single site for a methane digester

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.

High Voltage Distribution: The distribution system that operates at a voltage of 25,000 Volts or greater, not including transmission facilities.

Export: An installed electric generation project which operates in parallel with the 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: IEEE "Standard for Interconnecting and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces".

IEEE 1547.1: IEEE "Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources with Electric Power Systems Interfaces".

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

Level 1: A certified project of 20kW AC or less.

Level 2: A certified project of greater than 20 kW AC and not more than 150 kW AC.

Level 3: A non-certified project 150 kW AC or less or a project of greater than 150 kW AC and not more than 550 kW AC.

Level 4: A project of greater than 550 kW AC and not more than 1 MW AC.

Level 5: A project of greater than 1 MW AC.

Low Voltage Distribution: The distribution system that operates at a voltage of 2,400 Volts or greater but less than 25,000 Volts.

Material modification: A modification to the DER nameplate rating, electrical size of components, bill of materials, machine data, equipment configuration, or the interconnection site of the DER at any time after receiving notification by the electric utility of a complete interconnection application. For the proposed modification to be considered material, it shall have been reviewed and been determined to have or anticipated to have a material impact on 1 or more of the following:

(i) The cost, timing, or design of any equipment located between the point of common coupling and the DER.
(ii) The cost, timing, or design of any other application.
(iii) The electric utility's distribution system or an affected system.
(iv) The safety or reliability of the distribution system.

Methane digester: A renewable energy system that uses animal or agricultural waste for the production of fuel gas that can be burned for the generation of electricity or steam.

MW: megawatt

Nameplate rating: The manufacturer rating at which a DER is capable of sustained operation, including nominal voltage (V), current (A), maximum real power (W), apparent power (VA), and reactive power (VAr). The nameplate rating may not be de-rated using protection or control systems.

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

Non-Export: An installed electric generation project which operates in parallel with the electric utility with a relay protection scheme and isolating device preventing energy flow back to the utility.

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 premise or group of premises that deliver electric power to the load (electric utility customer).

Project: Electrical generating equipment and associated that are not owned or operated by an electric utility.

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).

Site: Means a contiguous site, regardless of the number of meters at that site. A site that would be contiguous but for the presence of a street, road, or highway is considered to be contiguous.

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

UL: Underwriters Laboratory

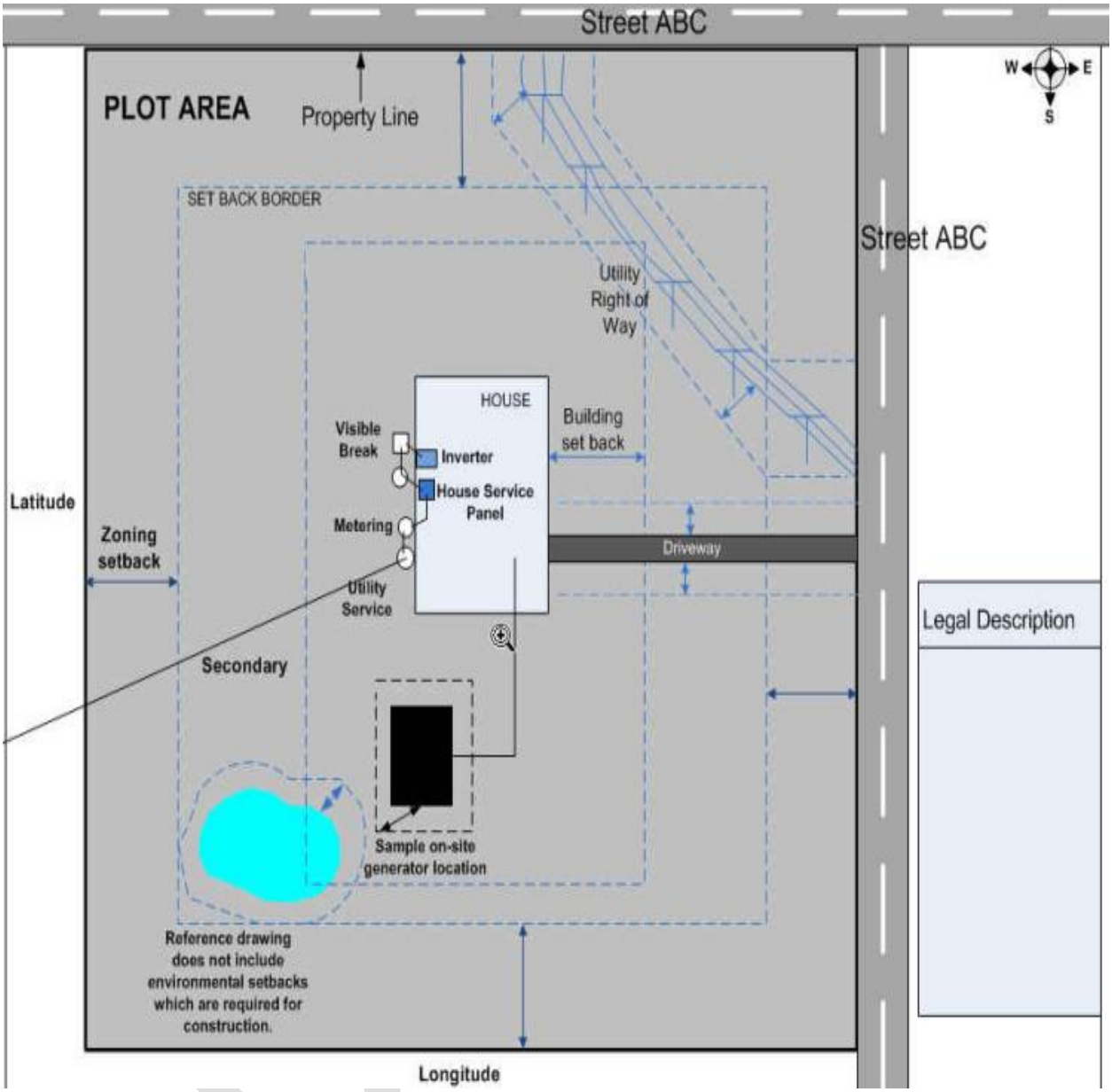
UL 1741: The 'Standard for Safety of Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources'.

APPENDIX D

INTERCONNECTION APPLICATION

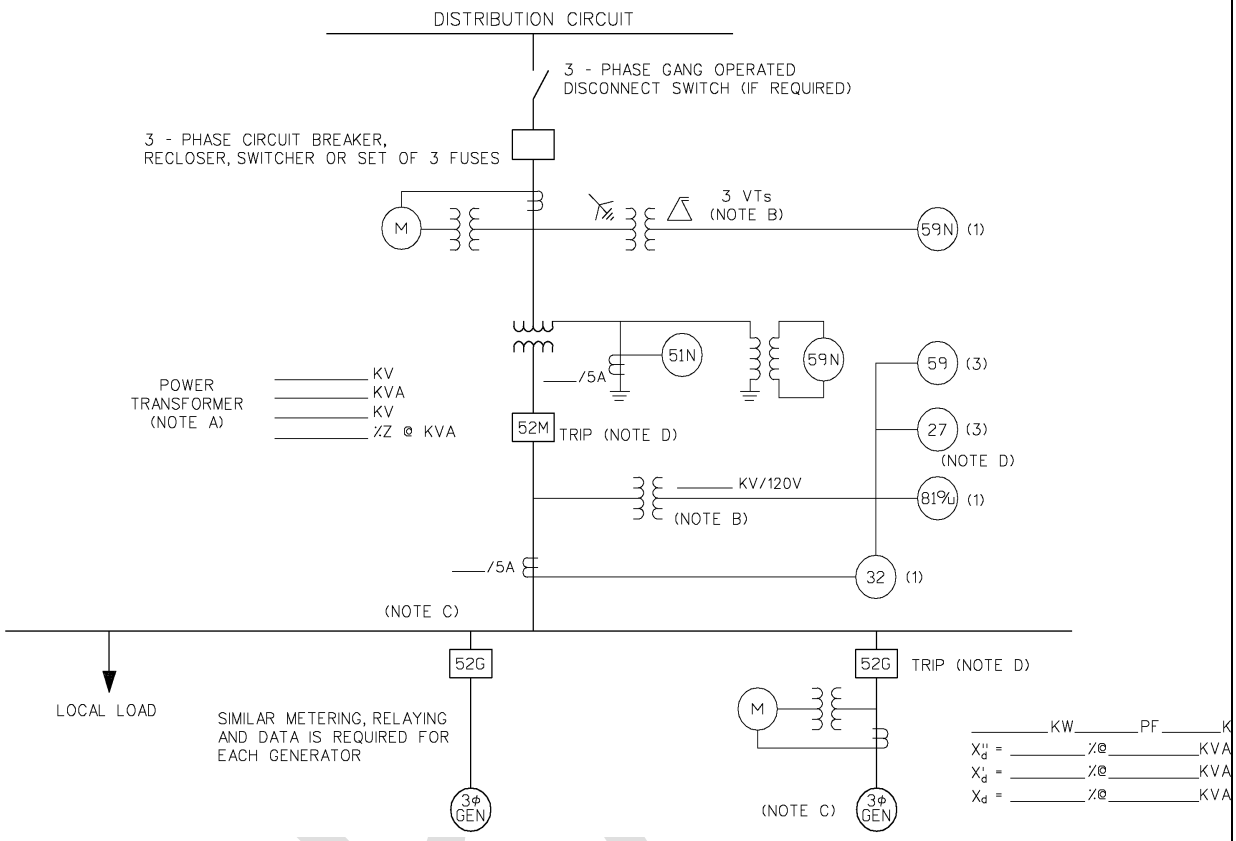
[INSERT APPLICATION]

SAMPLE SITE PLAN



SAMPLE ONE-LINE FOR SYNCHRONOUS PROJECTS

ONE-LINE DIAGRAM TYPICAL ISOLATION AND FAULT PROTECTION FOR SYNCHRONOUS GENERATOR INSTALLATIONS



LEGEND

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

NOTES

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

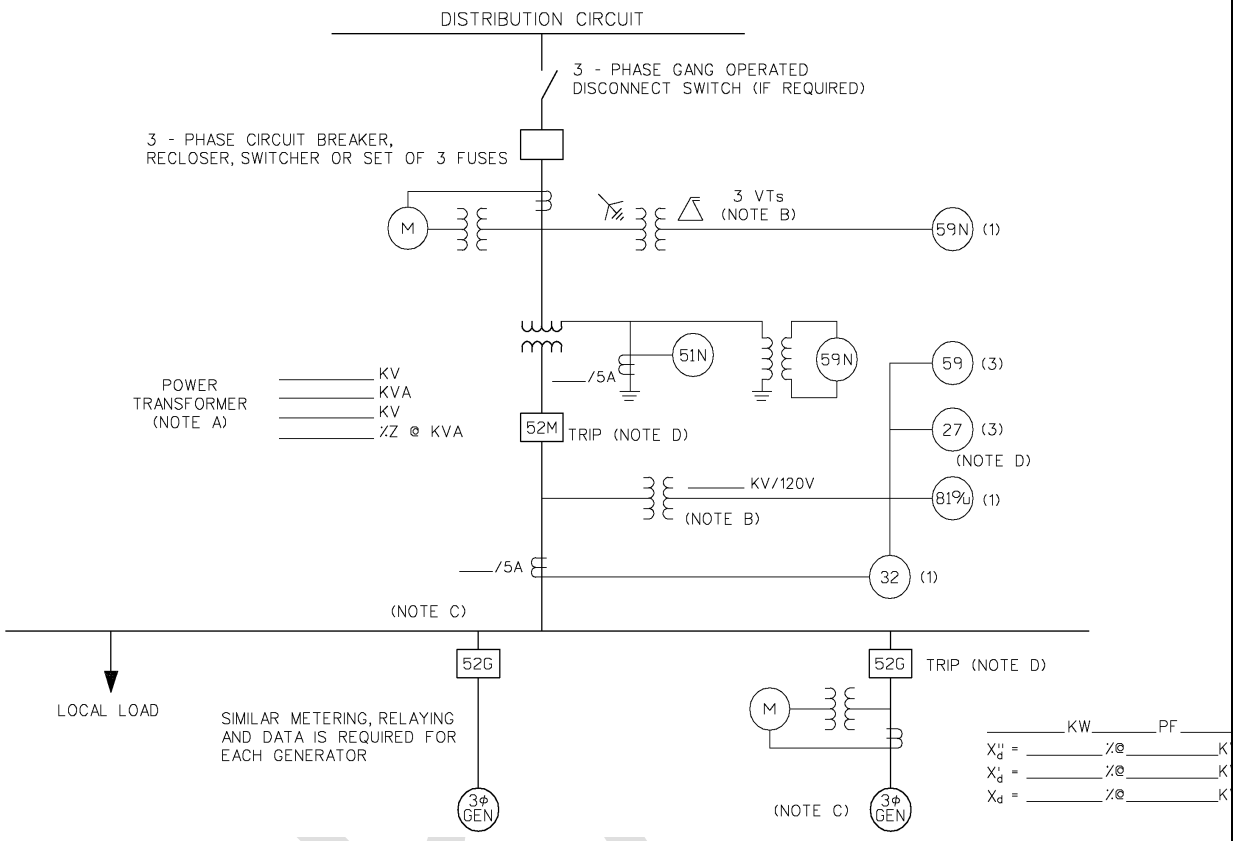
B) Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VTs for 59, 27, 81o/u and 32 are shown connected to the primary (Project side) of the power transformer,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

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

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

SAMPLE ONE-LINE FOR INDUCTION PROJECTS

ONE-LINE DIAGRAM TYPICAL ISOLATION AND FAULT PROTECTION FOR INDUCTION GENERATOR INSTALLATIONS



LEGEND

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

NOTES

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

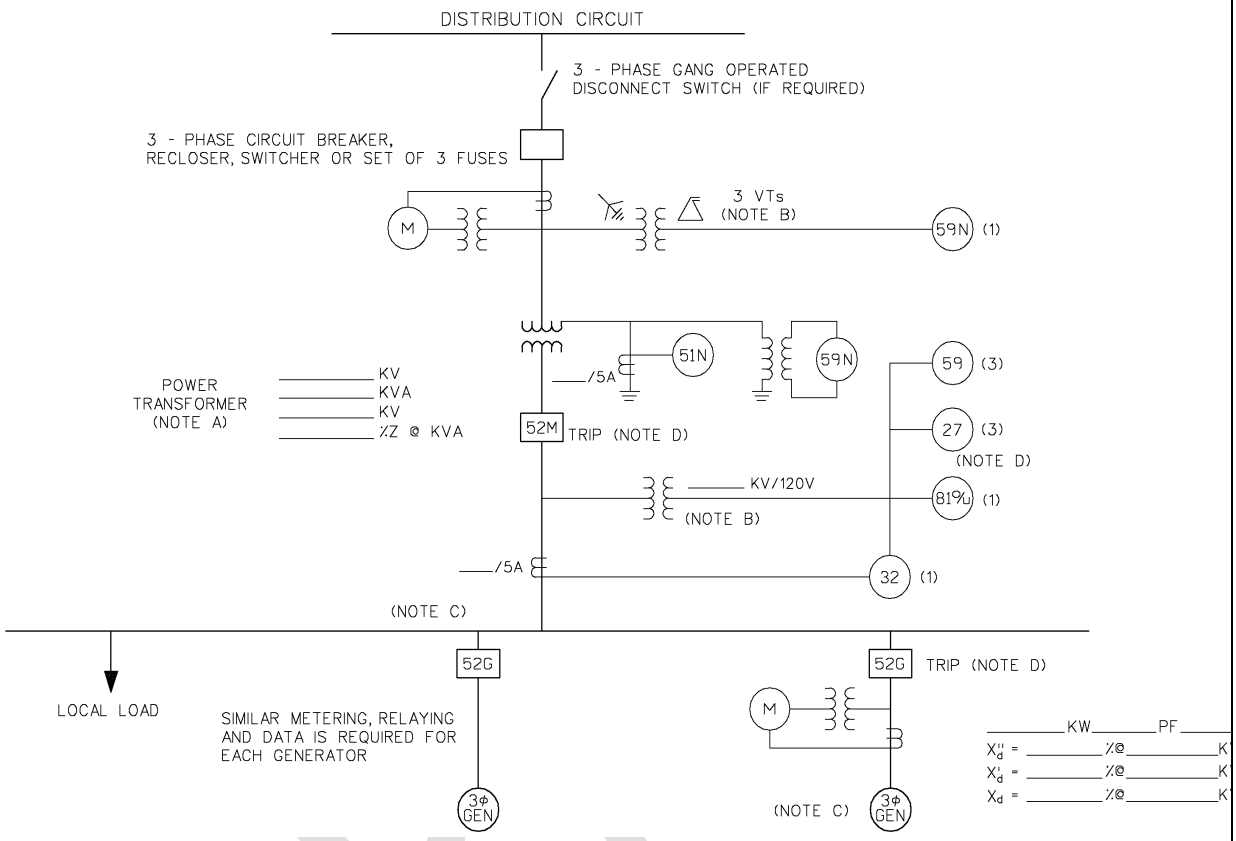
B) Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VTs for 59, 27, 81o/u and 32 are shown connected to the primary (Project side) of the power transformer,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

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

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

SAMPLE ONE-LINE FOR INVERTER PROJECTS

ONE-LINE DIAGRAM TYPICAL ISOLATION AND FAULT PROTECTION FOR INVERTER GENERATOR INSTALLATIONS



LEGEND

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

NOTES

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

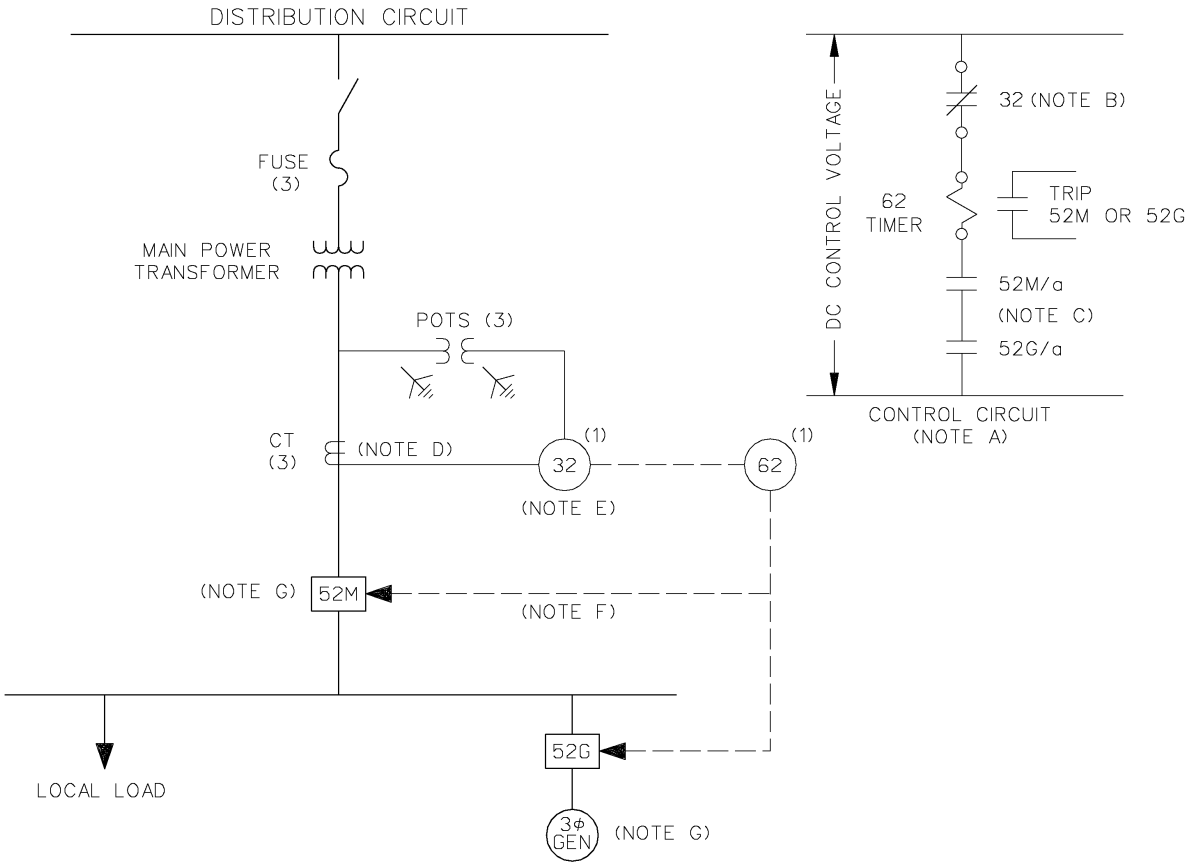
Protection alternatives for the various acceptable transformer connections are shown. Only one protection alternative will ultimately be used, depending on the actual transformer winding connections. VTs for 59, 27, 81o/u and 32 are shown connected to the primary (Project side) of the power transformer,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

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

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

SAMPLE ONE-LINE DIAGRAM FOR NON-EXPORT PROJECTS

ONE-LINE DIAGRAM & CONTROL SCHEMATIC
TYPICAL ISOLATION PROTECTION FOR NON-EXPORT INSTALLATIONS



LEGEND

32 REVERSE POWER (NOTE E)

62 TIMER FOR 32

NOTES

A) SCHEME TO BE USED ONLY WITH NO NORMAL POWER FLOW TO THE UTILITY SYSTEM.

B) CONTACT OF 32 RELAY OPENS FOR MINIMAL POWER FLOW INTO IOG LOAD BUS & CLOSES EITHER FOR POWER FLOW INTO THE UTILITY OR NO POWER FLOW INTO THE IOG LOAD BUS.

C) BREAKER AUXILIARY CONTACTS ARE REQUIRED TO INTERLOCK OPERATION.

D) RATIO OF CTs TO BE DETERMINED FOR EACH SPECIFIC CASE.

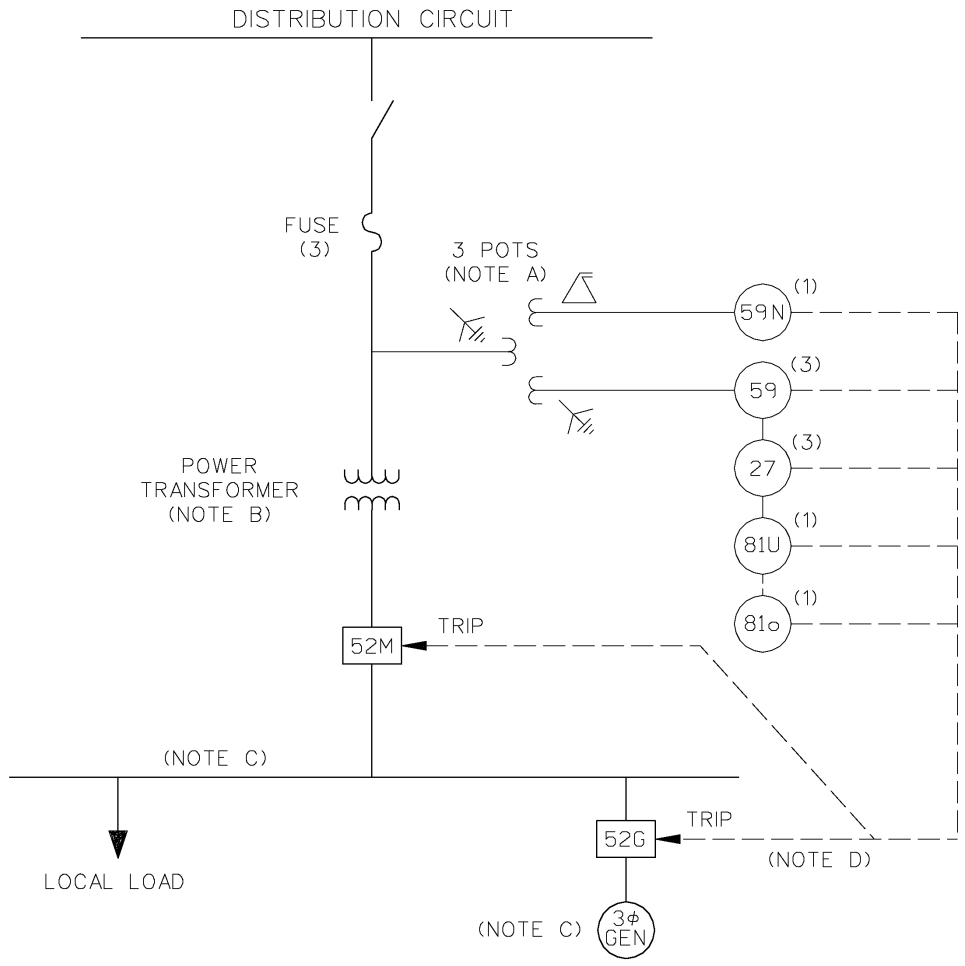
E) DEVICE 32 MAY BE EITHER THREE-PHASE OR THREE SINGLE-PHASE RELAYS. TO BE DETERMINED BY THE UTILITY.

F) TRIP OF EITHER BREAKER IS ACCEPTABLE.

G) MAIN BREAKER PROTECTION, GENERATOR PROTECTION AND SYNCHRONIZING EQUIPMENT ARE NOT SHOWN.

SAMPLE ONE-LINE DIAGRAM FOR EXPORT PROJECTS

ONE-LINE DIAGRAM TYPICAL ISOLATION AND FAULT PROTECTION FOR EXPORT INSTALLATIONS



LEGEND

27	**UNDERVOLTAGE**
59	**OVERVOLTAGE**
59N	**ZERO SEQUENCE OVERVOLTAGE (ASSUMING UNGROUNDED PRIMARY ON POWER TRF.)**
81U	**UNDERFREQUENCY**
81O	**OVERFREQUENCY**

NOTES

A) LOCATION OF POTENTIAL TRANSFORMERS IS ON THE HIGH SIDE OF THE POWER TRANSFORMER IF A 59N IS REQUIRED.

B) TRANSFORMER CONNECTION AND PRIMARY GROUNDING TO BE APPROVED BY THE UTILITY.

C) MAIN BREAKER PROTECTION, GENERATOR PROTECTION AND SYNCHRONIZING EQUIPMENT ARE NOT SHOWN.

D) TRIP OF EITHER BREAKER IS ACCEPTABLE, DEPENDING UPON WHETHER THE IOG WANTS TO SERVE ITS OWN ISOLATED LOAD AFTER LOSS OF UTILITY SERVICE. IF GENERATOR IS SYNCHRONOUS, THE FIELD SHOULD ALSO BE TRIPPED.

APPENDIX G

Sample Periodic Interconnection Test Log

IEEE 1547 Periodic test and verifications: 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 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 (electrically closing).

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