HOLY CROSS ENERGY

January 2020

DISTRIBUTED GENERATORS and ENERGY STORAGE SYSTEMS INTERCONNECT POLICY
Generating Facilities
Less than 20MW

Document Contains two sections: Procedure and Guidelines

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DISTRIBUTED GENERATOR and ENERGY STORAGE SYSTEMS INTERCONNECT (PROCEDURE)

(PROCEDURE)

The following Generator Interconnect Procedure (Procedure) shall apply to:

- Interconnect new Distributed Generation (DG) facilities with an alternating current (AC) generator aggregated on the customer side of Point of Common Coupling (PCC) including eligible renewable energy resources applying for connection to the Holy Cross Energy (Holy Cross) System.

- Interconnect new Energy Storage System (ESS) facilities with an AC inverter(s)/converter(s) aggregated on the customer side of the PCC that may be stand-alone system or combined with existing or new DG, however, maximum export capacity onto the utility distribution system is capped at an AC nameplate rating and/or AC inverter(s)/converter(s) nameplate; and,

- Review any modifications affecting the interface at the PCC to existing DG and/or ESS facilities that are interconnected with the Holy Cross System.

This guide is intended to be consistent with the requirements of the current version of IEEE Standard 1547. "Standard for Interconnecting Distributed Resources with Electric Power Systems", Federal, State, and Local regulations, and accepted industry practices and standards. It is intended as a supplement to the PUC and the IEEE for installation and interconnection of DG and ESS system on Holy Cross' electrical distribution system.

In general, the DG and/or ESS System and associated facilities must be designed in accordance with, but not limited to, UL (Underwriters Laboratories) Standards, IEEE (Institute of Electrical and Electronics Engineers) Standards, NEC (National Electrical Code), NESC (National Electrical Safety Code). Particular attention should be paid to the latest versions of UL 1741, IEEE 519, and IEEE 1547.

DG and/or ESS review level will be based upon the combination of the onsite DG AC rated capacity and the onsite ESS nameplate AC capacity for the selected operating mode which for the ESS include charging the ESS from an on-site renewable energy source that is net-metered, non-export requirements, or stand-alone storage systems. The operating modes will be part of the Interconnection Agreement requirements and any change in operating modes, or firmware or software updates to the ESS control system which impacts operating modes, may require another review of the facility interconnection and possible mitigations.

It is highly encouraged to submit one (1) Interconnection Agreement if an ESS is installed at the same time as the DG. For installations with stand-alone ESS, Interconnection Agreements with Holy Cross are not required if the ESS is compliant with NEC 702, obtains an appropriate safety inspection, and can provide verifiable proof that those systems cannot operate in parallel with the Holy Cross system.

Holy Cross does not allow parallel ESS to discharge into the Holy Cross System without enrollment in a Holy Cross program and established communications and proof of controls to Holy Cross's Dispatch Center, nor does Holy Cross allow energy delivery from Vehicle to Grid (V2G) interconnections.

Holy Cross under a System Emergency may curtail resource operation in order to maintain balance on the system.

I. GENERAL OVERVIEW

Capitalized terms used within this document shall have the meanings specified in Attachment 1 (DEFINITIONS) of this document.

A. Applicability

1. This procedure shall apply to any request by an Interconnection Customer to interconnect Distributed Generation (DG) facility or Energy Storage System (ESS) with the Holy Cross System, as follows:

   a) An inverter-based DG and/or ESS that is Certified and has a rated capacity up to and including twenty-five (25) kW shall be evaluated under the **LEVEL 1 PROCESS**.

   b) An inverter-based DG and/or ESS that is Certified and has a rated capacity greater than twenty-five (25) kW and less than two (2) MW shall be evaluated under the **LEVEL 2 PROCESS**.

   c) A DG and/or ESS that has a rated capacity greater than or equal to two (2) MW but less than or equal to twenty (20) MW or a DG and/or ESS that is not Certified or fails to meet the Certification requirements for **LEVEL 1 PROCESS** or **LEVEL 2 PROCESS**, shall be evaluated under the **LEVEL 3 PROCESS**.

2. The Application shall be evaluated using the maximum AC rated capacity of the DG and/or ESS. If the Application is for an increase in capacity for an existing DG and/or ESS, the Application shall be evaluated on the basis of the new total capacity of the DG and/or ESS. If the Application is for a DG and/or ESS that includes multiple energy production devices at a site for which the Interconnection Customer seeks a single Point of Interconnection, the Application shall be evaluated on the basis of the aggregate capacity of the multiple devices.

3. Prior to submitting an Application, the Interconnection Customer shall consult with Holy Cross to determine whether the proposed interconnection is subject to this Procedure. Holy Cross shall respond within fifteen (15) Business Days.

4. As a condition of interconnection with Holy Cross' System, each Interconnection Customer shall comply with requirements to ensure infrastructure security, operational security, and reliability with respect to electric system equipment, operations, control hardware and software (cyber-security), as determined by Holy Cross and notified to Interconnection Customer or required by applicable law. Holy Cross shall take account of requirements and recommendations of the President's "Critical Infrastructure Protection Board" and best practice recommendations from the North American Electric Reliability Corporation (NERC) and the Public Utilities Commission (PUC). The Interconnection Customer shall provide all security measures required by Holy Cross.

B. Pre-Application

1. Holy Cross, through its Power Supply Department, will provide information about

the Application process and Holy Cross' System upon request from a Interconnection Customer accompanied by a description of a proposed project and project site.

2. Contact information shall be made available on Holy Cross' website (http://www.holycross.com).

3. System information for specific project locations provided to the Interconnection Customer may include relevant system studies, interconnection studies, and other information Holy Cross deems useful in determining a Point of Interconnection on the Holy Cross System.

4. Holy Cross shall not be required to provide information to the Interconnection Customer that is proprietary or confidential. All design, operating specifications, and metering data provided by the Interconnection Customer shall be deemed confidential information to the extent so marked or designated in writing by the Interconnection Customer. Confidential information does not include information previously required to be publicly submitted or disclosed to governmental authorities (after notice to the other Party and after exhausting any opportunity to oppose such publication or release), or necessary to be disclosed in an action to enforce any agreement, including an Interconnection Agreement, entered into between Holy Cross and the Interconnection Customer.

5. Holy Cross may at its option, or upon request of an Interconnection Customer, conduct a pre-application conference, at which information provided to the Interconnection Customer and information to be provided by the Interconnection Customer in the Application may be reviewed informally.

C. Application Contents

1. The Interconnection Customer shall submit an Application to Holy Cross as required in this Procedure, together with the processing fee or deposit specified in the Application.

2. The Application shall include the following information: description of project equipment and specifications; project design drawings; site plan/layout; photos of existing components, including but not limited to main service meter and existing external disconnect; evidence of site control; Certification of the facilities (in Accordance with Attachments 2 and 3, if applicable); list of required permits and approvals; contact information for the Interconnection Customer; and such other information as Holy Cross shall have advised the Interconnection Customer, is required in connection with its Application or that is required under any provision of the Procedures or Guidelines. If other entities, like an Agent, will have responsibility for interfacing with Holy Cross with respect to the Application, the Interconnection Customer must provide all necessary contact information in the Application.

3. Upon request, the Interconnection Customer shall provide to Holy Cross a copy of all manufacturers' literature for its facilities, including specifications, operating instructions and recommendations for installation and operation.

4. The Interconnection Customer or Agent shall be notified of receipt of the Application by Holy Cross within three (3) Business Days of such receipt.

5. Holy Cross shall notify the Interconnection Customer within ten (10) Business Days of the receipt of the Application as to whether the Application is deemed by Holy Cross to be complete or incomplete.

    a) If the Application is incomplete, Holy Cross shall provide a deficiency notice setting forth the information that must be provided to complete the Application.

    b) The Interconnection Customer will have ten (10) Business Days after receipt of such deficiency notice to submit the listed information.

    c) If the Interconnection Customer does not provide the listed information or a request for an extension of time by the date specified in b), the Application will be deemed withdrawn.

    d) An Application will be considered complete only upon submission of the information required by the deficiency notice to Holy Cross.

6. Holy Cross shall receive, process, and analyze each Application in a timely manner as set forth in this Procedure. Holy Cross shall use the same reasonable efforts in processing and analyzing each Application from all Interconnection Customers, whether the DG and/or ESS is owned or operated by Holy Cross, its subsidiaries or affiliates, or others.

7. Holy Cross shall maintain records for three (3) years, subject to audit, of each Application received under this Procedure, the times required to complete Application approvals and disapprovals, and justification for the actions taken on each Application.

8. Holy Cross shall coordinate and conduct any studies required to determine the impact of the Application on affected systems with affected system operators and, if possible, include those results (if available) in its applicable interconnection study within the time frame specified in this Procedure. Holy Cross will include such affected system operators in all meetings held with the Interconnection Customer as required by this Procedure. The Interconnection Customer will cooperate with Holy Cross in all matters related to the conduct of studies and the determination of modifications to affected systems.

D. Modification of the Application

1. Any material modification of the project equipment, project design, or location of the project not otherwise agreed to in writing by Holy Cross and the Interconnection Customer shall be deemed a withdrawal of the Application. Interconnection Customer shall notify Holy Cross in a timely manner of any material modification of the project equipment, project design or location of the project.

E. Site Control Documentation

1. Upon request, a Site control shall be submitted with the Application.

2. Site control may be demonstrated by any of the following methods:

    a) Ownership of, a leasehold interest in, or a right to develop the site for the purpose of constructing the DG and/or ESS; or

b) An option to purchase or acquire a leasehold site for such purpose; or

c) An exclusivity or other business relationship between the Interconnection Customer and the entity having the right to sell, lease, or grant the Interconnection Customer the right to possess or occupy a site for such purpose.

F. Queue Position

1. Holy Cross shall place each Application in a first come, first served order per feeder and per substation based upon the date receipted of the Application.

2. The order of each Application will be used to determine the cost responsibility of the Interconnection Customer for any System upgrades that Holy Cross determines are necessary to accommodate the interconnection. The Interconnection Customer(s) whose interconnection causes the need for such upgrades shall be responsible for up to 100% of such costs, subject to Holy Cross' requiring later contribution toward such costs by Interconnection Customers that interconnect after completion of the System upgrades and that Holy Cross determines benefit from such upgrades. Holy Cross shall allocate such costs in a manner it deems to be consistent with industry practice.

3. Applications may be grouped together for study purposes at the option of Holy Cross.

G. Regulatory Approvals, Permits, and Certification

1. The Interconnection Customer shall be solely responsible for compliance with all applicable laws, regulations, codes, and standards of any government agency respecting construction, installation, and electrical interconnection of the DG and/or ESS or obtaining waivers or exemptions thereof from the applicable government agency and shall provide evidence thereof to Holy Cross as a condition of approval of its Application. Holy Cross shall assist the Interconnection Customer in confirming the applicable requirements.

2. In connection with submitting an Application pursuant to the Level 1 Process or Level 2 Process, the Interconnection Customer shall obtain Certification that its facilities comply with the codes and standards set forth in Attachments 2 and 3 and so certify to Holy Cross. Such Certification may be provided in connection with the Level 3 Process.

3. Interconnection Customers that obtain certification of their DGs and/or ESSs shall demonstrate that their facilities are capable of supplying their commissioned capacity over the four (4) peak hours of a day for a five (5) day successive period. These requirements shall not apply to variable generation resources, such as wind or solar power.

H. Execution of Interconnection Agreement

1. After receiving an Interconnection Agreement from Holy Cross, the Interconnection Customer shall have 30 Business Days to sign and return the Interconnection Agreement.

2. If the Interconnection Customer does not sign the Interconnection Agreement within

30 Business Days, the Application shall be deemed withdrawn.

3. After the Interconnection Agreement is signed by Interconnection Customer , the interconnection of the DG and/or ESS shall proceed under the provisions of the Interconnection Agreement, provided that in case of any conflict between the specific terms of the Interconnection Agreement and this Procedure and/or Guidelines, the terms of the Interconnection Agreement shall govern.

I. Limitation of Interconnection Approval

1. Approval of Interconnection to Holy Cross' System shall be conditioned on

   a) Holy Cross being satisfied that all requirements for System safety, protection, and reliability are met, as determined in connection with approval of the Application.

   b) Execution by Interconnection Customer of an Interconnection Agreement with Holy Cross; and

   c) All costs of interconnection, including any required System upgrades, being paid by Interconnection Customer, subject to Interconnection Customer providing security for such payments that is acceptable to Holy Cross, except as otherwise agreed by Holy Cross, including, but not limited to, costs of studies if required, meter installation, testing and maintenance, operating expenses including communication circuits, protective device installation and testing, and review and inspection of design and test witnessing. Any costs detailed in the generation Interconnection Agreement between Holy Cross and the Interconnection Customer shall take precedence over this Procedure.

2. Holy Cross shall endeavor to provide for interconnection within the period proposed by Applicant but shall not be responsible for changes to estimated dates for completion of any System upgrades and/or interconnection due to changes to Interconnection customer's completion schedule, contractor work schedule, system maintenance, force majeure or uncontrolled events, requirements of law, or scheduling.

J. Construction, Ownership and Operation

1. Holy Cross shall own and operate all distribution- and transmission-level facilities as part of its System and shall own all Holy Cross Interconnection Facilities and System upgrades that Holy Cross determines it is appropriate to own. Holy Cross may, at its option, contract with Interconnection Customer or a third party for construction of any or all of these facilities.

2. The Interconnection Customer will normally construct and own all Interconnection Customer Interconnection Facilities, unless the parties agree in the Interconnection Agreement that Holy Cross shall construct and/or maintain these facilities. If Holy Cross constructs and/or operates Interconnection Customer Interconnection Facilities, Holy Cross may require use of certain Holy Cross design standards or certain manufacturers approved by Holy Cross. Interconnection Customer shall be required to maintain their own parts inventories.

K. Insurance

1. For systems of combined capacity of twenty-five (25) kW or less, the Interconnection Customer, at its own expense, shall secure and maintain in effect during the term of the agreement liability insurance with a combined single limit for bodily injury and property damage of not less than $300,000 for each occurrence.

2. For systems with combined capacity above twenty-five (25) kW but not more than two (2) MW, the Interconnection Customer, at its own expense, shall secure and maintain in effect during the term of the agreement liability insurance with a combined single limit for bodily injury and property damage of not less than $1,000,000 for system above 25kW and up to 500kW and $2,000,000 for system above 500 kW and up to 2 MW for each occurrence.

3. Insurance coverage for systems equal or greater than two (2) MW shall be determined on a case-by-case basis by Holy Cross and shall reflect the size of the installation and the potential for system damage.

4. Except for those solar systems or solar plus storage installed on a residential premise which have a design combined capacity of twenty-five (25) kW or less, Holy Cross shall be named as an additional insured party by endorsement to the insurance policy and the policy shall provide that written notice be given to Holy Cross at least thirty (30) days prior to any cancellation or reduction of any coverage.

5. Such liability insurance shall provide, by endorsement to the policy, that Holy Cross shall not by reason of its inclusion as an additional insured incur liability to the insurance carrier for the payment of premium of such insurance.

6. For all DG or DG and/or ESS the liability insurance shall not exclude coverage for any incident related to the subject DG and/or ESS or its operation.

7. Certificates of Insurance evidencing the requisite coverage and provision(s) shall be furnished to Holy Cross prior to the date of interconnection of the DG and/or ESS.

8. Holy Cross shall be permitted to periodically obtain proof of current insurance coverage from the generating Interconnection Customer in order to verify proper liability insurance coverage.

9. Interconnection Customer will not be allowed to commence or continue interconnected operations unless evidence is provided that satisfactory insurance coverage is in effect at all times.

II. LEVEL 1 PROCESS (INVERTER TYPE GENERATION AND STORAGE)

A. This process shall be used for evaluating any Application for interconnection of a Certified inverter-based DG and/or ESS no larger than twenty-five (25) kW that meets the codes, standards and certification requirements of Attachments 2 and 3 of this Procedure.

1. The Interconnection Customer must complete the Application and submit it to Holy Cross based on the process described above in 1.C. Application.

2. Within fifteen (15) Business Days after notification by Holy Cross that the Application is complete, Holy Cross will conduct an initial review, which shall include the following screening criteria:

    a) For interconnection of a proposed DG and/or ESS to a radial distribution circuit, the aggregated generation, including the proposed DG and/or ESS, shall not exceed seventy-five percent (75%) of daytime minimum load as most recently measured or calculated at the substation.

    b) If the proposed DG and/or ESS is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the proposed DG and/or ESS, shall not exceed twenty-five (25) kW.

    c) If the proposed DG and/or ESS is single-phase and is to be interconnected on a center tap neutral of a 240 or 208 volt service, its addition shall not create an imbalance between the phases of the two sides of the 240 or 208 volt service of more than 20% of the nameplate rating of the service transformer.

    d) No construction or modification of Holy Cross' System shall be required to accommodate the DG and/or ESS.

3. If, having deemed the Application to be complete, Holy Cross finds that the Application satisfies the Level 1 requirements described above and that the DG and/or ESS can be interconnected safely and reliably to its System and Interconnection Customer is otherwise in compliance with the applicable requirements of the Procedure, Holy Cross shall notify the Interconnection Customer that its Application is accepted. Holy Cross shall endeavor to complete processing of the Application within 5 Business Days of the Application being deemed accepted. After processing of the Application is complete, an executable Interconnection Agreement will be provided to the Interconnection Customer within five (5) days.

III. LEVEL 2 PROCESS (FAST TRACK)

A. This process shall be used for evaluation of any Application for interconnection of a Certified inverter-base DG and/or ESS larger than twenty-five (25) kW less than two (2) MW if the proposed DG and/or ESS meets the codes, standards, and certification requirements of Attachments 2 and 3 of this Procedure.

1. The Interconnection Customer must complete the Application and return it to Holy Cross under the process described above in 1.C. Application.

2. Within fifteen (15) Business Days after notification by Holy Cross that the Application is complete, Holy Cross will conduct an initial review, which shall include the following screening criteria:

    a) The proposed DG and/or ESS Point of Interconnection must be on a portion of the Holy Cross System that is subject to its tariffs.

    b) Maximum allowable Interconnection on a single-phase line is 99kW. Any combined system greater than 99kW requires three (3) phase interconnection and must have effective grounding.

c) For interconnection of a proposed DG and/or ESS to a radial distribution circuit, in aggregate with other generation on the distribution circuit, including the proposed DG and/or ESS, shall not exceed seventy-five percent (75%) of daytime minimum load as most recently measured or calculated at the substation.

d) The proposed DG and/or ESS, in aggregate with other generation on the distribution circuit, shall not contribute more than ten percent (10%) to the distribution circuit's maximum fault current at the point nearest the proposed Point of Interconnection.

e) The proposed DG and/or ESS, in aggregate with other generation on the distribution circuit, shall not cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fused cutouts, and line reclosers), or the Interconnection Customer equipment on the system to exceed 87.5% of its short circuit interrupting duty; nor shall the interconnection be proposed for a circuit that already exceeds 87.5% of the short circuit interrupting duty of such equipment.

f) If the proposed DG and/or ESS is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the proposed DG and/or ESS, shall not exceed 20 kW.

g) If the proposed DG and/or ESS is single-phase and is to be interconnected on a center tap neutral of a 240 or 208 volt service, its addition shall not create an imbalance between the phases of the two sides of the 240 or 208 volt service of more than 20% of the nameplate rating of the service transformer.

h) No construction of facilities by Holy Cross on its System shall be required to accommodate the DG and/or ESS.

B. If Holy Cross determines that the proposed interconnection passes the screens, the Application shall be accepted. and Holy Cross will have five (5) days to complete the process and then provide to the Interconnection Customer an executable Interconnection Agreement within five (5) Business Days after the determination.

C. If Holy Cross determines that the proposed interconnection fails the screens, but Holy Cross determines that the DG and/or ESS may nevertheless be interconnected consistent with safety, reliability, and power quality standards, Holy Cross shall provide to the Interconnection Customer an executable Interconnection Agreement within five (5) Business Days after the determination.

D. If Holy Cross determines that the proposed interconnection fails the screens, but Holy Cross does not determine that the DG and/or ESS may nevertheless be interconnected consistent with safety, reliability, and power quality standards, Holy Cross shall within five (5) Business Days of the determination, notify the Interconnection Customer of such determination.

Such notice shall include:

1. A description of any required modifications to the Interconnection customer's facilities or to Holy Cross' System or alternatively any investigation required to address safety, reliability, power quality or other issues;

2. Copies of relevant data and analyses;

3. A proposed date for an Interconnection Customer Options Meeting which shall be within ten (10) Business Days of the notice.

E. At the time of notification of Holy Cross' determination, or at the Interconnection Customer Options Meeting, Holy Cross shall:

1. If modifications to Interconnection customer's facilities are required, describe the modifications that Interconnection Customer shall be responsible to make. If minor modifications to the Holy Cross System are required (e.g., changing meters, fuses, relay settings), Holy Cross shall provide a non-binding good faith estimate of the limited cost to make such modifications to its System. If Interconnection Customer notifies Holy Cross that it agrees to make, or to have Holy Cross make, the necessary modifications at the Interconnection customer's expense, Holy Cross shall provide to Interconnection Customer an executable Interconnection Agreement within five (5) Business Days; or

    a) Offer to perform a supplemental review if Holy Cross concludes that the supplemental review is required to determine whether the DG and/or ESS could continue to qualify for interconnection pursuant to the **LEVEL 2 PROCESS**, including providing a non-binding good faith estimate of the costs and time of such review; or

    b) Offer to process the Application under the **LEVEL 3 PROCESS** (below) upon obtaining Interconnection customer's agreement.

F. If the Interconnection Customer agrees to a supplemental review in writing within fifteen (15) Business Days of the offer, the Interconnection Customer shall submit a deposit for the estimated costs. The Interconnection Customer shall be responsible for Holy Cross' actual costs of conducting the supplemental review and must pay any review costs that exceed the deposit within twenty (20) Business Days of receipt of the invoice or resolution of any dispute. If the deposit exceeds the invoiced costs, Holy Cross will return such excess within twenty (20) Business Days of the invoice without interest.

G. Within ten (10) Business Days following receipt of the deposit for a supplemental review, Holy Cross will determine if the DG and/or ESS can be interconnected safely and reliably.

1. If no modifications are required, Holy Cross shall forward an executable Interconnection Agreement to the Interconnection Customer within five (5) Business Days after notice to Interconnection Customer of its determination.

2. If modifications to the Interconnection customer's facilities are required to allow the DG and/or ESS to be interconnected consistent with safety, reliability, and power quality standards under this Procedure, Holy Cross shall forward an executable Interconnection Agreement to the Interconnection Customer within five (5) Business Days after confirmation that the Interconnection Customer has agreed to make the necessary changes at the Interconnection customer's expense.

3. If minor modifications to Holy Cross' System are required to allow the DG and/or ESS to be interconnected consistent with safety, reliability, and power quality standards under this Procedure, Holy Cross shall forward an executable Interconnection Agreement to the Interconnection Customer within five (5) Business Days after confirmation that Interconnection Customer shall pay the costs of such System modifications prior to interconnection, and provide security for such payment, as applicable.

H. If Holy Cross determines that the DG and/or ESS cannot be interconnected safely and reliably in accordance with the **LEVEL 2 PROCESS**, it shall offer to process the Application under the **LEVEL 3 PROCESS** upon obtaining Interconnection customer's agreement.

IV. LEVEL 3 PROCESS (FEASIBILITY AND FACILITIES IMPACT STUDIES)

A. This process shall be used by an Interconnection Customer proposing to interconnect its generating facility with the Holy Cross System if the DG and/or ESS meets any of the following conditions:

1. Has a rated capacity larger than or equal to two (2) MW but less than or equal to twenty (20) MW; or

2. Is not Certified under Attachment 3; or

3. Is Certified but did not pass the **LEVEL 1 PROCESS** or the **LEVEL 2 PROCESS** screens.

B. Scoping Meeting

1. A scoping meeting will be held within ten (10) Business Days after the Application is deemed complete.

2. The Parties will bring all system engineers or other personnel and other resources as may be reasonably required to accomplish the purpose of the meeting.

   a) The purpose of the scoping meeting is to determine the Application Feasibility Study, Facilities Impact Study and the Interconnection Agreement.

   b) If the Parties agree that a Feasibility Study should be performed, Holy Cross shall provide the Interconnection Customer within five (5) Business Days after the scoping meeting, a Feasibility Study Agreement including an outline of the scope of the study and a non-binding good faith cost estimate for the study and an estimated completion date for the study.

   c) The scoping meeting may be omitted by mutual agreement. In order to remain in consideration for interconnection, an Interconnection Customer who has requested a Feasibility Study must return the executed Feasibility Study Agreement within fifteen (15) Business Days.

   d) If the Parties agree not to perform a Feasibility Study, Holy Cross shall provide the Interconnection Customer within five (5) Business Days after the scoping meeting, a Facilities Impact Study Agreement including an outline of the scope of the study and a non-binding good faith cost estimate for the study.

   e) The Feasibility Study and Facility Impact Study may be combined for simpler projects by mutual agreement of the Parties.

3. Feasibility Study

   a) The Feasibility Study shall identify any potential adverse System impacts that would result from the interconnection of the DG and/or ESS.

b) A deposit will be required from the Interconnection Customer in the amount of the cost estimate for the Feasibility Study but not less than $1,000.

c) The scope, responsibilities and cost estimate for the Feasibility Study are to be described in the Feasibility Study Agreement.

d) If the Feasibility Study shows the potential for adverse System impacts, the review process shall include a Facilities Impact Study; otherwise such Feasibility Impact Study shall not be required.

4. Facilities Impact Study

a) Once the required Feasibility Study is completed, and the Interconnection Customer wishes to proceed, a Facilities Impact Study Agreement shall be developed within five (5) Business Days, including an outline of the scope of the study and a cost estimate of the Facilities Impact Study.

b) In order to remain under consideration for interconnection, or, as appropriate, in Holy Cross' interconnection queue, the Interconnection Customer must return the executed Facilities Impact Study Agreement or a request for an extension within thirty (30) Business Days.

c) The Facilities Impact Study shall specify and estimate the cost of the equipment, engineering, procurement, and construction work (including overheads) required to mitigate the adverse System impact identified by the Feasibility Study.

d) Design for any required Interconnection Facilities and/or upgrades shall be performed as part of the Facilities Impact Study Agreement.

e) Holy Cross may contract with consultants to perform activities required under the Facilities Impact Study Agreement.

f) Interconnection Customer may request, and Holy Cross may then authorize, in its discretion, the Interconnection Customer to undertake the design and construction of specified Interconnection Facilities directly, or through approved contractors, consistent with conclusions of the Facilities Impact Study Agreement. In such cases, facilities design will be reviewed and/or modified prior to acceptance by Holy Cross, under the provisions of the Facilities Impact Study Agreement Holy Cross shall make information available to the Interconnection Customer, in accordance with confidentiality restrictions and critical infrastructure requirements to enable the Interconnection Customer to obtain an independent design and cost estimate for any necessary facilities.

g) A deposit for the estimated costs for the Facilities Impact Study or other security acceptable to Holy Cross will be required from the Interconnection Customer.

h) The scope of and cost responsibilities for the Facilities Impact Study are described in the Facilities Impact Study Agreement.

i) Upon completion of the Facilities Impact Study, and identification of any upgrades based on the Facilities Impact Study, Holy Cross shall provide the Interconnection Customer an executable Interconnection Agreement within five

(5) Business Days pursuant to which the Interconnection Customer shall be required to pay for all costs of Interconnection Facilities and any such upgrades.

5. Interconnection Guidelines

   a) Level 3 generation facilities shall be installed in accordance with the Holy Cross "DISTRUTED GENERATORS AND ENERGY STORAGE SYSTEMS INTERCONNECT GUIDELINES" (Guidelines).

   b) The Guidelines provide minimum protection requirements for interconnection with the Holy Cross System for Level 3 generation facilities and the Interconnection Customer is required to comply with them as a condition of interconnection.

V. COMMISSIONING, INSPECTION AND TESTING REQUIREMENTS

A. Completion and Commencement of Parallel Operation

1. After completing installation of the DG and/or ESS and associated facilities, the Interconnection Customer shall return the "Certificate of Completion" (Attachment 6) to Holy Cross, together with an updated certification of compliance with Attachments 2 and 3 (if applicable) and updated evidence of compliance with or waiver of any and all applicable laws, regulations, codes and standards of any government agency respecting construction, installation and electrical interconnection of the DG and/or ESS.

2. Interconnection Customer shall notify Holy Cross of its planned date for commencement of parallel operation of the DG and/or ESS and its testing and commissioning schedule. Following such notice Holy Cross shall inspect the DG and/or ESS for compliance with the Interconnection customer's representations in its Application and with other applicable requirements, which may include a witness test, and may require scheduling of appropriate metering replacement, if necessary.

3. Interconnection Customer shall not operate in parallel until a witness test has been performed or waived by Holy Cross in writing. Holy Cross shall schedule the witness test to be held within ten (10) Business Days of Holy Cross' receipt of the "Certificate of Completion" and all other items deemed necessary to complete the witness test.

4. Holy Cross will notify the Interconnection Customer or Agent in writing, fax, or e-mail of the results of its inspection and testing and whether interconnection of the DG and/or ESS is authorized. Such notification shall occur within five (5) Business Days after the inspection and witness testing specified herein. If the witness test is not satisfactory, Holy Cross has the right to disconnect the DG and/or ESS. An additional witness test may be scheduled by Holy Cross within ten (10) Business Days following the Interconnection customer's notice to Holy Cross that it has corrected the deficiencies which must be corrected in order to pass such tests, as identified by Holy Cross in its notification to the Interconnection Customer of a failed test.

B. Commissioning Testing

1. Testing of the Interconnection customer's installed equipment shall be performed

pursuant to applicable codes and standards, including the latest version of IEEE1547.1 "IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems".

2. Holy Cross must be given at least five (5) Business Days written notice of the tests and may be present to witness the commissioning tests.

3. Holy Cross Energy shall be compensated by the Interconnection Customer for its expense in witnessing **LEVEL 2 PROCESS** and **LEVEL 3 PROCESS** commissioning tests.

C. Maintenance and Inspection

1. For facilities with a manufacturer's nameplate rating in excess of 1 MW, Holy Cross may require that immediately prior to interconnection the Interconnection Customer shall file a schedule of planned maintenance with Holy Cross, specifying dates, times, means and procedures planned. No DG and/or ESS shall commence interconnected operations until Holy Cross approves the relevant maintenance schedule.

2. Holy Cross has the right to inspect the DG and/or ESS from time to time on demand, to ensure conformance with the representations made in the Application and any terms of the Interconnection Agreement

3. The Interconnection Customer shall maintain records of maintenance and Holy Cross shall maintain records of inspections and shall provide copies of such records to the other party.

4. Before Holy Cross disconnects the Interconnection customer's DG and/or ESS from its System, it shall furnish a disconnection notice specifying the required maintenance, modification of facilities or changes in operation or repairs required to be made to protective equipment, prior to disconnection. The Interconnection Customer shall perform the specified maintenance, modifications or changes in operation or repairs, prior to the disconnection. Upon completion thereof, the Interconnection Customer shall notify Holy Cross, which shall reinspect the facilities. I

   a) If Holy Cross finds compliance with the required measures, the disconnection shall be cancelled.

   b) If Holy Cross finds non-compliance with the required measures, it may disconnect the DG and/or ESS as specified in the disconnection notice.

   c) Nothing herein shall prevent Holy Cross from disconnecting the DG and/or ESS in case of an emergency.

ATTACHMENT 1- Definitions

1. **Agent** – A person who acts on behalf of an Interconnection Customer

2. **Application** – The interconnection customer's request to interconnect a new Distributed Generating Facility, or to increase the capacity of, or make a material modification to the operating characteristics of, an existing Distributed Generating Facility that is interconnected with the Holy Cross Energy System.

3. **Business Day** – Monday through Friday, excluding Federal Holidays.

4. **Certified or Certification** – With reference to a DG and/or ESS, meeting the codes and standards set forth in Attachment 2 and 3 to this Procedure, to the satisfaction of Holy Cross.

5. **Distributed Energy Resource or DER** – The interconnection customer's source of electric power, including retail renewable distrusted generation, other small generation facilities for the production of electricity, and energy storage systems, as identified in the interconnection request, but shall not include the interconnection facilities not owned by the interconnection customer. An interconnection system is a supplemental DER device that is necessary for the compliance with IEEE 1547 and is owned by the interconnection customer is part of a DER.

6. **Distributed Generating Facility** – The interconnection customer's devices for the production of electricity as identified in the Application, inclusive of energy storage technologies, but not including the Interconnection Facilities not owned by the Interconnection Customer, as schematically depicted in the Application.

7. **Energy Storage System (ESS)** – A commercially available, member-sited system, including batteries and the batteries paired with on-site generation, that is capable if retaining, storing, and delivering energy by chemical, thermal, mechanical, or other means. For the purposes of these Interconnection Procedures and Standards, and energy storage system is a generating facility.

8. **Facilities Impact Study** – A study performed by Holy Cross and paid for by Interconnection Customer to determine the requirements for modifications of Holy Cross' System based on findings of a Feasibility Study, including the estimated cost of the work required to make such modifications.

9. **Feasibility Study** – A study performed by Holy Cross and paid for by Interconnection Customer to determine the effects of the DG and/or ESS interconnect on the Holy Cross System.

10. **Interconnection Agreement** - An Agreement between Holy Cross and the Interconnection Customer to allow the interconnection of a DER to the Holy Cross System.

11. **Interconnection Facilities** – include Holy Cross's Interconnection Facilities and the Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Distributed Generating Facility and the Point of Interconnection, including any modification, additions, or upgrades that are necessary to physically and parallel electrically interconnect the Distributed Generating Facility to Holy Cross's System. Interconnection Facilities are sole-use facilities and shall not include Distribution Upgrades.

12. **Line Section** – A portion of the Holy Cross System connected to the Interconnection Customer at the Point of Interconnection, bounded by automatic sectionalizing devices or the end of the distribution line.

13. **Party or Parties** – Holy Cross Energy, Interconnection Customer or any combination of the above.

14. **Point of Interconnection** – The point where the Interconnection Facilities connect with the Holy Cross System. The location of the Point of Interconnection will be determined by Holy Cross in accordance with standard industry practice or as individual circumstances may dictate. Point of Interconnection on the Holy Cross System is typically the low voltage side of the service transformer and not the meter.

15. **Renewable Energy** – Energy generated from an "Eligible Renewable Energy Resource" or "ERR" Including a solar, wind, geothermal, or biomass generation facility, or a hydroelectric facility with a nameplate rating of twenty (20) MW or less, that meets the standards for an eligible renewable energy resource as set forth by the PUC pursuant to §40-2-124, C.R.S.

16. **Renewable Energy Credits (RECs)** – "Renewable Energy Credit" or "REC" has the meaning set forth in to §40-2-124, C.R.S., as may be amended from time to time or as further defined or supplemented by Law, and any regulations adopted pursuant to this section, and for purposes of these rules shall be deemed to include any and all rights to credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to generation from renewable energy sources and/or displacement of conventional energy generation.

17. **Member** – Any entity, that proposes to interconnect or that has a Distributed Generating Facility that is interconnected with the Holy Cross System.

18. **Member Options Meeting** – A meeting held with Holy Cross and Interconnection Customer to discuss available options if the Application cannot be approved.

19. **Member System** – The facilities owned, controlled, or operated by Holy Cross that are used to provide electric service under its tariff.

20. **System Emergency** – The ability to safeguard against reliability or safety concerns, such as utility curtailment and anti-islanding provisions, or requirements to install equipment that forces resources to trip offline during extreme frequency, voltage, or fault current incidents.

21. **Upgrades** – The required additions and modifications to the Holy Cross Energy System at or beyond the Point of Interconnection. Upgrades do not include Interconnection Facilities.

ATTACHMENT 2 - Certification Codes and Standards

Standard	Conditions Covered
IEEE1547	Standard for Interconnecting Distributed Resources with Electric Power Systems (including use of IEEE 1547.1 testing protocols to establish conformity, 1547a, 1547.2, 1547.3, 1547.4, 1547.6, 1547.7)
IEEE1453	Recommended Practice for the Analysis of Fluctuating Installation on Power Systems
UL 1741	Inverters, Converters, and Controllers for Use in Independent Power Systems
UL 1741 SA	Grid Support Utility Interactive Inverters
IEEE Std 100	IEEE Standard Dictionary of Electrical and Electronic Terms
IEEE Std 519	IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
IEEE Std C37.90	IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems
IEEE Std C37.90.2	IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers
IEEE Std C37.108	IEEE Guide for the Protection of Network Transformers
IEEE Std C57.12.44	IEEE Standard Requirements for Secondary Network Protectors
IEEE Std C62.41.2	IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits
IEEE Std C62.45	IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits
IEEE Std 929	IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems NFPA 70 (2005), National Electrical Code
UL 1989	Standard for Standby Batteries
UL 2200	Stationary Engine Generator Assemblies
UL 9540	Standard for Energy Storage Systems and Equipment
ANSI C84.1	Electric Power Systems and Equipment – Voltage

	Ratings (60 Hertz)
NEMA MG 1-2003	Motors and Generators, Revision 1

ATTACHMENT 3 - Certification of DG Equipment Packages

1. Distributed Generating Facility equipment proposed for use separately or packaged with other equipment in an interconnection system shall, subject to the other criteria in this Attachment 3, be considered certified for interconnected operation only if (1) it has been tested in accordance with industry standards for continuous utility interactive operation in compliance with the appropriate codes and standards listed in Attachment 2 by any Nationally Recognized Testing Laboratory (NRTL) recognized by the United States Occupational Safety and Health Administration to test and certify interconnection equipment , (2) it has been labeled and is publicly listed by such NRTL at the time of the interconnection Application, and (3) such NRTL makes readily available for verification all test standards and procedures it utilized in performing such equipment certification, and, with Interconnection Customer approval, the test data itself. The NRTL may make such information available on its website and by encouraging such information to be included in the manufacturer's literature accompanying the equipment.

2. The Interconnection Customer must verify that the intended use of the equipment falls within the use or uses for which the equipment was tested, labeled, and listed by the NRTL.

3. Certified equipment shall not require further type-test review, testing, or additional equipment to meet the requirements of this interconnection procedure; however, nothing herein shall preclude the need for an on-site commissioning test by the Parties to the interconnection nor follow-up production testing by the NRTL.

4. If the certified equipment package includes only interface components (switchgear, inverters, or other interface devices), then a Interconnection Customer must show that the generator or other electric source being utilized with the equipment package is compatible with the equipment package and is consistent with the testing and listing specified for this type of interconnection equipment.

5. Provided the generator or electric source, when combined with the equipment package, is within the range of capabilities for which it was tested by the NRTL, and does not violate the interface components' labeling and listing performed by the NRTL, no further design review, testing or additional equipment on the Interconnection Customer side of the point of common coupling shall be required to meet the requirements of this interconnection procedure.

6. An equipment package does not include equipment provided by Holy Cross.

ATTACHMENT 4 - Application

Distributed Generator and/or Energy Storage System Interconnection Application

Member of Record: This form must be signed and submitted by the Interconnection Customer of record, or an agent on their behalf, for the Holy Cross Energy (HCE) account where the Distributed Generator (DG) and/or Energy Storage System (ESS) will be located. Proof of site control must be attached to this application (HCE Generator Interconnection Policy for further information) as necessary.

Member of Record: _____

Mailing Address: _____

City, State Zip: _____

Telephone: _____ Email: _____

Account Number: _____ Meter Number: _____

Generation Facility Information: *System Expansion?* ☐ Yes ☐ No

County: _____ Assessor Parcel #: _____

Property owner: _____ (must match county property records)

Permit Authority: _____ Permit #: _____

Estimated Installation Start Date: _____ Estimated HCE Inspection Date: _____

Installation Address: _____

City, State, Zip: _____ (only required if different from mailing address)

Installer or Designer: (please provide any contact information for any additional Engineering Firms or Designers on a separate page)

Company: _____

Contact name: _____ NABCEP #: _____

Mailing Address: _____

City, State Zip: _____

Telephone: _____

Email Address: _____

Generator Owner (if not Member of Record):

Company: _____

Contact: _____

Mailing Address: _____

City, State Zip: _____

Telephone: _____ Email: _____

Leased systems must provide a fully executed copy of the lease agreement with this application.

Inverter Information:

Manufacturer	*Model #*	*Qty*	*Voltage (V)*	*Current (A)*

Inverter Type: ☐ Single Phase ☐ Three Phase

Are all inverters pre-certified per IEEE 1547 and UL 1741 SA?

"Grid Support Utility-Interactive Inverter" ☐ Yes ☐ No

Service Information:

Service Entrance Size: ____ Amps (for retrofit, provide service disconnect rating) Service Voltage: _____ V

Service Type: ☐ Single Phase ☐ Three Phase

Connected to load side of service disconnect? ☐ Yes ☐ No

Existing Service Disconnect in accessible outdoor location within 24" of net meter socket?
☐ Yes ☐ No

Production meter socket:

Manufacturer: _____Model: _____ Form: _____

Describe proposed location: _____

Meter sockets must meet the requirements of Holy Cross' Consumer Service Facilities Metering and Use Guidebook.

Lockable, knife-blade style disconnect required for any system that is metered at 277/480V or is not self-contained.

A single meter must be installed to monitor proposed and existing generating facilities (for system expansions).

Generator information:

Energy Source: ☐ Solar ☐ ESS ☐ Wind ☐ Hydro ☐ Other (_____)
For photovoltaic generators, use the table below. For all others, provide a copy of the manufacturer specification sheet.

Manufacturer	*Model #*	*Qty*	*Orientation (0 is south)*	*Tilt (0 is flat)*

Location description: _____ (house roof, ground, etc)

Sizing Information:

Total nameplate capacity: _____ kW DC Estimated Annual Production: _____ kWh

Estimated System Losses: _____% (excluding shading & snow) Due to shading: ____%

Due to snow cover: ____% (annual)

ESS energy rating: _____ kW max continuous*(1-SOCmin)/kWh*(1-SOCmin)
(where SOCmin = minimum state of charge as defined by the battery manufacturer

Describe any other existing or planned power sources: _____ (battery backup, etc)

New Construction:

Planned floor area: _____ sq. ft. Calculated maximum NEC Demand: _____ kW

Expected occupancy: ☐ Full Time ☐ Seasonal ☐ Vacation

HCE will not allow parallel generation at a temporary service. HCE will reject any application received for a major retrofit or new construction project for which a complete and approved load form has not been submitted.

Installer checklist:

I have attached the following documents for review:

☐ Site plan
☐ Inverter specification sheet
☐ Evaluation Fee ($_____ Check # _____)
☐ Renewable Requirements documentation
☐ One-line diagram (including any existing generators)
☐ Evidence of Insurance
☐ Lease agreement (if applicable)
☐ Photos of Service Meter and Exterior Disconnect

Signed: _____ (Installer) Date: _____

Interconnection System Owner Acknowledgement

- All equipment is UL listed and factory new when installed and a one-line diagram has been provided to HCE.
- Applicant must provide evidence that General Liability Property Insurance is in place in the amounts specified in HCE's Generator Interconnection Policy. For residential systems with an AC nameplate capacity of 10 kW and less, the minimum requirement is $300,000. Requirements for other situations are available on HCE's website at www.holycross.com/generator-interconnect-policy
- A production meter capable of being read remotely using HCE's standard metering interface will be installed prior to operation.
- System shall not be energized, except for testing purposes, until system has passed electrical inspection from the relevant permitting authority, an HCE final inspection has occurred, and any necessary metering equipment is installed or programmed as necessary.

- HCE does not guarantee the projected value of any electricity produced by the system. Changes in rates, rate structures, or net-metering policy could affect this value. Any such changes may apply to existing systems when implemented.

I hereby certify that, to the best of my knowledge, the information provided in this Application is true and that I am authorized to make changes to the listed HCE account. I have read and agree to abide by the HCE Interconnection Policy, thus if this generation system causes power quality to fall outside of HCE parameters, HCE has the right to disconnect the generator and/or my electrical service. I will provide HCE a signed copy of the Interconnection Agreement within 30 days of approval and Certificate of Completion when the generation system has been installed.

Member Signature: _____

Name (Print): _____ Date: _____

Member Signature: _____

Name (Print): _____ Date: _____

Incentives for installation of Eligible Energy Resources:

HCE makes certain incentives available to Interconnection Customers who have installed certain types of Eligible Energy Resources in a net-metering configuration on a first come, first served basis. Payment of these incentives is subject to the availability of funding, the completion of all necessary documentation, and inspection of the installation premises.

DG and ESS systems constructed for compliance with local or county requirements are NOT eligible for standard incentives for that portion of their capacity associated with the requirement; however any capacity in excess of the requirement may be eligible for the incentive. Documentation of the requirement from the applicable authority must be supplied to HCE prior to the issuance of any incentive payment. Failure to inform Holy Cross of a requirement will result in immediate forfeiture of all incentive payments.

If the following requirements are not met to Holy Cross's satisfaction within 120 days of the receipt of this application, the incentive reservation will be canceled. The consumer may be eligible for incentives as available under the Holy Cross incentive program at the time the generator is completed, subject to the availability of funds.

1. Signed Application and any additional requested information must be provided to Holy Cross.
2. Designer or Installer of a photovoltaic system must be NABCEP accredited or if installed by a licensed electrical contractor, the generator approved by a NABCEP accredited company or individual prior to the utility inspection.

3. After the system is installed and inspected by the relevant permitting authority, HCE will perform a final inspection prior to approving the system for parallel operation.
4. All required documents must be provided to Holy Cross, including the following: Interconnection Agreement, Renewable Energy Credit Sales and Assignment Agreement, proof of state or county electrical inspection, insurance certificates, a detailed invoice and any other documentation requested by Holy Cross.

Purchase of Renewable Energy Credits:

Holy Cross will purchase the Renewable Energy Credits generated by the system via an upfront payment. The Consumer of Record may choose to forego this payment and retain claims to any RECs generated by the generation equipment without affecting their other rights and responsibilities under Holy Cross's Rules, Regulations, and Tariffs and the Interconnection Agreement.

☐ I agree to relinquish my claims to any REC that will be generated with my equipment in exchange for the REC Incentive offered by HCE at the time this application is received. I acknowledge that this incentive payment is contingent on the availability of funds and the return of a completed REC Sales and Assignment Agreement.

Estimated or contract installation price: $_____ (required for reservation)

This system has been Installed to meet local jurisdictional requirement: ☐ Yes ☐ No

Required system capacity: _____ kW *(Documentation Required)

☐ I will retain my claims to any REC that will be generated with my equipment and forego the incentives offered by Holy Cross.

Member Signature: _____

Name (Print): _____ Date: _____

Member Signature: _____

Name (Print): _____ Date: _____

Incentive assignment (optional):

The Member of Record may elect to assign the incentive payment (in whole) to the company responsible for the installation of the facilities associated with this application.

As evidenced by my signature below, I hereby direct Holy Cross Energy to make any applicable incentive payment to:

Recipient: _____

Contact name: _____

Mailing Address: _____

City, State Zip: _____

Member Signature: _____

Name (Print): _____ Date: _____

Member Signature: _____

Name (Print): _____ Date: _____

I understand and agree that HCE is not liable for forfeiture of any incentive amounts due to changes in program structure, the action or failure to act of Member, or any of the Member's consultants, employees or contractors, including Recipient. I affirm it is my responsibility as a Member to contact Holy Cross Energy directly to determine eligibility for any incentives amounts, including but not limited to the ineligibility of installers who are not included on the HCE Preferred Solar Installer List - https://www.holycross.com/renewable-energy-incentives/

Member Signature: _____

Name (Print): _____ Date: _____

Release of Information:

I give my permission for HCE to discuss the status of my account and this application with the Installer or Designer noted. I release HCE of any and all liability for supplying such information, which shall be in effect until I provide a written request to HCE rescinding such permission, or any incentive payment is mailed.

Member Signature: _____

Name (Print): _____ Date: _____

Member Signature: _____

Name (Print): _____ Date: _____

ATTACHMENT 5 -Model Interconnection Agreement

This Interconnection Agreement ("Agreement") is made and entered into this ____ day of _____, 20____, by and between Holy Cross Electric Association, Inc., dba Holy Cross Energy ("Holy Cross"), a Colorado cooperative electric association and _____ ("Member"). The parties to this Agreement may each hereinafter be referred to individually as "Party" or both referred to collectively as the "Parties". In consideration of the mutual covenants set forth herein, the Parties agree as follows:

1. **Definitions.**

(a) "Electric Tariffs" means Holy Cross's Electric Service Tariffs, Rules and Regulations as in effect on the effective date of this Agreement and as the same may be amended from time to time.

(b) "Generating Facility" means the Interconnection customer's device for the production of electricity identified in an interconnection request but shall not include the Interconnection Facilities not owned by the Interconnection Customer, as schematically depicted on Appendix A, attached hereto and incorporated herein by this reference.

(c) "Interconnection Facilities" include Holy Cross's Interconnection Facilities and the Interconnection Facilities. Collectively, Interconnection Facilities include all facilities and equipment between the Generating Facility and the Point of Interconnection, including any modification, additions, or upgrades that are necessary to physically and electrically interconnect the Generating Facility to Holy Cross's System. Interconnection Facilities are sole-use facilities and shall not include Distribution Upgrades.

(d) "Point of Interconnection" means the point where the Interconnection Facilities connect with Holy Cross's System. The location of the Point of Interconnection will be determined by Holy Cross in accordance with standard industry practice or as individual circumstances may dictate.

(e) "System" means the electric distribution facilities owned, controlled, or operated by Holy Cross that are used to provide electric service under the Electric Tariffs.

2. **Intent of Parties:** It is the intent of the Interconnection Customer to interconnect a Generating Facility to the System, located at _____(Member's legal address). It is the intent of Holy Cross to operate its System in a manner which will maintain a high level of service to all of its customers. It is the intent of both parties to operate the Interconnection Facilities in a manner that ensures the safety of the Interconnection Customer, the public, and the employees of each party.

3. **Service to be Provided.** Holy Cross shall deliver and sell to Interconnection Customer, and Interconnection Customer shall receive and purchase from Holy Cross, during the term of, and subject to, the provisions of this Agreement, all electric power and energy as may be required by Interconnection Customer in addition to the electric power and energy produced by the Interconnection customer's Generating Facility. All electric power and energy delivered by Holy Cross to the Interconnection Customer at the Point of Interconnection shall be paid for by the Interconnection Customer at the applicable rates established in the Electric Tariffs.

4. **Term.** This Agreement shall be in full force and effect for an initial period of one (1) year from the date hereof and shall remain in full force and effect each year thereafter, unless terminated by either party as set forth herein.

5. **Facilities Provided by Holy Cross.** Holy Cross shall install, own, operate and maintain the System up to the Point of Interconnection. All such facilities will be installed in accordance

with the line extension policy as contained in the Electric Tariffs.

6. **Facilities Provided by Interconnection Customer.** Interconnection Customer shall, own, operate, and maintain all facilities on the load side of the Point of Interconnection necessary to enable Interconnection Customer to take and use the electric energy provided by Holy Cross in accordance with the Electric Tariffs. Such Interconnection Customer facilities shall include the Generating Facility and all appurtenant equipment necessary to own, operate, and maintain the Generating Facility. Interconnection Customer shall provide suitable space on Interconnection Customer's premises for Holy Cross meters and metering equipment. A utility accessible and lockable switch to disconnect the Generating Facility must be properly labeled and installed at or near the Interconnection Customer's meter panel and labeled with an engraved yellow placard with permanent adhesive designed for outdoor use to ensure adhesion over time through extreme weather conditions.

7. **No Construction of Facilities.** Holy Cross shall not be required to construct any facilities in order to accommodate the installation or operation of a Generating Facility. Any upgrades of the Holy Cross System or equipment needed to interconnect the DG and/or ESS to the Holy Cross System will be at the full cost of the Interconnection Customer.

8. **Design, Construction, Operation.** Interconnection Customer shall be responsible for the design, construction, installation, operation, maintenance, and replacement or repair of the Generating Facility and the Interconnection Facilities so that, at all times, the Interconnection Customer complies with Holy Cross's Interconnection Policy and Guidelines as set forth in the Electric Tariffs. Interconnection Customer shall also install, operate, and maintain the Generating Facility and Interconnection Facilities in a safe manner in accordance with the rules for safety and reliability set forth in the National Electrical Code, all other applicable local, state, and federal codes, and prudent electrical practices.

9. **Design Review.** Interconnection Customer shall provide Holy Cross an electrical one-line diagram and a relaying and metering one-line diagram prior to completion of detailed designs, unless the Interconnection Customer is installing a packaged system that is pre-certified to IEEE 1547.1 and UL 1741 standards. Packaged systems pre-certified under IEEE Standard 1547.1 and UL Standard 1741 will not require a relaying and metering one-line diagram. The submitted application and diagrams will be processed, reviewed, and acted upon in accordance with the Holy Cross Interconnection Policy.

10. **Inspection and Testing.** Prior to parallel operation of the Generating Facility, Holy Cross may inspect the Generating Facility for compliance with industry standards and the Electric Tariffs. Holy Cross's inspection may include a witness test and Holy Cross may require appropriate metering replacement, if necessary. If the witness test is not satisfactory in the sole judgment of Holy Cross, Holy Cross has the right to disconnect the Generating Facility. The Interconnection Customer shall have no right to operate in parallel until a witness test has been performed, or previously waived in writing by Holy Cross. Holy Cross must complete the witness test within ten (10) business days of receipt of a "Certificate of Completion" from the Interconnection Customer. The Interconnection Customer shall be responsible for all costs associated with witness tests conducted by Holy Cross.

11. **Commissioning Tests.** Commissioning tests of the Interconnection customer's installed Generating System shall be performed pursuant to applicable codes and standards, including IEEE 1547.1. Holy Cross must be given at least five (5) business days' written notice, or as otherwise mutually agreed to by the Parties, of the tests and may be present to witness the commissioning tests. The Interconnection Customer shall be responsible for all costs associated with Commissioning tests conducted by Holy Cross.

12. **Confidentiality.** All design features, operating specifications, and metering data provided by the Interconnection Customer shall be deemed confidential information by Holy Cross regardless of whether it is clearly marked or otherwise designated as such. Confidential Information shall not include information previously in the public domain or required by governmental authorities to be publicly submitted or divulged.

13. **No Company Warranty of Generation Facility.** Any approval or acceptance by Holy Cross of Interconnection Customer's designs, analyses, operating and maintenance procedures, instructions, drawings, specifications, and installation shall not be construed as confirming or endorsing the design or operation of the Generating Facility or as a warranty of its safety, durability, reliability, or fitness for the purpose intended. Holy Cross shall not, by reason of such review or failure to review, be responsible or liable for the performance of the Generating Facility in any manner, including, but not limited to, the strength, details of design, adequacy, safety, capacity, or fitness for the purpose intended.

14. **Future Design Changes.** No changes to the Generating Facility or to the Interconnection Facilities shall be made without the prior written approval of Holy Cross. If changes are made without Holy Cross's written approval, Holy Cross may, at its sole discretion and upon reasonable notice to the Interconnection Customer, require the Interconnection Customer to conform the Generating Facility or the Interconnection Facilities to specifications set forth in the Electric Tariffs at the Interconnection Customer's sole expense within thirty (30) days after informing the Interconnection Customer of the required changes, or Holy Cross may disconnect the Generating Facility from the System and terminate this Agreement.

15. **Right to Locate Facilities.** Interconnection Customer hereby grants to Holy Cross the right to use the premises of Interconnection Customer for the purpose of providing the Interconnection Facilities necessary to connect the Generating Facility to the System, and agrees to provide any required rights-of-way by separate instrument without cost, if so requested by Holy Cross.

16. **Access.** Holy Cross shall have access to the disconnect switch and metering equipment of the Generating Facility at all times. Holy Cross shall provide reasonable notice to the Interconnection Customer when possible prior to using its right of access.

17. **Disconnection.** The interconnection of the Generating Facility shall not compromise the operational requirements of the System. The operation of the Generating Facility and the quality of electric energy supplied by the Generating Facility shall meet the standards as specified by Holy Cross. If the operation of the Generating Facility or quality of electric energy supplied does not meet the standards as specified, Holy Cross will require the Interconnection Customer to take reasonable and appropriate corrective action. Holy Cross shall have the right to disconnect the Generating Facility until compliance is reasonably demonstrated. Holy Cross may in its sole discretion disconnect the Generating Facility from the System without notice if operation of the Generating Facility poses a threat, in Holy Cross's sole judgement, to life and/or property.

18. **Maintenance Outages.** Maintenance outages will occasionally be required on the System, and Holy Cross will provide as much notice as practical to the Interconnection Customer to minimize downtime.

19. **Billing and Payment.** Interconnection Customer shall reimburse Holy Cross for all of the costs that Holy Cross incurs under this Agreement in accordance with the Electric Tariffs. Holy Cross agrees that, when performing or causing to be performed any work for Interconnection Customer's account, Holy Cross will use the same degree of care and diligence in controlling and minimizing the costs of the work it performs as if the work were being performed for

Holy Cross's own account. Holy Cross shall invoice Interconnection Customer for reimbursement of Holy Cross's costs, from time to time, as those costs are incurred, but no more frequently than once each month. Payment shall be due within thirty (30) days of the date of Holy Cross's invoice. If payment in full is not made by the Interconnection Customer within that time, the unpaid balance shall bear interest at the rate of one- and one-half percent (1.5%) per month. If the Interconnection Customer is more than ninety (90) days delinquent in reimbursing Holy Cross's costs, Holy Cross may, in its sole discretion, terminate this Agreement, in which event the Interconnection Customer shall be liable for all costs Holy Cross has incurred to the date of termination of this Agreement. If Holy Cross must bring a legal action to obtain reimbursement of its costs from Interconnection Customer, Holy Cross shall be entitled to recover from Interconnection Customer its reasonable attorney's fees, expenses, and court costs

20. **Force Majeure.** Holy Cross shall not be liable for failure or fault in the delivery of electrical energy to the Interconnection Customer or for total or partial interruption of service caused by accidents, breakdown of equipment, acts of God, floods, storms, fires, strikes, riots, war, terrorist attacks, sabotage, labor disputes, shortage of materials, the forces of nature, the authority and orders of government, and other causes or contingencies of whatever nature beyond the reasonable control of Holy Cross, or which reasonably could not have been anticipated and avoided by Holy Cross.

21. **Indemnification.** Each party shall save and hold harmless the other party, its officers, employees, agents, affiliates, and subsidiaries from any and all damages, losses, judgments, claims, including claims and actions relating to injury or death of any person or damage to property, demand, suits, recoveries, costs, and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other party's actions or inactions in performing its obligations under this Agreement on behalf of the indemnifying party, except in cases of gross negligence or intentional wrongdoing by the indemnified party. In the event of concurrent negligence on the part of each party, there shall be contribution in the percentage of each party's respective negligence; and, provided further, that each of the parties hereto shall be solely responsible for injury or damage, wherever occurring, due solely to any defect in equipment installed, furnished, or maintained by such party.

22. **Limitation of Liability.** Each party's liability to the other party for any loss, cost, claim, injury, liability, judgment or expense, including reasonable attorney fees, relating to or arising from any act or omission in its performance of this Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either party be liable to the other party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever.

23. **Insurance.** Interconnection Customer shall, at its own expense, secure and maintain in effect during the term of this Agreement, liability insurance in the amounts set forth in Holy Cross's Interconnection Policy. Such liability insurance shall not exclude coverage for any incident related to the subject Generating Facility, its installation, maintenance, operation, repair, or replacement. Holy Cross shall be named as an additional insured under the liability policy unless the system is installed on a residential premise and has a design capacity of 25 kW or less. The insurance policy shall include a provision that written notice shall be given to Holy Cross at least thirty (30) days prior to any cancellation or reduction of any coverage. A copy of the liability insurance certificate must be received by Holy Cross prior to the date of interconnection of the Generating Facility. The liability insurance shall include as an endorsement to the policy, that Holy Cross shall not, by reasons of its inclusion as an additional insured, incur liability to the insurance carrier for the payment of any premium of such insurance. Certificates of insurance evidencing the requisite coverage and provision(s) shall be furnished to Holy Cross and attached to this Agreement and appended hereto as an attachment prior to the date of interconnection of the Generating Facility. Holy Cross shall be

permitted to periodically obtain proof of current insurance coverage from the Interconnection Customer in order to verify proper liability insurance coverage. Interconnection Customer will not be allowed to commence or continue interconnected operations unless evidence is provided that satisfactory insurance coverage is in effect at all times.

24. **Termination.** This Agreement may be terminated by the Interconnection Customer with thirty (30) days written notice to Holy Cross. In the event Interconnection Customer terminates this Agreement, Holy Cross shall have a reasonable amount of time to remove its Interconnection Facilities as described in Sections 15 and 16 of this Agreement. This Agreement may be terminated by Holy Cross for non-performance by the Interconnection Customer of any of the terms of this Agreement or the Electric Tariffs. The Interconnection Customer shall have thirty (30) days from the date that Holy Cross sends written notice to the Interconnection Customer to remedy the item of non-performance. Upon expiration of the thirty (30) day remedy period and if the item of non-performance has not been corrected Holy Cross may terminate this Agreement. Unless terminated earlier by the Interconnection Customer or Holy Cross as described herein, this Agreement shall terminate when the Generating Facility is permanently removed from service or becomes inoperative for a period in excess of one year.

25. **Governing Law.** The validity, interpretation, and enforcement of this Agreement and each of its provisions shall be governed by the laws of the state of Colorado.

26. **Amendment.** The Parties may amend this Agreement only by a written instrument duly executed by both Parties.

27. **No Third-Party Beneficiaries.** This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any person, corporation, association, or entity other than the parties hereto, their successors and assigns and the obligations herein assumed are solely for the use and benefit of the parties, their successors in interest and, where permitted, their assigns.

28. **Waiver.** The failure of a party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a waiver of any obligation, right or duty of, or imposed upon, such party. Any waiver at any time by either Party of its respective rights relating to this Agreement shall not be deemed a continuing waiver or a waiver with respect to any other failure to comply with any other obligation, right, duty of this Agreement. Termination or default of this Agreement for any reason by Interconnection Customer shall not constitute a waiver of the Interconnection Customer's legal rights to obtain an interconnection from Holy Cross. Any waiver of this Agreement shall, if requested, be provided in writing.

29. **Multiple Counterparts.** This Agreement may be executed in two or more counterparts, each of which is deemed original, but all constitute one and the same instrument. The Parties agree that a facsimile copy of a signature will be deemed original and binding.

30. **No Partnership.** This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the parties or to impose any partnership obligation or partnership liability upon either party. Neither party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other party.

31. **Severability.** If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction, (1) such portion or provision shall be deemed separate and independent, (2) the parties shall

negotiate in good faith to restore insofar as practicable the benefits to each party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

32. **Subcontractors.** Nothing in this Agreement shall prevent a party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under this Agreement; provided, however, that each party shall require its subcontractors to comply with all applicable terms and conditions of this Agreement in providing such services and each party shall remain primarily liable to the other party for the performance of such subcontractor. The creation of any subcontract relationship shall not relieve the hiring party of any of its obligations under this Agreement. The hiring party shall be fully responsible to the other party for the acts or omissions of any subcontractor the hiring party hires as if no subcontract had been made; provided, however, that in no event shall Holy Cross be liable for the actions or inactions of the Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under this Agreement. Any applicable obligation imposed by this Agreement upon the hiring party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such party. The obligations under this article will not be limited in any way by limitation of subcontractors' insurance.

33. **Notices.** Notices to be given hereunder shall be deemed sufficiently given and served after receipt of notice sent by United States certified mail, return receipt requested and respectively addressed as follows:

    Interconnection Customer:
    _____
    _____
    _____
    _____

    Holy Cross:

    Holy Cross Energy
    Attn: Power Supply Department
    P.O. Box 2150
    Glenwood Springs, CO 81602-2150

34. **Assignment-Consent.** This Agreement shall be binding upon and inure to the benefit of the successors and assigns of the respective parties hereto and shall not be assigned by either party without the written consent of the other party, which consent shall not be unreasonably withheld.

35. **Total Agreement.** Subject to the Electric Tariffs, this Agreement, together with the Generator Interconnect Policy and its Attachments, represents the entire agreement between the parties relating to the rates, terms, and conditions for electric service provided to Interconnection Customer by Holy Cross and to electric energy supplied to Holy Cross by the Interconnection Customer.

36. **Binding Effect.** This Agreement, as it may be amended from time to time, shall be binding upon and inure to the benefit of the parties hereto and their respective successors, legal representatives, assigns, affiliates and subsidiaries.

37. **Breaches Ongoing.** All breaches of this Agreement shall be considered ongoing breaches until such breaches are remedied or until there may be a written waiver of the breach by the nonbreaching party.

38. **Remedies for Breach.** This Agreement and the respective rights and duties of the parties are unique and of such a special nature that it is enforceable through the remedy of specific performance and injunctive relief, in addition to any other remedies that may exist at law or in equity.

39. **Disputes.** In the event of a dispute related to this Agreement, either party may exercise whatever rights and remedies it may have at law or in equity consistent with the terms of this Agreement. The prevailing party shall be entitled to recover from the non-prevailing party its reasonable attorney fees, expenses, and costs of any civil legal action brought for the purpose of resolving the dispute or enforcing its rights under the Agreement.

IN WITNESS WHEREOF, the Parties have caused this Interconnection Agreement to be executed in their respective names by the proper officers hereunto duly authorized as of the date and year first above written.

AGREED TO BY:

Interconnection Customer	Holy Cross
Name: _____	Name: _____
Title: _____	Title: _____
Date: _____	Date: _____

ATTACHMENT 6 – Certificate of Completion

Member

Name: _____

Address: _____

City: State: Zip: _____

Phone (Day): _____ (Evening): _____

Fax: _____ E-Mail: _____

Location (if different from above):

_____

I certify that the generation facilities described above were installed on _____ in accordance with the requirements described in the "Terms and Agreements". I further certify that the facilities are ready for Holy Cross (at its discretion) on-site inspection and witness testing and all inspections by local authorities have been completed.

Signed _____

Date _____

ATTACHMENT 7 -Energy Storage Systems (ESS)

Holy Cross allows for Energy Storage Systems (ESS) under its Renewable Generation Tariff and will require a Net Energy Meter (NEM). The specific configurations are detail in the latest Holy Cross Member Service Facilities Metering Guide.

Holy Cross allows the following configurations

1. PV+ESS AC Coupled – Standby backup only (10.5)
2. PV+ESS AC Coupled – Renewable Charge, Grid Discharge (10.6)
3. PV+ESS AC Coupled – Grid Charge, Grid Discharge (10.7)
4. PV+ESS DC Coupled – Renewable Charge, Grid Discharge (10.8)

1. Application Requirements
    a. Provide a general overview / description and associated scope of work for the proposed project. Is the new ESS project associated with a new or existing DG facility?
    b. Identify whether this is a Stand-Alone or Hybrid ESS proposal, or a change to the operating characteristics of an existing system.
    c. Indicate the type of Energy Storage (ES) technology to be used. For example, NaS, Dry Cell, PB-acid, Li-ion, LiFePO4, vanadium flow, etc.
    d. Indicate how the ESS will be charged and/or act as a load:
        i. Electrical Grid Only
        ii. Unrestricted charging from Electrical Grid and/or DG system
        iii. Restricted charging from Electrical Grid and/or DG systems
        iv. Charging from DG only.
    e. If the intended use case for the ESS includes behind-the-meter backup services, please provide a description and documentation illustrating how the entire system disconnects from utility during an outage (e.g. mechanical or electronic, coordination, etc.).
    f. Provide the data sheet for the battery portion of the energy storage equipment. Including the model, capacity (kWh), and manufacturer
    g. Provide specification data/rating sheets including the manufacturer, model, and nameplate ratings (kW) of the inverter(s)/converters(s) for the energy storage and/or DG system.
    h. Indicate any impacts of ambient temperatures on charging and discharging capabilities, specifically noting any restrictions on available capacity as a function of temperature and listed on the system facility's nameplate.
    i. Provide details on cycling (anticipated maximum cycles before replacement), depth of discharge restrictions, and overall expected lifetime regarding the energy storage components.
    j. Provide proposed inverter(s) power factor operating range and whether inverter(s) are single quadrant, two-quadrant, or four-quadrant operation.
    k. Provide specification data/rating sheets including the manufacturer, model, and nameplate ratings (kW) of the inverter(s)/converter(s) for the energy storage and/or DG system.
    l. Provide details on whether the inverter(s)/converter(s) have any intrinsic grid support functions, such as autonomous or interactive voltage and frequency support. If they do, please describe these functions and default settings.
    m. Indicate whether the ESS and DG system inverter(s)/converter(s) are DC-coupled or AC-coupled.
    n. Indicate whether the system inverter(s)/converter(s) is/are listed on the Holy Cross' "Certified Interconnection Equipment List"
        i. If the interconnected inverter(s)/converter(s) are not listed on the "Certified Interconnection Equipment List" but are certified, provide a

copy of the certificate of compliance.

ii. If the interconnected inverter(s)/converter(s) are not listed on the "Certified Interconnection Equipment List, or the storage and paired DG are AC coupled, please detail the use of control systems such as utility grade relays including AC and DC control schematics and relay logic.

iii. If the interconnected inverter(s)/converter(s) are not listed on the "Certified Interconnection Equipment List", please detail the verification of protection operation in equivalent deployments of the equipment configuration. For example, if this exact configuration has been previously deployed, please describe the project and reference the commissioning/test report.

o. Indicate whether the interconnected inverter(s)/converter(s) is/are compliant to the latest versions of the following additional standards. If partially compliant to subsections of the latest standards, please list those subsections:
   i. IEEE 1547a
   ii. UL 1741 and its supplement SA

p. If the interconnected inverter(s)/converter(s) are not compliant with the previously listed additional standards, please describe showing utility grade protection, relay and controls are implemented between your hardware and the utility.

q. Detail any integrated protection that is included in the interconnected inverter(s)/converter(s). For example, describing over/under-voltage/current frequency behavior and reconnection behavior would comply, such as solid-state transfer switching or other.

2. System Operating Characteristics
   a. Identify the maximum nameplate rating in kW AC for each source (storage, any paired inverter-based distributed generation).
   b. Identify the maximum net export and import of the DG and/or ESS Stand-Alone system in kW AC
   c. Indicate the maximum ramp rates during charging and discharging.
   d. Indicate the maximum frequency of change of operating modes (i.e. charging to discharging and vice-versa) that will be allowed based upon control system configurations
   e. Indicate any specific and/or additional operational limitations that will be imposed (e.g. will not charge between 4-9pm 7 days a week).
   f. Provide a summary of protection and control scheme functionality and provide details of any integrated protection of control schematics and default settings within controllers.
   g. Provide descriptions of any software functionality that enables intelligent charging and discharging of the ESS using interconnected DG, such as PV. For example, if the ESS can be charged only through the DG input, or if the ESS can be switched to be charged from the line input, provide those details in a sequence of operations. Provide details on grounding of the interconnected energy storage and/or DG system to meet utility effective grounding requirements.
   h. Provide short circuit current capabilities and harmonic output from the Hybrid Project or stand-alone storage system
   i. Provide details on standard communication hardware interfaces that are available, e.g., TCP/IP, serial, etc.
   j. Provide details on standard communication protocols that are available, e.g., MODBUS, DNP-3, 2030.5, etc.
   k. Provide details on standard communication data models that are available, e.g., 61850-90-7, SunSpec, MESA, etc.
3. System Participation

a. Will the system operate in participation in any Holy Cross programs and be compensated under a Holy Cross tariff(s)? If yes, please specify.

HOLY CROSS ENERGY

January 2020

DISTRIBUTED GENERATORS and ENERGY STORAGE SYSTEMS INTERCONNECT (GUIDELINES)

I. FUNDAMENTALS

A. General

Producer's generators, Qualifying Facilities, Small Power Producers, Non-Utility Generators and Generators are herein designated as "Producer." Holy Cross Energy is herein designated as "Holy Cross". The term "generator" in these guidelines refers to any device or system which produces or stores electricity suitable for interconnection to the Holy Cross distribution system.

These Guidelines enact **minimum** provisions for safe and effective Parallel Systems Operation (PSO) with the Holy Cross facilities. They do not discuss every fine distinction and complication associated with designing a protection scheme. These guidelines provide guidance for larger generation interconnects that are not covered under the **LEVEL 1 PROCESS** and **LEVEL 2 PROCESS** criteria outlined in the Small Generation Interconnection Procedures document.

Contact Information:

Holy Cross Energy
Attn: Power Supply Department
3799 Highway 82, Glenwood Springs, Colorado 81602
(970) 945-5491

B. Policy

It is the policy of Holy Cross to authorize PSO for generations with the Holy Cross facilities. Such installations shall be installed with **NO** adverse effects to the general public, Holy Cross facilities or personnel, and other Interconnection customer's equipment or personnel.

Protective devices (relays, circuit breakers, etc.) and metering equipment, detailed herein, shall be installed at locations where a Producer desires PSO. The purpose of the protective device is to rapidly disconnect the Producer's equipment from the Holy Cross System when faults or abnormal operations occur. These devices are mutually beneficial to Holy Cross and the Producer; however, it is the responsibility of the Producer to install the equipment necessary to protect its equipment. Modifications to the Holy Cross facilities may be required in order to accommodate PSO. These modifications will be done at the Producer's expense. Producer should discuss project plans with Holy Cross before purchasing or installing equipment. There are portions of the Holy Cross System that are not suited to PSO without extensive System upgrades.

Holy Cross has **NO** responsibility, either direct or implied, for the protection of the Producer's equipment. It is fully the responsibility of the Producer to protect its installation in such a manner that faults or other disturbances on the Holy Cross System shall not cause damage to the Producer's installation.

C. Sources

The Producer's facility must produce 60 Hz sinusoidal alternating current at the Holy Cross standard voltage (**SECTION 2**) and phase rotations (ABC counterclockwise), and meet all other operating requirements (harmonics, power quality, etc.) specified herein.

D. PSO or Hot Transfer

A PSO facility transfers power between the Producer and the Holy Cross System. It is a direct and often desired effect for revenue generating Producers. A Hot Transfer System will typically parallel with the Holy Cross System for a short time to minimize the disturbance caused by switching between the two systems. Hot transfer Systems have the same interconnection requirements unless a failsafe interlocking system is approved and demonstrated to limit the parallel time to less than one (1) second.

Holy Cross facilities are subjected to an assortment of environmental (lightning, wind, and ice) and man-made hazards. Short-circuits, grounded conductors, and open conductors are the electric problems which are the outcome of these hazards. These subject problem conditions pose an elevated risk to the public and to the operation of the Holy Cross System. Prompt de-energizing of involved equipment is essential. Producer's facilities shall have adequate protective devices to sense problems on the Holy Cross System and promptly disconnect from all sources.

PSO can also cause a condition known as "accidental isolating" or "islanding." This condition is created when a portion of the Holy Cross load is isolated from the Holy Cross System but is still connected to a Producer's facilities. Such load could continue to operate but at abnormal voltage and/or frequency. Correctly installed protective relaying, installed by the Producer, will avoid accidental isolating or islanding. Requirements are minimal for small facilities and increase with the complexity of the Producer's generating system. General and specific requirements for PSO of various sizes are discussed in following sections.

E. Liability

This section is a guide for Holy Cross and the Producer for responsibilities and liabilities. Any obligation detailed in the actual contract between the parties that conflict with this guide takes precedence over this guide.

The terms "approve", "approved", and "approval" used within this guide means acceptance. Acceptance by Holy Cross is not an endorsement of Producer's design, specifications or facility. Acceptance by Holy Cross does not relieve the Producer of any responsibility for the safety or reliability of the Producer's equipment. Each Party shall be responsible for and shall defend, indemnify and hold the other Party harmless from and against any and all claims or causes of action for personal injury, death, property damage or loss, or violation of governmental laws, regulations or orders, which injury, death, damage, loss or violation occurs on or is caused by operations of equipment or facilities on the party's respective side of the point of connection. Notwithstanding the above, each Party shall be solely responsible for and shall defend, indemnify and hold harmless the other Party from and against any and all claims or causes of action for personal injury, death, property damage or loss, or violation of governmental laws, regulations or orders, wherever occurring, which injury, death, damage, loss or violation is due solely to the acts or omissions of such Party, including the use of defective equipment or faulty installation or maintenance of equipment by such party. However, nothing contained in this section shall be construed as relieving or releasing either Party from liability for personal injury, death, property damage or loss, or violation of governmental laws, regulations or orders,

wherever occurring, resulting from its own negligence or the negligence of any of its officers, servants, agents or employees. In the event of concurrent negligence, liability shall be apportioned between the Parties according to each Party's respective fault. Neither Party shall be liable to the other or any other third party, in contract or in tort or otherwise, for loss of use of equipment and related expenses, expense involving cost of capital, claims of customers of either party as applicable, loss of profits or revenues, cost of purchase of replacement power, or any indirect, incidental or consequential loss or damage whatsoever.

Producer shall provide Holy Cross with documentation demonstrating that the Producer has obtained the liability insurance required by this Policy.

If use of the Producer's facility should cause unusual fluctuation or disturbance on, or inductive interference with the Holy Cross facility or other Holy Cross Member(s), then Holy Cross shall have the right to require the Producer to install, at the Producer's expense, suitable apparatus to correct such fluctuation, disturbance or interference.

II. GENERAL OPERATING CONDITIONS

A. De-energized Circuits

Producers shall not energize a de-energized Holy Cross owned circuit(s). Producers will be liable for any accident, injury, or damage resulting from an intentional or unintentional energizing of Holy Cross circuits. Producers will be disconnected immediately for energizing a de-energized circuit and will not be reconnected until all issues that resulted in the action are resolved to the satisfaction of Holy Cross.

B. Disconnecting from Holy Cross Facilities

Producers will disconnect from Holy Cross facilities when requested for routine maintenance, etc. of Holy Cross equipment, or if notified by Holy Cross that system conditions require the removal. Holy Cross shall disconnect Producer manually or automatically, without notice, for system emergencies. When a Producer is disconnecting from Holy Cross facilities for its own purposes, Producer's will notify Holy Cross prior to disconnecting.

1. The location of the disconnects shall be clearly indicated preferably on the informational plaque
2. Solar PV: DC Disconnects are required and typically internal to inverters for system maintenance. Additional DC disconnects may be required to meet Rapid Shutdown requirements per Article 690.12 of the NEC
3. Energy Storage Systems: At least one lockable, visible blade DC disconnect is required for first responders on external DC conductors between the battery and the inverter (not required for self-contained systems). Additional disconnects may be required in accordance with 2017 NEC 706.7(E), readily accessible and within sight of the ESS
4. Self-Contained Energy Storage Systems (Back Up Applications): A lockable, visible blade AC disconnect is required for first responders on self-contained systems when used in a backup application. The disconnect shall be located within sight of the battery, and before the backup panel. Additional disconnects may be required in accordance with 2017 NEC 706.7(E)
5. Isolation Switch: An isolation switch shall be required to automatically disconnect Holy Cross from any DG sources upon loss of primary power, and shall

not be reconnected until the primary source is restored in accordance with NEW 705.40

C. Revision, Replacement, or Design Change

Any change to the Producer's facility that affects the output, major components, or critical systems must be approved in writing by Holy Cross prior to the changes taking place.

III. HOLY CROSS FACILITY FACTS

A. Voltage

Primary distribution voltage for Holy Cross is **mostly** 25kV, effectively grounded, 4 wire facilities. Producer shall contact Holy Cross for specific circuit information where the Producer's facility is proposed.

B. Circuit Restoration

Because most faults on overhead lines are of a temporary nature, it is the general practice of Holy Cross to reclose its protection equipment (reclosers) on the distribution facilities within one and a half (1.5) seconds after automatically tripping open. Relaying shall be installed by the Producer to disconnect the generator(s) from Holy Cross faulted or isolated facilities before the reclosing operation. During a recloser operation there is some risk that the Producer's relaying is inadequate or too slow to separate the systems before the reclosing operation. The Producer may desire added protection to mitigate such risk. Holy Cross may be capable of providing "Hot Line Reclose Blocking" (HLRB) or Synch-Check Supervision at the reclosing point. The Producer is obligated to ascertain the necessity for this added protection. If needed, Holy Cross shall install, maintain and/or rearrange its equipment for HLRB, or other protection features. All design, materials, construction costs and ongoing maintenance costs associated with the added protection will be done at the expense of the Producer.

The Producer is responsible for ensuring proper disconnection of systems. It should be noted that out-of-sync reclosing is hazardous and potentially destructive to Producer's equipment.

C. Effective Grounding

A PSO facility design (through selection of transformer(s), generator(s), grounding, etc.) shall contribute to maintaining an effectively grounded system. Effective grounding limits the voltage rise, typically to 130%, on unfaulted phases during single-phase to ground fault conditions. To achieve this, a Producer's facility equivalent impedance (Thevenin equivalent impedance) shall meet the following criteria (reference IEEE Std 142-1982):

1. The positive sequence reactance must be greater than the zero sequence resistance ($X_1 > R_0$); and

2. The zero sequence reactance must be greater than or equal to two and one-half (2½) times the positive sequence reactance and less than or equal to three (3) times the positive sequence reactance ($2\frac{1}{2} X_1 <= X_0 <= 3X_1$).

When calculating the effective grounding networks, the networks should include the impedance for the following: The step-up transformer, generator subtransient reactance,

neutral grounding on the step-up transformer and generator cable runs greater than 50 feet in length.

There are many different system configurations that will meet the effective grounding requirements. Common guidelines and restrictions include, but are not limited to, the following:

1. Step-up transformer with a delta generator and a grounded-wye system must have a reactor in its grounded-wye neutral connection.

2. Line voltage producing generators, not using a step-up transformer, shall be adequately grounded (with grounding reactor in generator neutral) or use a grounding bank.

Substantial current flow into Producer generator(s) or grounding equipment can be caused by voltage imbalance on the Holy Cross System. Producer's equipment shall withstand allowable imbalances and operate during such conditions.

Producer shall consult Holy Cross for normal source impedance and current and voltage imbalance data for a given location before purchasing equipment to insure all devices are properly rated. Both steady state and short time duty shall be considered. Normal source is the ordinary arrangement of the Holy Cross facility, while a temporary source, due to maintenance, construction or emergency activities, will alter the source impedance of a Producer facility. Future changes to the Holy Cross System can impact the Producer's System. Any changes to the Producers System that are required to meet Holy Cross System changes are the responsibility of the Producer.

Solidly grounded generators can be harmonic sources or sinks and should be avoided. Generators that cannot tolerate severe phase current imbalance should have a grounding bank.

D. HCE Ground Relays

When a Producer's facility is operating in parallel with a Holy Cross facility, the ground relays associated with the Holy Cross substation will become de-sensitized during a single-phase to ground fault. To maintain protection of Holy Cross facilities, the Producer shall not limit the Holy Cross contribution to a single-phase to ground fault to less than 90% of the value without the Producer's ground source on line.

Before a Producer selects a site and purchases equipment, Holy Cross recommends that the Producer's plans be reviewed by Holy Cross' Engineering Department. Holy Cross may limit a Producer from adding generation to certain feeders due to system requirements and/or protection issues.

E. Ungrounded Distribution Connected Producers

Ungrounded generators under 100 kW may be used if under all conditions and at all times the islanded generator load shall be greater than two (2) times larger on each phase than the generator per phase kW rating.

Grounding is required even when anticipated relaying will take the islanded generator offline in a few cycles. This will preclude an ungrounded source from serving a Holy Cross load for any length of time and/or providing extremely high voltage to other Holy Cross Members on the same feeder as the Producer.

IV. HOLY CROSS FACILITY INTEGRITY

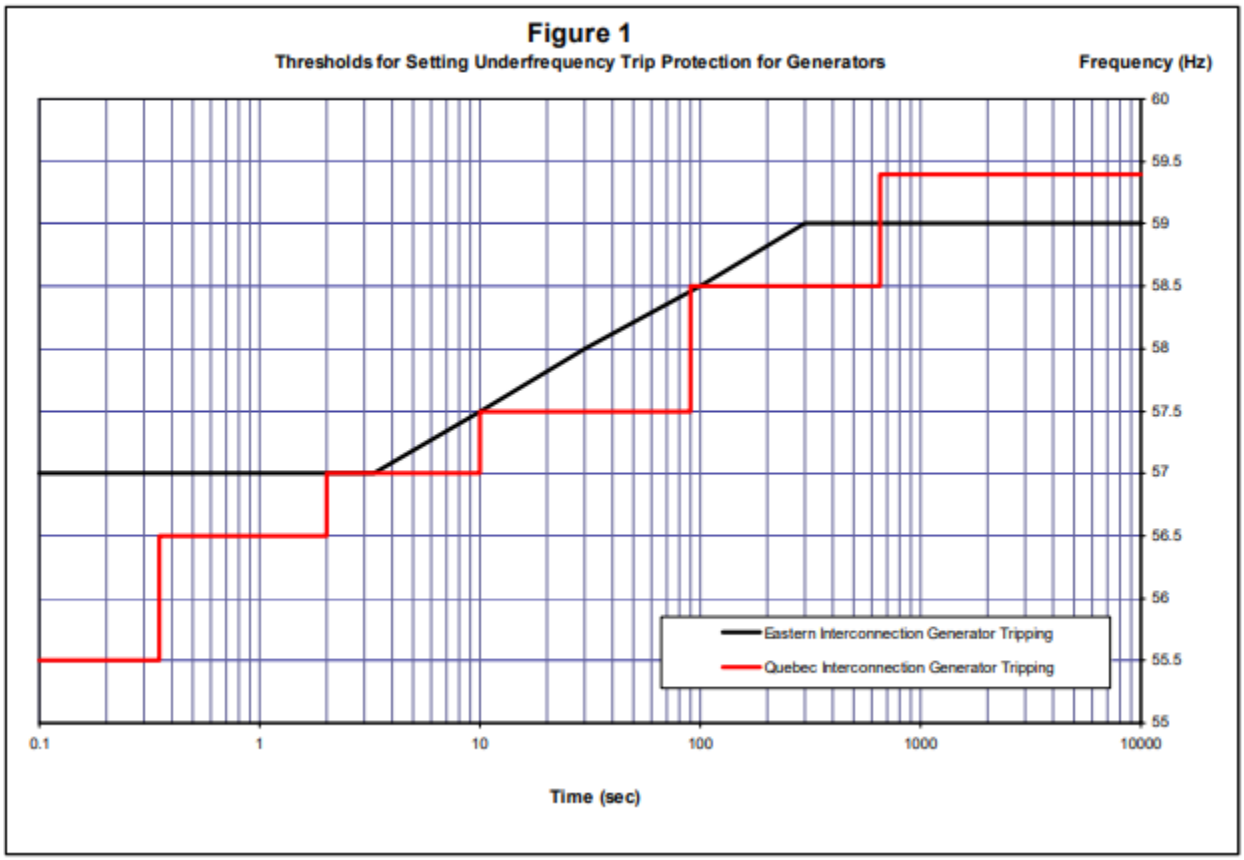
A. General

Interconnection of Producer's facilities with Holy Cross facilities shall not cause a reduction in the quality of service to other Holy Cross Members. Producer's facilities shall not cause abnormal voltages, frequencies, or interruptions. Producer shall immediately disconnect from the Holy Cross facilities if notified that Holy Cross receives a high or low voltage, transient voltage, or voltage distortion complaint. The Producer will be allowed to reconnect to the Holy Cross facility after the Producer has resolved the problem. It is the responsibility of the Producer to maintain the generator(s) in good working order so that the voltage, frequency, Total Harmonic Distortion (THD), power factor, and VAR requirements are continually met.

B. Frequency Response

All DG and/or ESS facilities are to operate at a nominal frequency of 60Hz with an operating range from 59.3hZ to 60.5hZ. If deemed necessary due to abnormal system conditions, Holy Cross may request that a generator operate at frequency range below 59.3hZ in coordination with the load shedding schemes of Holy Cross. All DG and/or ESS facilities are also responsible to comply with the most current version of IEEE 1547 and provide two levels of underfrequency protection and one or more levels of overfrequency protection.

Underfrequency set point and curve in the figure below from PRC-006-WECC on generator underfrequency settings.



Holy Cross shall require the following frequency trip setting which are consistent with the allowable ranges of the revised IEEE 1547-2018

Shall Trip Function	Default Settings (b)	
	Frequency (Hz)	Clearing Time(s)
OF2	62	0.16
OF1	61.2	300
UF1	58.5	300
UF2	56.5	0.16

Holy Cross shall require the following frequency ride-through capability which are consistent with the allowable ranges of the revised IEEE 1547-2018

Frequency Range (Hz)	Operating Mode	Minimum Time(s) (design criteria)
f > 62.0	No ride-through requirements apply to this range	
61.2 < f ≤ 61.8	Mandatory Operation	297-300
58.8 ≤ f ≤ 61.2	Continuous Operation	Infinite
57.0 ≤ f < 58.8	Mandatory Operation	297-300
f < 57.0	No ride-through requirements apply to this range	

C. Harmonics

Harmonics on the power system from all sources shall be minimized. The THD from the facility shall be measured at the facility's metering point or point of common coupling (PCC). The Producer must meet or exceed the current addition of IEEE Std. 519. The following Tables are reprinted from IEEE Std. 519-1992.

CURRENT DISTORTION LIMITS FOR GENERAL DISTRIBUTION SYSTEMS
(120V through 25kV)

Maximum Harmonic Current Distortion in percent % of I_L						
	Individual Harmonic Order (Odd Harmonics*)					
I_{SC}/I_L	<11	11≤h<17	17≤h<23	23≤h<35	35≤h	TDD
<20**	4.0	2.0	1.5	0.6	0.3	5.0
20<50	7.0	3.5	2.5	1.0	0.5	8.0
50<100	10.0	4.5	4.0	1.5	0.7	12.0
100<1,000	12.0	5.5	2.0	2.0	1.0	15.0
>1,000	15.0	7.0	6.0	2.5	1.4	20.0

*Even harmonics are limited to 25% of the odd harmonic limits above.
**All power generation equipment is limited to these values of current distortion, regardless of actual I_{SC}/I_L.
Notes
1) Current distortions that result in a dc offset, e.g., half-wave converters, are not allowed.
2) I_{SC} = maximum short-circuit current at PCC.
3) I_L = maximum demand load current (fundamental frequency component) at PCC.

VOLTAGE (V) DISTORTION LIMITS

Buss V. @ PCC	Individual V. Distortion (%)	Total V. Distortion THD (%)
25kV and below	3.0	5.0

Any interference with customers or communications caused by Producer's harmonics in excess of federal, state and local codes shall be resolved at the expense of the Producer.

D. Voltage at Distribution Level

Operation of Producer's generator(s) shall not adversely affect the voltage stability of the Holy Cross System. Adequate voltage control shall be provided by the Producer to minimize voltage deviation on the Holy Cross System caused by changing generator source or loading conditions. In addition, the generator shall not cause the system voltage at the PCC to deviate from a range of 95% to 105% of the utility system voltage. For excursions outside these limits the protection device shall automatically initiate a disconnect sequence from the Holy Cross System as detailed in the most current version of IEEE 1547. Automatic power factor or VAR controllers shall be provided for installations using synchronous generators. Generator installations greater than five (5) kW shall maintain Power Factors between 95% leading and 90% lagging, inclusive, over an operating range of 25% to 100% of rating during all hours of operation. Operation with a leading power factor (VARS to generator) is a function of generator design and manufacturer rating and difficult for the Producer to control. However, if a Producer's facility is operating with a power factor less than 95% leading, the Producer shall be responsible for installing reactive power compensation to improve the overall power factor to greater than 95% leading. Power factor requirements shall be met at the point of delivery during all hours of operation and overall operating conditions.

Adequate generator reactive power shall be installed to withstand the normal voltage changes on the Holy Cross System. To insure proper coordination of voltages and regulator operations the generator voltage VAR schedule, voltage regulator and transformer ratings (with taps if applicable) will be jointly determined by Producer and Holy Cross

Induction generator starts which adversely impact the Holy Cross System voltage shall limit voltage changes and bring the unit to synchronous speed before connecting to the Holy Cross System using step-switched capacitors or other techniques.

Producer created voltage flicker (magnitude and frequency) shall not exceed the values given by Holy Cross in "**Appendix G**" of the "Consumer Service Facilities Metering Guidebook". Voltage flicker percentage is referenced to generator pre-synchronize or motor pre-start conditions. Holy Cross Members may have voltage sensitive loads; therefore, if Holy Cross receives complaints related to Producer's operation, the Producer shall be responsible for reducing voltage variations even if the current operation is within the guidelines.

Voltage flicker is normally measured at the interface between the Producer and Holy Cross. If voltage flicker problems occur, Holy Cross may also take measurements at the nearest Members.

The Producer is responsible for all associated damage caused to the equipment of other Holy Cross Members due to voltage flicker issues. It is suggested that a Producer review the "Computer Business Equipment Manufacturer's Association" (CBEMA) curve detailed in IEEE/ANSI Standard 446-1987, for typical equipment sensitivity to very short voltage disturbances.

Metering requirements will vary depending on the size and configuration of the Producer's equipment. Amps, volts, watts, vars, power factor, and harmonics could all be metered and recorded by various devices. Although these devices will probably be specified and installed by Holy Cross, all costs will be borne by the Producer.

Holy Cross shall require the following voltage trip setting which are consistent with the allowable ranges of the revised IEEE 1547-2018

Shall Trip - IEEE std 1547-2018 Category II		
Shall Trip Function (OV = Overvoltage UV = Undervoltage)	Voltage (per unit of nominal voltage)	Clearing Time(s)
OV2	1.20	0.16
OV1	1.10	2.0
UV1	0.88	2.0
UV2	0.50	1.1

Holy Cross shall require the following voltage ride-through capability which are consistent with the allowable ranges of the revised IEEE 1547-2018

Voltage Range (p.u.)	Operating Mode/Response	Range of Ride-through Time(s) (min – max)
V > 1.20	Cease to Energize	N/A
1.175 < V ≤ 1.20	Permissive Operation	0.2 – 2.0
1.15 < V ≤ 1.175	Permissive Operation	0.50 – 2.0
1.10 < V ≤ 1.15	Permissive Operation	1.00 – 2.0
0.88 ≤ V ≤ 1.10	Continuous Operation	Infinite
0.65 ≤ V < 0.88	Mandatory Operation	1.84 – 2.0

0.50 ≤ V < 0.65	Mandatory Operation	0.32 – 2.0
V < 0.50	Momentary Cessation (with a maximum response time of 0.083 seconds)	0.16 – 1.1

E. Dynamic Volt/Var Operations

The Smart Inverter shall be capable of operating dynamically within a power factor range of +/- 0.85 PF for all system sizes, down to 20% of rated active power. The default shall always be to activate this Volt/VAR capability. This dynamic Volt/VAR capability shall also be capable of being deactivated in accordance with HCE instructions.

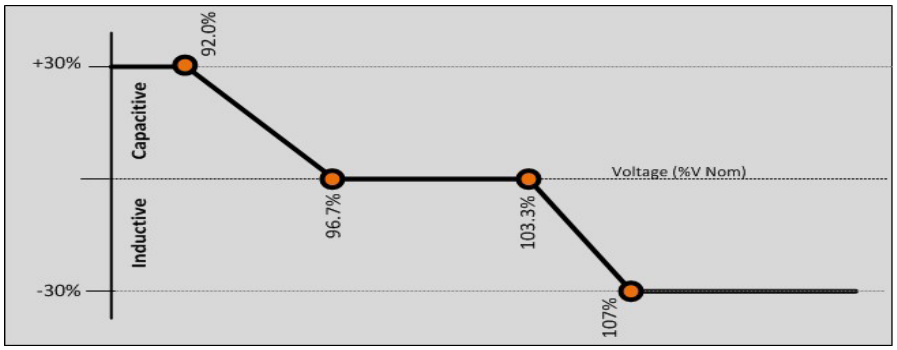
The Smart Inverter shall also be capable of providing dynamic reactive power compensation and dynamic Volt/VAR operation within the following constraints:

- The Smart Inverter shall be able to consume reactive power in response to an increase in line voltage and produce reactive power in response to a decrease in line voltage.
- The reactive power shall be per the range irrespective of real power production, but the maximum reactive power provided to the system shall be as determined by HCE.

Dynamic Volt/VAR Default Settings

- The Volt/VAR curve of the unit(s) must be set in the "On" position with the default settings shown below.
- Vref = 1.0 PU (100%)
- Open Loop Response Time for Volt/VAR operation should be set to five (5) seconds

Voltage Setpoint	Voltage Value	Reactive Setpoint	Reactive Value	Operation
V1	92.00%	Q1	30%	Reactive Power Injection
V2	96.70%	Q2	0	Unity Power Factor
V3	103.30%	Q3	0	Unity Power Factor
V4	107.00%	Q4	30%	Reactive Power Absorption



F. Reconnection to the Holy Cross System

If the generation facility is disconnected as a result of the operation of a protection device, the Producer's equipment shall remain disconnected until Holy Cross' service voltage and frequency have recovered to acceptable voltage and frequency limits as defined in the most current version of IEEE 1547 for a minimum of five (5) minutes. Systems greater than 25kW that do not utilize inverter-based interface equipment shall not have automatic recloser capability unless other approved by Holy Cross. If Holy Cross determines that a facility must receive permission to reconnect, then any automatic reclosing function must be disabled and verified to be disabled during verification testing.

V. BASIC DESIGN of DISTRIBUTED GENERATORS (less than 25Kw)

A. Codes

Producer installations must comply with all applicable National, State, and Local construction and safety codes.

B. Design Review

Most installations in the class feature a standard protection package offered by the manufacturer. Each package will be reviewed by Holy Cross Power Supply Department. All devices must be UL approved or have an exemption from the appropriate inspection authority.

The installation must be permanently wired into a suitable load center and a lockable disconnect must be provided that is readily accessible, at all times, to Holy Cross personnel. This switch is to be at the metering point unless an alternate location is readily accessible and easily identifiable. Alternate locations must be approved in writing by Holy Cross.

Refer to **APPENDIX A** for a typical generation protection one-line. These one-lines included in this document are intended to provide guidelines for minimum protection of the Holy Cross System. Holy Cross protection requirements are not for the protection of Producer equipment from short circuits, overload, equipment failure or other malfunctions of Producer loads or equipment. The Producer is responsible for design and protection of its own facility and equipment.

C. Inverter Systems

Inverter systems are harmonic sources. If a Producer's equipment is found to be interfering with the Holy Cross System, other Producers, or public communications, the interfering Producer will be required to install filtering or other corrective measures to bring the harmonic output of his inverter to within the values specified in **SECTION 4**. The 95% power factor requirement also applies to inverter systems.

Line commutated inverter systems are the preferred design for interconnection to the Holy Cross System. These systems, by design, will disconnect when the Holy Cross voltage source is removed.

Self-commutated inverter systems will self-excite and could back-feed into the Holy Cross System. The energizing of a de-energized circuit is discussed in **SECTION 2** and is not allowed.

A good companion book to the NEC is the "Photovoltaic Power System and the National Electric Code" booklet. This booklet is published by the Photovoltaic Design Assistance Center. To request a copy, call 505-844-3698.

VI. BASIC DESIGN of GENERATORS (greater than 25kW)

A. Codes

Producer installations must comply with all applicable National, State, and Local construction and safety codes including UL 1741 SA

B. Protective Devices

Protection, control and synchronizing equipment shall be installed by the Producer as required by Holy Cross. The minimum protective elements are shown in the one-line diagrams at the back of this document.

Manual disconnecting equipment capable of interrupting maximum available fault current shall be accessible, at all times, to Holy Cross personnel. Such equipment shall be capable of being locked open by Holy Cross.

For Generators greater than 500 kW Direct Transfer Trip and/or Electric Recloser shall be required

1. Direct Transfer Trip

   Where required by project screening criteria, the Company will install, own, and operate a Customer billable Direct Transfer Trip (DTT) scheme from upstream sectionalizing devices to a Company owned reclosing device near the PCC. The communication requirements for DTT include a latency of less than 35 milliseconds and ability to alarm on loss of a communication path. The Company uses Schweitzer Engineering Laboratories' mirrored bits® communication protocol with either licensed radio paths or fiber optic communication paths however alternatives will be considered if they meet the communication requirements.

   DTT is specifically considered for rotating machines that do not pass anti-islanding screens individually, or with aggregate generation on the feeder section. DTT may need to be added to existing facilities due to the increase of other forms of generation in the same feeder sections.

   When transfer trip is required, DG and/or ESS Customer is responsible to provide the following in the facility design:

   a) A circuit breaker capable of receiving an external trip via a shunt trip or undervoltage release.

   b) Seven feet of unobstructed horizontal wall space in the generator control building to mount a Company owned communications and controls cabinet.

   c) An ungrounded DC source from an uninterruptible power source to the Company owned communications and controls cabinet. The preferred voltage is 24VDC and the power requirements of Company equipment connected to the 24VDC source typically do not exceed 35W but should be verified prior to purchase of the power supply

2. Electronic Recloser

All DG and/or ESS facilities with a rated capacity greater than 500kW AC will require the installation of a Company owned, gang operated, electronic recloser near the PCC. Synchronous and induction generators smaller than 500 kW typically require a recloser, especially when DTT is necessary. After a fault the unit will attempt to reclose when nominal system conditions have been restored. At DG and/or ESS facilities with rotating machines, the recloser may be configured to prevent the generator from restarting for a fixed period of time to limit the visible voltage fluctuations on the area EPS caused by starting inrush current.

C. Grounding

Facilities shall maintain effective grounding requirements (**SECTION 3**).

D. Specifications

Producer shall submit a detailed design and engineering package at least 3 months prior to interconnection. The design and engineering shall include, but may not be limited to, the following:

1. Service voltage and location of the point of interconnection
2. Electrical one-line of Producer's System including the point of common connection and the AC and DC schematics
3. Detailed description of connects and disconnects of Producer's System (how and where)
4. Capacity and ownership of all circuits and equipment
5. Capacity and interrupting ratings for all equipment (including protective relaying with settings)
6. Electrical ratings (impedance, voltage, current, etc.) for all major equipment (generators, breakers, and step-up transformers, etc.).
7. Detailed description of special control equipment
8. Electrical performance curves (accuracy class/secondary excitation, rating correction factor) for all instrument transformers required for metering and relaying
9. Right-of-Way and easements for installation, operation, maintenance, replacement and removal of Holy Cross facilities
10. Intended operating mode(s) and in-service dates

E. Design Review

Holy Cross will review the protection and control design and accept or outline additional functions and supportive data which must be provided. The review of the design will include cost estimates for modifications to the Holy Cross System that is required to accommodate the interconnection. Rejected plans must be modified by the Producer and re-submitted to Holy Cross for review. To avoid unnecessary costs associated with

changes to design plans, the design package should be submitted prior to the Producer ordering equipment, or beginning detailed engineering activities.

Refer to **APPENDIX B** and **APPENDIX C** for typical generation protection one-lines. These one-lines included in this document are intended to provide guidelines for protection of the Holy Cross System. Holy Cross protection requirements will not necessarily provide protection for the Producer equipment from short circuits, overload, equipment failure or other malfunctions. The Producer is responsible for design and protection of its own facility and equipment.

F. Metering

Metering requirements will vary depending on the size and configuration of the Producer's equipment. Amps, volts, watts, vars, power factor, and harmonics could all be metered and recorded by various devices. Although these devices will probably be specified and installed by Holy Cross, all costs will be burdened by the Producer.

Distributed Generation facilities greater than 500 kW shall be required to provide real time telemetry back to the Holy Cross dispatch control center. All costs associated with the telemetry equipment and the ongoing lease charges of the communications lines shall be the responsibility of the Producer.

A. Telemetry, Monitoring, and Control
Generation facilities rated above 500kW require telemetry. At the minimum this is to include:

Net kW (+)
Net kW (-)
Net KVAR (+)
Net KVAR (-)
Net kWh (+)
Net kWh (-)
Voltage (kV)
SOC (%) for ESS
Recloser status (control may also be required)

All values are to be delivered in near real time, defined as samples every 5 seconds or less with less than one second delivery delay.

Holy Cross will provide, at cost to the customer, a remote terminal unit (RTU) to interface with the PCC recloser and in most cases the facility inverters or master controller. The implementation of supervisory control and data acquisition (SCADA) to the inverters, including remote power factor adjustment, active power curtailment, ramp rate, and scheduling, will depend upon the site and terms of the generation interconnection agreement.

If necessary, the customer is responsible to provide a suitable environmentally controlled space for telemetry equipment inside a generator building. At locations without a generator building, the customer will be billed for a pole mounted, heated, rack mount cabinet for placement of the RTU and associated network service provider equipment.

The telemetry cabinet requires battery backup and 120V station service. The responsibility to supply and maintain battery backup and station service should be agreed upon between the Holy Cross and the customer prior to execution of the generator interconnection agreement and can vary depending upon the facility design.

B. Communications

The customer is responsible for all communication costs associated with engineering access, metering data, and telemetry at distributed resource sites. Inverter based facilities 500kW and below generally do not require any communications. Acceptable forms of communication include:

1. Business Grade, Private Cellular (Compatible Network)
2. Business Grade, Private Ethernet LAN
3. Holy Cross Fiber Optic Cable (where available)
4. Holy Cross operated, licensed radios

G. Demonstration

One month (minimum) prior to a Producer demonstrating the operation of the generation equipment, a written testing procedure outlining the testing of relay(s), breaker(s), generator(s), and voltage and VAR requirements shall be provided to Holy Cross. Holy Cross will witness sufficient testing to determine the safe operation of the Producer's facility. These tests will include, but may not be limited to, trip checks, calibration checks and in-service checks. The Producer is responsible for providing personnel to perform all testing. The Producer is financially responsible for all Holy Cross labor costs associated with Holy Cross witnessing.

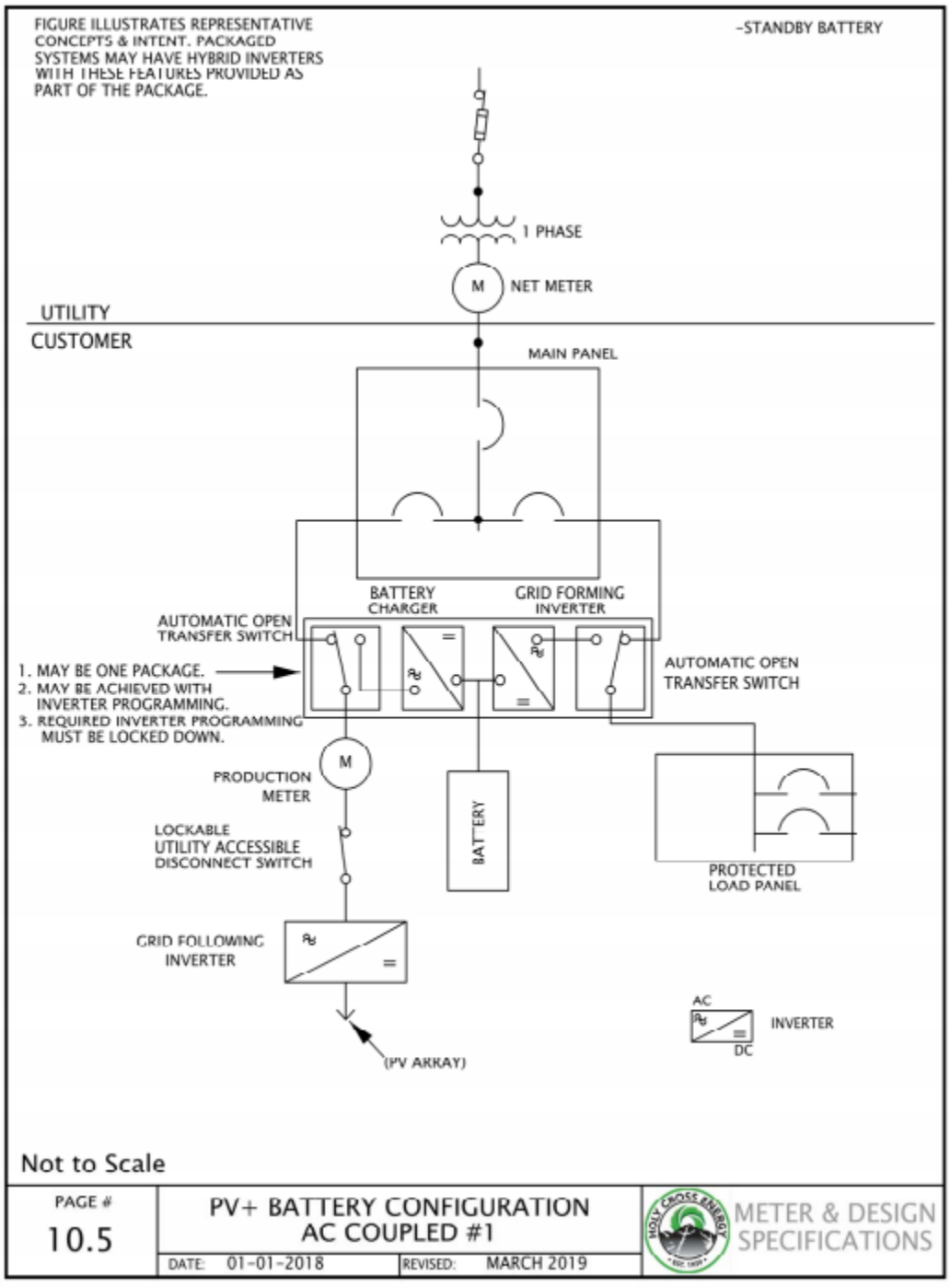
When witness testing is complete the unit can be released for PSO.

H. Operating Procedures

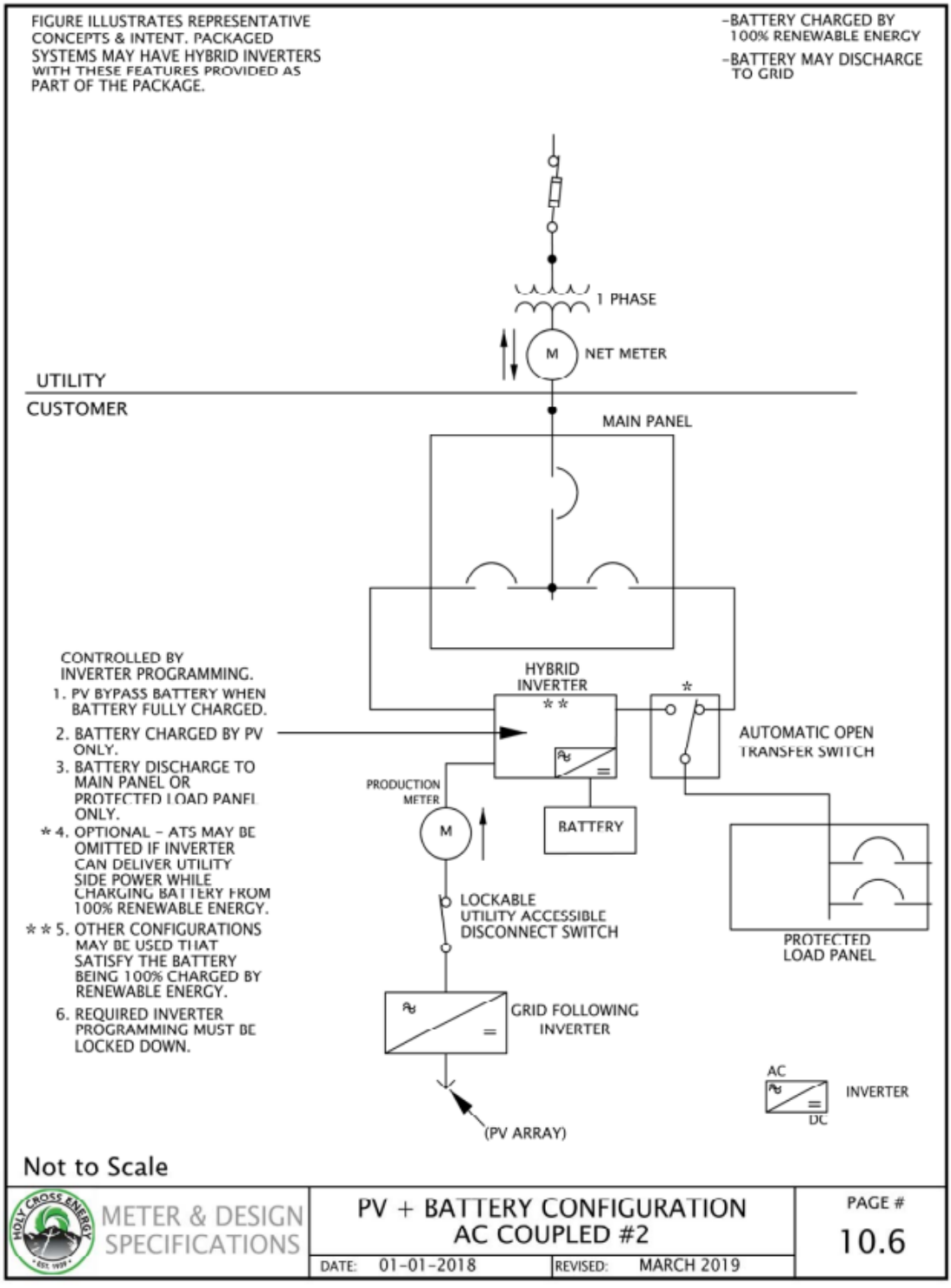
The Producer shall submit Operating Procedures to Holy Cross for review and acceptance. The Operating Procedures will include, but not be limited to, the following:

1. Written description of normal startup and shutdown procedures.
2. Written description of emergency shutdown procedures.
3. Physical description of the location of the facility.
4. Phone number, for voice communications, at the facility.
5. Name, phone number and address of owner.
6. Name, phone number and address of operating agent.
7. Name, phone number and address of design engineer.
8. List of major components (breaker, transformer, generator, etc.)

APPENDIX A
(Typical Certified Standby DG and ESS Less than 25 kW)



APPENDIX B
(Typical Parallel Generation DG and ESS Less than 25 kW)



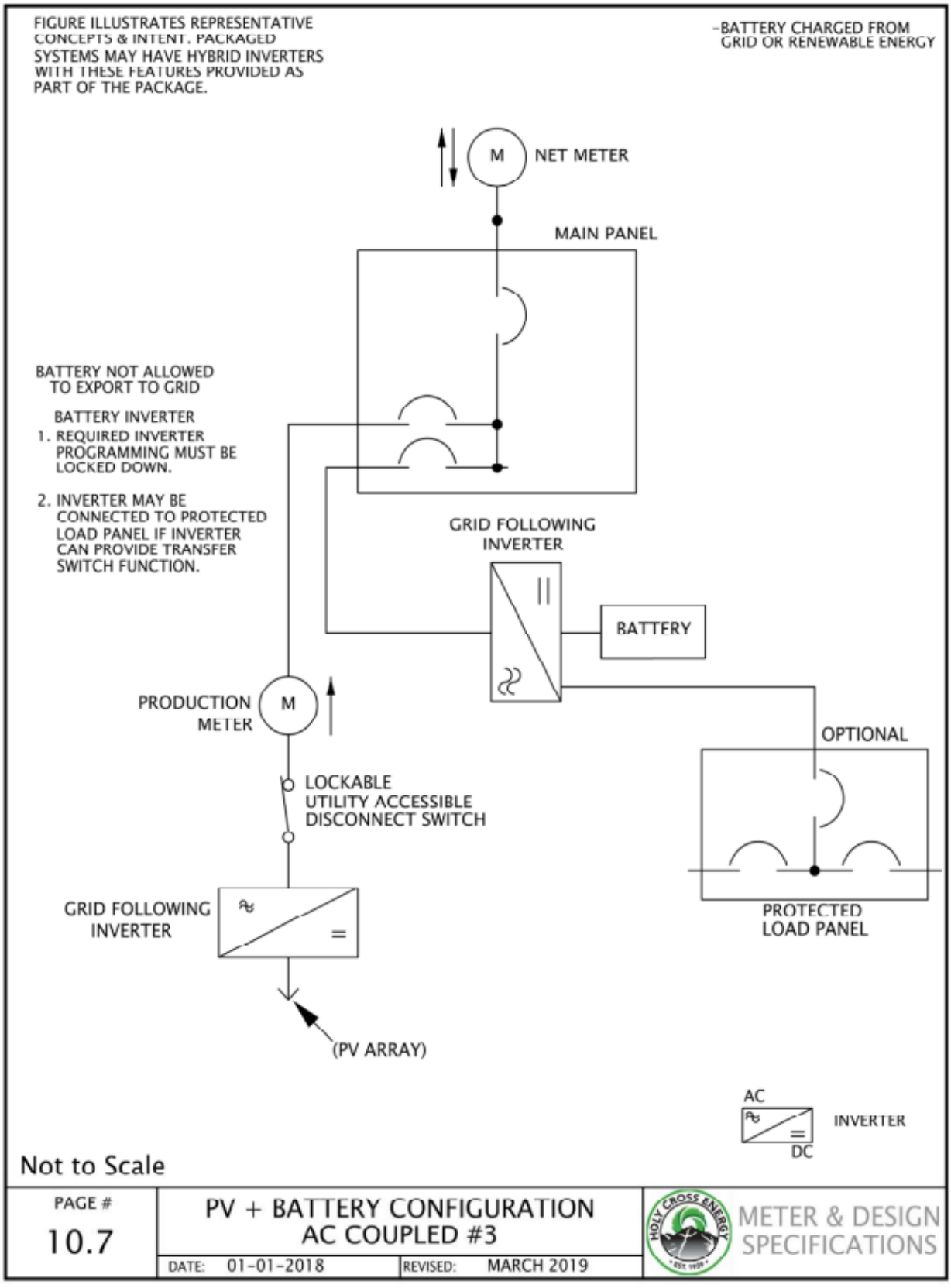


FIGURE ILLUSTRATES REPRESENTATIVE CONCEPTS & INTENT. PACKAGED SYSTEMS MAY HAVE HYBRID INVERTERS WITH THESE FEATURES PROVIDED AS PART OF THE PACKAGE.
-BATTERY CHARGED FROM GRID OR RENEWABLE ENERGY
M
NET METER
MAIN PANEL
BATTERY NOT ALLOWED TO EXPORT TO GRID
BATTERY INVERTER
1. REQUIRED INVERTER PROGRAMMING MUST BE LOCKED DOWN.
2. INVERTER MAY BE CONNECTED TO PROTECTED LOAD PANEL IF INVERTER CAN PROVIDE TRANSFER SWITCH FUNCTION.
GRID FOLLOWING INVERTER
BATTERY
PRODUCTION METER
M
OPTIONAL
LOCKABLE UTILITY ACCESSIBLE DISCONNECT SWITCH
GRID FOLLOWING INVERTER
PROTECTED LOAD PANEL
(PV ARRAY)
AC
DC
INVERTER
Not to Scale
PAGE #
10.7
PV + BATTERY CONFIGURATION
AC COUPLED #3
DATE: 01-01-2018
REVISED: MARCH 2019
METER & DESIGN SPECIFICATIONS

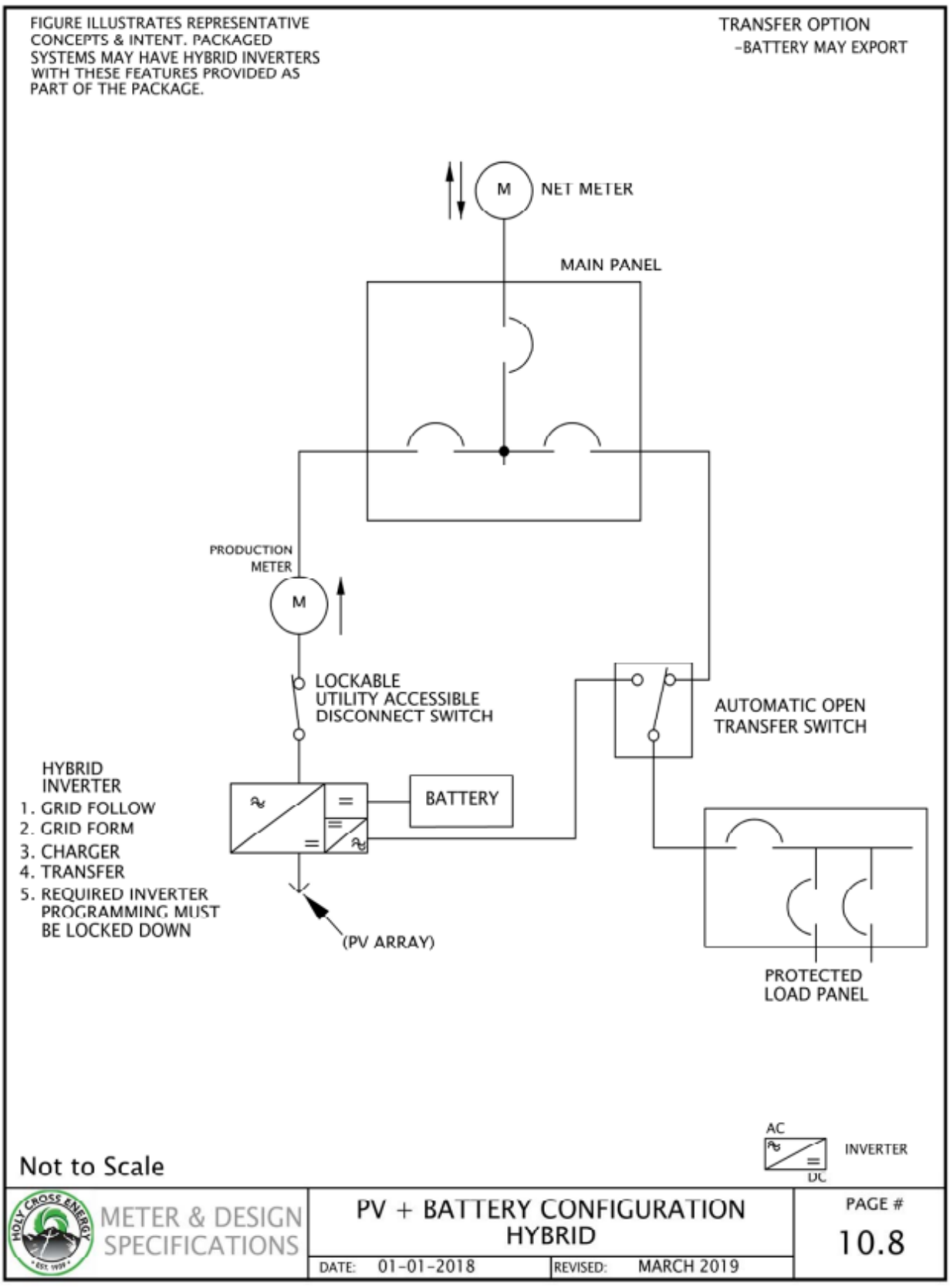
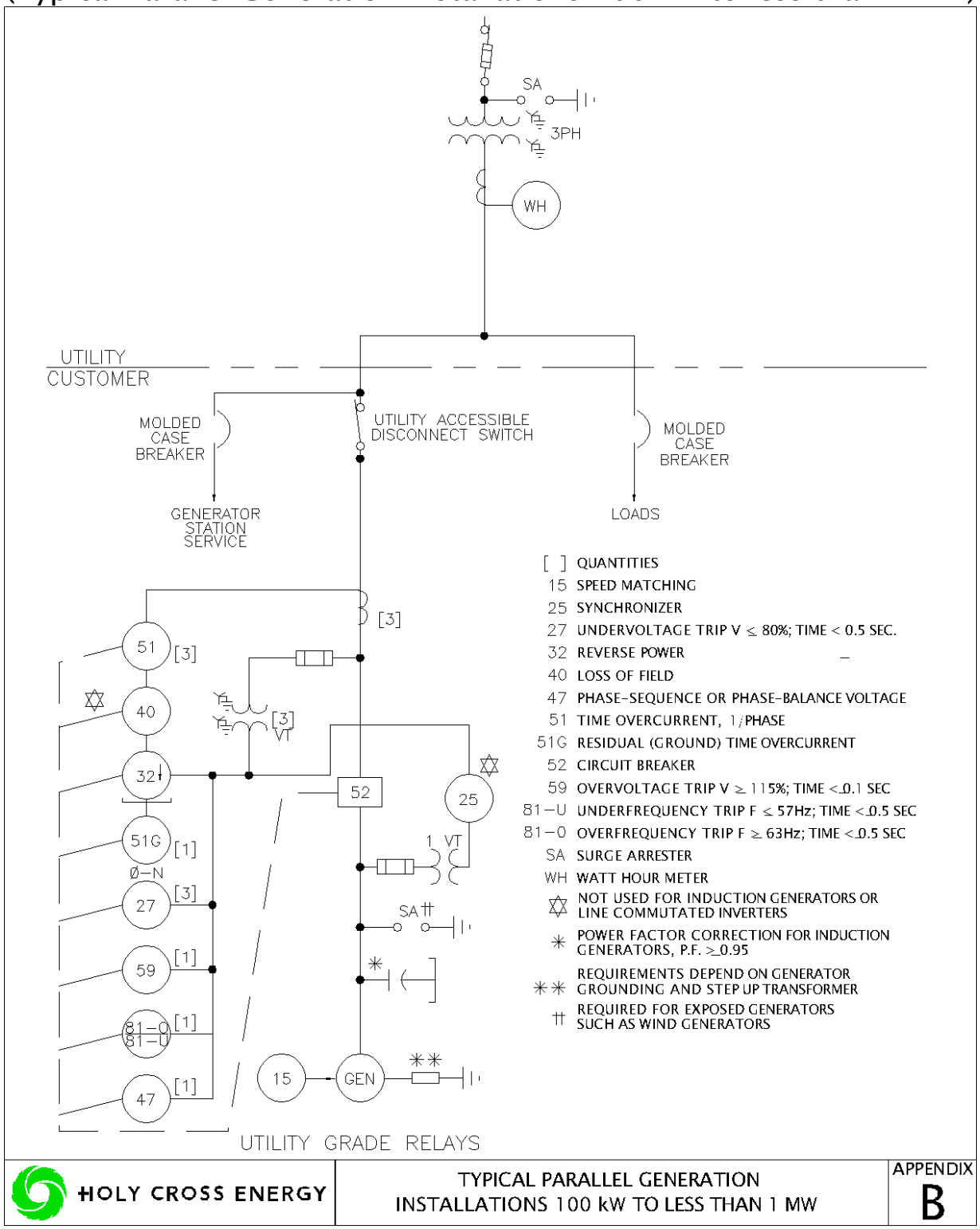


FIGURE ILLUSTRATES REPRESENTATIVE CONCEPTS & INTENT. PACKAGED SYSTEMS MAY HAVE HYBRID INVERTERS WITH THESE FEATURES PROVIDED AS PART OF THE PACKAGE.
TRANSFER OPTION -BATTERY MAY EXPORT
M
NET METER
MAIN PANEL
PRODUCTION METER
M
LOCKABLE UTILITY ACCESSIBLE DISCONNECT SWITCH
AUTOMATIC OPEN TRANSFER SWITCH
HYBRID INVERTER
1. GRID FOLLOW
2. GRID FORM
3. CHARGER
4. TRANSFER
5. REQUIRED INVERTER PROGRAMMING MUST BE LOCKED DOWN
BATTERY
(PV ARRAY)
PROTECTED LOAD PANEL
Not to Scale
AC
DC
INVERTER
METER & DESIGN SPECIFICATIONS
PV + BATTERY CONFIGURATION
HYBRID
DATE: 01-01-2018
REVISED: MARCH 2019
PAGE #
10.8

APPENDIX C
(Typical Parallel Generation Installations 100 kW to less than 2 MW)



APPENDIX D
(Typical Parallel Generation Installations 2 MW to less than 20 MW)