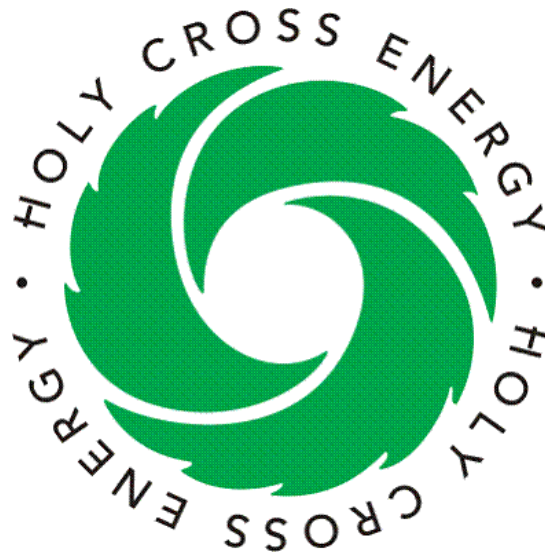


# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***GENERATOR INTERCONNECT POLICY***



***GENERATOR INTERCONNECT (PROCEDURE)***

***GENERATOR INTERCONNECT (GUIDELINES)***

P:\Generator Interconnect Policy\HCE Interconnection Policy – Rev 3 (2008.12.1789).pdf

# HOLY CROSS ENERGY

June 1, 2008

## TABLE OF CONTENTS

<b>GENERATOR INTERCONNECT (PROCEDURE)</b> .....	<b>4</b>
I.    GENERAL OVERVIEW .....	5
A.  Applicability.....	5
B.  Pre-Application.....	6
C.  Application Contents.....	6
D.  Modification of the Application.....	7
E.  Site Control Documentation .....	7
F.  Queue Position.....	8
G.  Regulatory Approvals, Permits, and Certification .....	8
H.  Execution of Interconnection Agreement .....	8
I.  Limitation of Interconnection Approval.....	9
J.  Construction, Ownership and Operation.....	9
II.   LEVEL 1 PROCESS (INVERTER TYPE GENERATION) .....	10
III.  LEVEL 2 PROCESS (FAST TRACK) .....	11
IV.  LEVEL 3 PROCESS (FEASIBILITY AND FACILITIES IMPACT STUDIES).....	13
V.   COMMISSIONING, INSPECTION AND TESTING REQUIREMENTS.....	15
A.  Completion and Commencement of Parallel Operation .....	15
B.  Commissioning Testing.....	16
C.  Maintenance and Inspection .....	16
D.  Insurance.....	9
VI.  NET METERING .....	17
ATTACHMENT 1 (DEFINITIONS) .....	18
ATTACHMENT 2 (CERTIFICATION CODES & STANDARDS).....	20
ATTACHMENT 3 (CERTIFICATION Of GENERATOR EQUIPMENT PACKAGES).....	21
ATTACHMENT 4 (APPLICATION) .....	22
ATTACHMENT 5 (MODEL INTERCONNECTION AGREEMENT).....	27
ATTACHMENT 6 (CERTIFICATE of COMPLETION) .....	35
<b>GENERATOR INTERCONNECT (GUIDELINES)</b> .....	<b>36</b>
I.    FUNDAMENTALS.....	37
A.  General.....	37
B.  Policy.....	37
C.  Sources.....	38
D.  PSO or Hot Transfer .....	38
E.  Liability.....	38
II.   GENERAL OPERATING CONDITIONS.....	39
A.  De-energized Circuits.....	39
B.  Disconnecting from Holy Cross Facilities .....	39
C.  Revision, Replacement, or Design Change .....	39
III.  HOLY CROSS FACILITY FACTS .....	39
A.  Voltage .....	39
B.  Circuit Restoration .....	40
C.  Effective Grounding.....	40
D.  HCE Ground Relays.....	41
E.  Ungrounded Distribution Connected Producers .....	41
IV.  HOLY CROSS FACILITY INTEGRITY.....	41
A.  General.....	41
B.  Harmonics .....	42
C.  Voltage at Distribution Level .....	43
V.   BASIC DESIGN of GENERATORS (less than 25Kw).....	43

# HOLY CROSS ENERGY

June 1, 2008

A.	Codes .....	43
B.	Design Review .....	44
C.	PV and Inverter Systems .....	44
VI.	BASIC DESIGN of GENERATORS (greater than 25kW) .....	44
A.	Codes .....	44
B.	Protective Devices .....	44
C.	Grounding.....	45
D.	Specifications.....	45
E.	Metering .....	46
F.	Design Review.....	45
G.	Demonstration .....	46
H.	Operating Procedures.....	46
	APPENDIX A (Typical Parallel Generation Installations 25 kW to less than 100 kW) .....	47
	APPENDIX B (Typical Parallel Generation Installations 100 kW to less than 1 MW).....	48
	APPENDIX C (Typical Parallel Generation Installations 1 MW to less than 5 MW).....	49

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***GENERATOR INTERCONNECT (PROCEDURE)***



# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***(PROCEDURE)***

The following Generator Interconnect Procedure (Procedure) shall apply to all generation resources including eligible renewable energy resources applying for connection to the Holy Cross Energy (Holy Cross) 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 a Consumer to interconnect a Generating Facility (GF) with the Holy Cross System, as follows:
  - a) An inverter-based Generating Facility (GF) that is certified and has a rated capacity up to and including ten (10) kW shall be evaluated under the **LEVEL 1 PROCESS**.
  - b) An inverter-based GF that is Certified and has a rated capacity greater than ten (10) kW and less than one (1) MW shall be evaluated under the **LEVEL 2 PROCESS**.
  - c) A GF that has a rated capacity greater than one (1) MW but less than five (5) MW or a GF 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 (below)**.
2. The Application shall be evaluated using the maximum rated capacity of the GF. If the Application is for an increase in capacity for an existing GF, the Application shall be evaluated on the basis of the new total capacity of the GF. If the Application is for a GF that includes multiple energy production devices at a site for which the Consumer 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 Consumer 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 Consumer 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 Consumer 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 electric reliability authority and the Public Utilities Commission. The Consumer shall provide all security measures required by Holy Cross.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## **B. Pre-Application**

1. Holy Cross, through its Engineering Department, will provide information about the Application process and Holy Cross' System upon request from a Consumer accompanied by a description of a proposed project and project site.
2. Contact information shall be made available on Holy Cross' web site (<http://www.holycross.com>).
3. System information for specific project locations provided to the Consumer 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 Consumer that is proprietary or confidential. All design, operating specifications, and metering data provided by the Consumer shall be deemed confidential information to the extent so marked or designated in writing by the Consumer. Confidential information does not include information previously required to be publically 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 Consumer.
5. Holy Cross may at its option, or upon request of a Consumer, conduct a pre-application conference, at which information provided to the Consumer and information to be provided by the Consumer in the Application may be reviewed informally.

## **C. Application Contents**

1. The Consumer shall submit an Application to Holy Cross as required in this Procedure, together with the processing fee or deposit specified in the Application. The Application shall be date stamped upon receipt. The date stamp applied to the Application at the time of its original submission shall be accepted as the qualifying date stamp for the purposes of any timetable in this Procedure.
2. The Application shall include the following information: description of project equipment and specifications; project design drawings; site plan/layout; map showing location; 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 Consumer; and such other information as Holy Cross shall have advised the Consumer, is required in connection with its Application or that is required under any provision of the Procedures or Guidelines. If other entities will have responsibility for interfacing with Holy Cross with respect to the Application, the Consumer must provide all necessary contact information in the Application.
3. Consumer 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 Consumer shall be notified of receipt of the Application by Holy Cross within three (3) Business Days of such receipt

# ***HOLY CROSS ENERGY***

*June 1, 2008*

5. Holy Cross shall notify the Consumer 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 Consumer will have ten (10) Business Days after receipt of such deficiency notice to submit the listed information.
  - c) If the Consumer 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 Consumers, whether the GF 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 Consumer as required by this Procedure. The Consumer 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 Consumer shall be deemed a withdrawal of the Application. Consumer 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. 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 GF; or

# ***HOLY CROSS ENERGY***

*June 1, 2008*

- b) An option to purchase or acquire a leasehold site for such purpose; or
- c) An exclusivity or other business relationship between the Consumer and the entity having the right to sell, lease, or grant the Consumer 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 stamp of the Application.
2. The order of each Application will be used to determine the cost responsibility of the Consumer for any System upgrades that Holy Cross determines are necessary to accommodate the interconnection. The Consumer(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 Consumers 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 Consumer 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 GF 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 Consumer in confirming the applicable requirements.
2. In connection with submitting an Application pursuant to the Level 1 Process or Level 2 Process, the Consumer 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. Consumers that obtain certification of their GFs 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 Consumer shall have 30 Business Days to sign and return the Interconnection Agreement.
2. If the Consumer does not sign the Interconnection Agreement within 30 Business Days, the Application shall be deemed withdrawn.
3. After the Interconnection Agreement is signed by Consumer and Holy Cross, the interconnection of the GF shall proceed under the provisions of the

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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 (i) Holy Cross being satisfied that all requirements for System safety, protection, and reliability are met, as determined in connection with approval of the Application, (ii) execution by Consumer of an Interconnection Agreement with Holy Cross; and (iii) all costs of interconnection, including any required System upgrades, being paid by .Consumer, subject to Consumer 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 Consumer 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 Consumer'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 Consumer or a third party for construction of any or all of these facilities.
2. The Consumer will normally construct and own all Consumer 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 Consumer Interconnection Facilities, Holy Cross may require use of certain Holy Cross design standards or certain manufacturers approved by Holy Cross. Consumer shall be required to maintain their own parts inventories.

## **K. Insurance**

1. For systems of ten (10) kW or less, the Consumer, 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 above ten (10) kW but not more than one (1) MW, the Consumer, 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 \$2,000,000 for each occurrence.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

3. Insurance coverage for systems greater than one (1) 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 installed on a residential premise which have a design capacity of ten (10) 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 solar systems, the liability insurance shall not exclude coverage for any incident related to the subject GF 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 GF.
8. Holy Cross shall be permitted to periodically obtain proof of current insurance coverage from the generating consumer in order to verify proper liability insurance coverage.
9. Consumer 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)**

- A. This process shall be used for evaluating any Application for interconnection of a Certified inverter-based GF no larger than ten (10) kW that meets the codes, standards and certification requirements of **ATTACHMENT 2** and **ATTACHMENT 3** of this Procedure.
  1. The Consumer 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 GF to a radial distribution circuit, the aggregated generation, including the proposed GF, shall not exceed fifteen percent (15%) of the Line Section annual peak load as most recently measured or calculated at the substation.
    - b) If the proposed GF is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the proposed GF, shall not exceed ten (10) kW.
    - c) If the proposed GF is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition shall not create an imbalance

# ***HOLY CROSS ENERGY***

*June 1, 2008*

between the two sides of the 240 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 GF.
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 GF can be interconnected safely and reliably to its System and Consumer is otherwise in compliance with the applicable requirements of the Procedure, Holy Cross shall notify the Consumer that its Application is accepted. Holy Cross shall endeavor to complete processing of the Application within 5 Business Days of the Application being deemed complete. After processing of the Application is complete, an executable Interconnection Agreement will be provided to the Consumer 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 GF larger than ten (10) kW but no larger than one (1) MW if the proposed GF meets the codes, standards, and certification requirements of **ATTACHMENT 2** and **ATTACHMENT 3** of this Procedure.
  1. The Consumer 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 GF Point of Interconnection must be on a portion of the Holy Cross System that is subject to its tariffs.
    - b) For interconnection of a proposed GF to a radial distribution circuit, the aggregated generation, including the proposed GF, shall not exceed fifteen percent (15%) of the Line Section's annual peak load as most recently measured or calculated at the substation.
    - c) The proposed GF, 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.
    - d) The proposed GF, 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 Consumer 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.
    - e) If the proposed GF is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the

# ***HOLY CROSS ENERGY***

*June 1, 2008*

proposed GF, shall not exceed 20 kW.

- f) If the proposed GF is single-phase and is to be interconnected on a center tap neutral of a 240 volt service, its addition shall not create an imbalance between the two sides of the 240 volt service of more than twenty percent (20%) of the nameplate rating of the service transformer.
  - g) No construction of facilities by Holy Cross on its System shall be required to accommodate the GF.
- B. If Holy Cross determines that the proposed interconnection passes the screens, the Application shall be approved and Holy Cross will provide to the Consumer 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 GF may nevertheless be interconnected consistent with safety, reliability, and power quality standards, Holy Cross shall provide to the Consumer 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 GF 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 Consumer of such determination. Such notice shall include (i) a description of any required modifications to the Consumer's facilities or to Holy Cross' System or alternatively any investigation required to address safety, reliability, power quality or other issues; (ii) copies of relevant data and analyses; (iii) a proposed date for a Consumer 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 Consumer Options Meeting, Holy Cross shall:
- 1. If modifications to Consumer's facilities are required, describe the modifications that Consumer 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 Consumer notifies Holy Cross that it agrees to make, or to have Holy Cross make, the necessary modifications at the Consumer's expense, Holy Cross shall provide to Consumer 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 GF 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 Consumer's agreement.
- F. If the Consumer agrees to a supplemental review in writing within 15 Business Days of the offer, the Consumer shall submit a deposit for the estimated costs. The Consumer

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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 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 GF can be interconnected safely and reliably.
  - 1. If no modifications are required, Holy Cross shall forward an executable Interconnection Agreement to the Consumer within five (5) Business Days after notice to Consumer of its determination.
  - 2. If modifications to the Consumer's facilities are required to allow the GF to be interconnected consistent with safety, reliability, and power quality standards under this Procedure, Holy Cross shall forward an executable Interconnection Agreement to the Consumer within five (5) Business Days after confirmation that the Consumer has agreed to make the necessary changes at the Consumer's expense.
  - 3. If minor modifications to Holy Cross' System are required to allow the GF to be interconnected consistent with safety, reliability, and power quality standards under this Procedure, Holy Cross shall forward an executable Interconnection Agreement to the Consumer within five (5) Business Days after confirmation that Consumer 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 GF 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 Consumer's agreement.

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

- A. This process shall be used by a Consumer proposing to interconnect its generating facility with the Holy Cross System if the GF meets any of the following conditions:
  - 1. Has a rated capacity larger than one (1) MW but not larger than five (5) 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 discuss the Application Feasibility Study, Facilities Impact Study and the Interconnection Agreement.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

- b) If the Parties agree that a Feasibility Study should be performed, Holy Cross shall provide the Consumer 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, a Consumer who has requested a Feasibility Study must return the executed Feasibility Study Agreement within 15 Business Days.
- d) If the Parties agree not to perform a Feasibility Study, Holy Cross shall provide the Consumer 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 GF.
- b) A deposit will be required from the Consumer 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 Consumer 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 Consumer 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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

- e) Holy Cross may contract with consultants to perform activities required under the Facilities Impact Study Agreement.
  - f) Consumer may request and Holy Cross may then authorize, in its discretion, the Consumer 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 Consumer, in accordance with confidentiality restrictions and critical infrastructure requirements (see I.A.4) to enable the Consumer 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 Consumer.
  - 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 Consumer an executable Interconnection Agreement within five (5) Business Days pursuant to which the Consumer 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 "GENERATOR INTERCONNECT GUIDELINES" (Guidelines).
  - b) The Guidelines provide minimum protection requirements for interconnection with the Holy Cross System for Level 3 generation facilities and the Consumer 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 GF and associated facilities, the Consumer 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 GF
2. Consumer shall notify Holy Cross of its planned date for commencement of parallel operation of the GF and its testing and commissioning schedule. Following such notice Holy Cross shall inspect the GF for compliance with the Consumer'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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

3. Consumer 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."
4. Holy Cross will notify the Consumer in writing, fax, or e-mail of the results of its inspection and testing and whether interconnection of the GF 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 GF. An additional witness test may be scheduled by Holy Cross within ten (10) Business Days following the Consumer'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 Consumer of a failed test.

## **B. Commissioning Testing**

1. Testing of the Consumer's installed equipment shall be performed pursuant to applicable codes and standards, including IEEE1547.1 2005 "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 Consumer 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 Consumer shall file a schedule of planned maintenance with Holy Cross, specifying dates, times, means and procedures planned. No GF shall commence interconnected operations until Holy Cross approves the relevant maintenance schedule.
2. Holy Cross has the right to inspect the GF 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 Consumer 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 Consumer's GF 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 Consumer shall perform the specified maintenance, modifications or changes in operation or repairs, prior to the disconnection. Upon completion thereof, the Consumer 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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

- b) If Holy Cross finds non-compliance with the required measures, it may disconnect the GF as specified in the disconnection notice.
- c) Nothing herein shall prevent Holy Cross from disconnecting the GF in case of an emergency.

## **VI. NET METERING**

- A. Holy Cross shall allow the Consumer's retail electricity consumption to be offset by the electricity generated from "Eligible Renewable Energy Resources" (ERR) in accordance with the Renewable Energy Net Metering Service as described in Holy Cross' Electric Service Tariffs, Rules and Regulations, provided that:
  - 1. The rated capacity of the generator does not exceed twenty-five (25) kW; and
  - 2. The rated capacity of the generator does not exceed the Consumer's service entrance capacity.
- B. If the rated capacity of the generator exceeds twenty-five (25) kW, Holy Cross will negotiate net metering on a case-by-case basis.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***ATTACHMENT 1 (DEFINITIONS)***

1. Application – The Consumer's request to interconnect a new Generating Facility, or to increase the capacity of, or make a material modification to the operating characteristics of, an existing Generating Facility that is interconnected with the Holy Cross Energy System.
2. Business Day – Monday through Friday, excluding Federal Holidays.
3. Certified or Certification – With reference to a GF, meeting the codes and standards set forth in Attachment 2 and Attachment 3 to this Procedure, to the satisfaction of Holy Cross.
4. Consumer – Any entity, that proposes to interconnect or that has a Generating Facility that is interconnected with the Holy Cross Energy System.
5. Consumer Options Meeting – A meeting held with Holy Cross and Consumer to discuss available options if the Application cannot be approved.
6. Facilities impact Study – A study performed by Holy Cross and paid for by Consumer 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.
7. Feasibility Study – A study performed by Holy Cross and paid for by Consumer to determine the effects of the GF interconnect on the Holy Cross System.
8. Generating Facility (GF) – The Consumer's devices for the production of electricity as identified in the Application, not including the Interconnection Facilities not owned by the Consumer, as schematically depicted in the Application.
9. Interconnection Agreement - An Agreement between Holy Cross and the Consumer to allow the interconnection of a Generating Facility to the Holy Cross System.
10. Interconnection Facilities – include Holy Cross's Interconnection Facilities and the Consumer's 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.
11. Line Section – A portion of the Holy Cross system connected to the Consumer at the Point of Interconnection, bounded by automatic sectionalizing devices or the end of the distribution line.
12. Party or Parties – Holy Cross Energy, Consumer or any combination of the above.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

13. Point of Interconnection - The point where the Consumer's 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.
14. 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 ten (10) 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.
15. 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.
16. Generating Facility (GF) - The Consumer's device for the production of electricity identified in the Application. Such Application shall not include the Interconnection Facilities not owned by the Consumer.
17. System - The facilities owned, controlled, or operated by Holy Cross that are used to provide electric service under its tariff.
18. 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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***ATTACHMENT 2 (CERTIFICATION CODES & STANDARDS)***

1. IEEE1547 Standard for Interconnecting Distributed Resources with Electric Power Systems (including use of IEEE 1547.1 testing protocols to establish conformity)
2. UL 1741 Inverters, Converters, and Controllers for Use in Independent Power Systems
3. IEEE Std 929-2000 IEEE Recommended Practice for Utility Interface of Photovoltaic (PV) Systems NFPA 70 (2005), National Electrical Code
4. IEEE Std C37.90.1-1989 (R1994), IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems
5. IEEE Std C37.90.2 (1995), IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers
6. IEEE Std C37.108-1989 (R2002), IEEE Guide for the Protection of Network Transformers
7. IEEE Std C57.12.44-2000, IEEE Standard Requirements for Secondary Network Protectors
8. IEEE Std C62.41.2-2002, IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000V and Less) AC Power Circuits
9. IEEE Std C62.45-1992 (R2002), IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits
10. ANSI C84.1-1995 Electric Power Systems and Equipment - Voltage Ratings (60 Hertz)
11. IEEE Std 100-2000, IEEE Standard Dictionary of Electrical and Electronic Terms
12. NEMA MG 1-1998, Motors and Small Resources, Revision 3
13. IEEE Std 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
14. NEMA MG 1-2003 (Rev 2004), Motors and Generators, Revision 1

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***ATTACHMENT 3 (CERTIFICATION OF GENERATOR EQUIPMENT PACKAGES)***

1. 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 consumer 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 Consumer 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 Consumer 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 consumer 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.

# HOLY CROSS ENERGY

June 1, 2008

## ATTACHMENT 4 (APPLICATION)

This Application is considered complete when it provides all applicable and correct information required below. Additional information to evaluate the Application may be required.

Please check one of the following processes.

\_\_\_ LEVEL 1 PROCESS (INVERTER TYPE GENERATION)

\_\_\_ LEVEL 2 PROCESS (FAST TRACK)

\_\_\_ LEVEL 3 PROCESS (FEASIBILITY AND FACILITIES IMPACT STUDIES)

### Processing Fee

No processing fee is required for PV installations of 25kW or smaller.

A processing fee of **\$ 250** must accompany all other Applications.

### Consumer

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: State: Zip: \_\_\_\_\_

Phone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_

# ***HOLY CROSS ENERGY***

*June 1, 2008*

**Engineering Firm (If Applicable):**

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

City: State: Zip: \_\_\_\_\_

Phone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**Contact (if different from Consumer)**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: State: Zip: \_\_\_\_\_

Phone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

# HOLY CROSS ENERGY

June 1, 2008

Owner of the facility (include % ownership by any electric utility):

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**GF Information [ten (10) kW Inverter or Less]**

Location (if different from above):

-----

Account Number: -----

Inverter Manufacturer: -----

Inverter Model: -----

Nameplate Rating: ----- (kW) ----- (kVA) ----- (AC Volts)

Single Phase ----- Three Phase -----

System Design Capacity: ----- (kW) ----- (kVA)

Is the equipment UL1741 Listed? Yes ----- No -----

If Yes, attach manufacturer's cut-sheet showing UL1741 listing

Estimated Installation Date: -----

Estimated In-Service Date: -----

# ***HOLY CROSS ENERGY***

*June 1, 2008*

**LEVEL 1 PROCESS** is available only for inverter-based GF no larger than ten (10) kW that meet the codes, standards, and certification requirements of **ATTACHMENT 2** and **ATTACHMENT 3**, or Holy Cross has reviewed the design or tested the proposed GF and is satisfied that it is safe to operate.

List components of the GF equipment package that are currently certified:

## **Equipment Type & Certifying Entity**

1	-----
2	-----
3	-----
4	-----
5	-----
6	-----
7	-----
8	-----

# ***HOLY CROSS ENERGY***

*June 1, 2008*

I hereby certify that, to the best of my knowledge, the information provided in this Application is true. I agree to abide by the terms of the "Interconnection Agreement" (ATTACHMENT 5) for interconnecting an inverter-based GF no larger than 10kW and return the "Certificate of Completion" (ATTACHMENT 6) when the GF has been installed.

Signed: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

## **Contingent Approval to Interconnect the GF**

**\*\*\*\*\* For Holy Cross Energy Use Only \*\*\*\*\***

Interconnection of the GF is approved contingent upon the "Interconnection Agreement" (ATTACHMENT 5) for interconnecting an inverter-based GF no larger than ten (10) kW and return of the "Certificate of Completion" (ATTACHMENT 6).

Holy Cross Energy Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Application ID number: \_\_\_\_\_

HCE waives inspection/witness test? Yes \_\_\_\_\_ No \_\_\_\_\_

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## **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 \_\_\_\_\_ (“Consumer”). 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 Consumer’s device for the production of electricity identified in an interconnection request, but shall not include the Interconnection Facilities not owned by the Consumer, as schematically depicted on Attachment A, attached hereto and incorporated herein by this reference.

(c) “Interconnection Facilities” include Holy Cross’s Interconnection Facilities and the Consumer’s 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 Consumer’s 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 Consumer to interconnect a Generating Facility to the System, located at \_\_\_\_\_ (Consumer’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 Consumer, the public, and the employees of each party.

3. **Service to be Provided.** Holy Cross shall deliver and sell to Consumer, and Consumer shall receive and purchase from Holy Cross, during the term of, and subject to, the provisions of

# ***HOLY CROSS ENERGY***

*June 1, 2008*

this Agreement, all electric power and energy as may be required by Consumer in addition to the electric power and energy produced by the Consumer's Generating Facility. All electric power and energy delivered by Holy Cross to the Consumer at the Point of Interconnection shall be paid for by the Consumer 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 Consumer.** Consumer shall, own, operate, and maintain all facilities on the load side of the Point of Interconnection necessary to enable Consumer to take and use the electric energy provided by Holy Cross in accordance with the Electric Tariffs. Such Consumer facilities shall include the Generating Facility and all appurtenant equipment necessary to own, operate, and maintain the Generating Facility. Consumer shall provide suitable space on Consumer'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 Consumer'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.

**8. Design, Construction, Operation.** Consumer shall be responsible for the design, construction, installation, operation, maintenance, and replacement or repair of the Generating Facility and the Consumer's Interconnection Facilities so that, at all times, the Consumer complies with Holy Cross's Interconnection Policy and Guidelines as set forth in the Electric Tariffs. Consumer 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.** Consumer 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 Consumer 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

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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 Consumer 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 Consumer. The Consumer shall be responsible for all costs associated with witness tests conducted by Holy Cross.

**11. Commissioning Tests.** Commissioning tests of the Consumer'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 Consumer 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 Consumer 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 Consumer'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 Consumer's 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 Consumer, require the Consumer to conform the Generating Facility or the Consumer's Interconnection Facilities to specifications set forth in the Electric Tariffs at the Consumer's sole expense within thirty (30) days after informing the Consumer of the required changes, or Holy Cross may disconnect the Generating Facility from the System and terminate this Agreement.

**15. Right to Locate Facilities.** Consumer hereby grants to Holy Cross the right to use the premises of Consumer for the purpose of providing the Interconnection Facilities necessary to connect the Consumer's 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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

**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 Consumer when possible prior to using its right of access.

**17. Disconnection.** The interconnection of the Consumer's 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 Consumer 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 Consumer to minimize downtime.

**18. Billing and Payment.** Consumer 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 Consumer'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 Consumer 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 Consumer within that time, the unpaid balance shall bear interest at the rate of one and one half percent (1.5%) per month. If the Consumer 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 Consumer 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 Consumer, Holy Cross shall be entitled to recover from Consumer its reasonable attorney's fees, expenses, and court costs

**19. Force Majeure.** Holy Cross shall not be liable for failure or fault in the delivery of electrical energy to the Consumer 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.

**20. 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

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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.

**21. 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.

**22. Insurance .** Consumer 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 10 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 Consumer in order to verify proper liability insurance coverage. Consumer will not be allowed to commence or continue interconnected operations unless evidence is provided that satisfactory insurance coverage is in effect at all times.

**23. Termination.** This Agreement may be terminated by the Consumer with thirty (30) days written notice to Holy Cross. In the event Consumer 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 Consumer of any of the terms of this Agreement or the Electric Tariffs. The Consumer shall have thirty (30) days from the date that Holy Cross sends written notice to the Consumer 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 Consumer 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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

**24. 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.

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

**26. 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.

**27. 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 Consumer shall not constitute a waiver of the Consumer's legal rights to obtain an interconnection from Holy Cross. Any waiver of this Agreement shall, if requested, be provided in writing.

**28. 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.

**29. 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.

**30. 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.

**31. 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

# HOLY CROSS ENERGY

June 1, 2008

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 Consumer or its subcontractors with respect to obligations of the Consumer 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.

- 32. 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:

Consumer :

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Holy Cross:

Steve Casey  
Member Services and Marketing Administrator  
P.O. Box 2150  
Glenwood Springs, CO 81602-2150

- 33. 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.

- 34. 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 Consumer by Holy Cross and to electric energy supplied to Holy Cross by the Consumer.

- 35. 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.

- 36. 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.

- 37. 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

# HOLY CROSS ENERGY

June 1, 2008

performance and injunctive relief, in addition to any other remedies that may exist at law or in equity.

**38. 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 nonprevailing 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:

Consumer

Holy Cross

Name (Print): \_\_\_\_\_

Name (Print): \_\_\_\_\_

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

# **HOLY CROSS ENERGY**

*June 1, 2008*

## **ATTACHMENT 6 (CERTIFICATE of COMPLETION)**

Please check one of the following processes.

\_\_\_\_ LEVEL 1 PROCESS (INVERTER TYPE GENERATION)

\_\_\_\_ LEVEL 2 PROCESS (FAST TRACK)

\_\_\_\_ LEVEL 3 PROCESS (FEASIBILITY AND FACILITIES IMPACT STUDIES)

### **Consumer**

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.

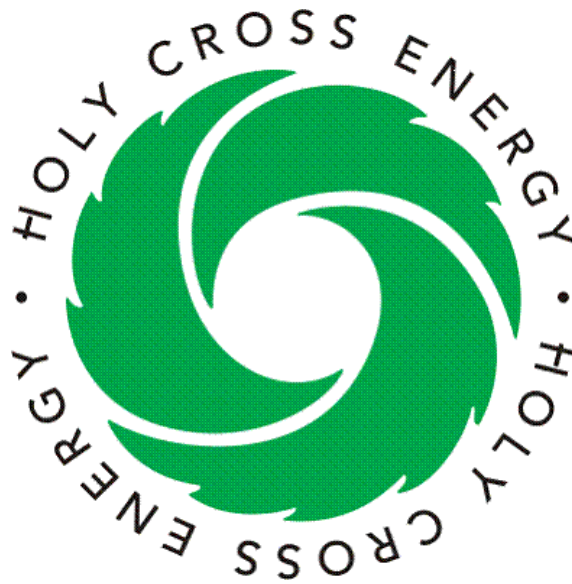
Signed \_\_\_\_\_

Date \_\_\_\_\_

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***GENERATOR INTERCONNECT (GUIDELINES)***



# ***HOLY CROSS ENERGY***

*June 1, 2008*

## ***(GUIDELINES)***

### **I. FUNDAMENTALS**

#### **A. General**

Producer's generators, Qualifying Facilities, Small Power Producers, Non-Utility Generators and Consumer-Owned 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 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: Engineering Department  
3799 Highway 82, Glenwood Springs, Colorado 81602  
(970) 945-5491

#### **B. Policy**

It is the policy of Holy Cross to authorize PSO for Producer generation 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 consumer'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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## **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 fail safe 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

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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 consumer(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.

### **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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## **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-line 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 ( $2\frac{1}{2}$ ) times the positive sequence reactance and less than or equal to three (3) times the positive sequence reactance ( $2\frac{1}{2} X_1 \leq X_0 \leq 3X_1$ ).

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 grounded-wye high side and low side
2. Step-up transformer with a delta generator and a grounded-wye system must have a reactor in its grounded-wye neutral connection.
3. 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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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-line to ground fault. To maintain protection of Holy Cross facilities, the Producer shall not limit the Holy Cross contribution to a single-line 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 off line 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 consumers 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 consumers. 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, Total Harmonic Distortion (THD), power factor, and VAR requirements are continually met.

# HOLY CROSS ENERGY

June 1, 2008

## B. 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 $I_L$						
<u>Individual Harmonic Order (Odd Harmonics*)</u>						
$I_{sc}/I_L$	<11	$11 \leq h < 17$	$17 \leq h < 23$	$23 \leq h < 35$	$35 \leq h$	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. DistortionTHD (%)
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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

## **C. 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. 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 over all 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 and Use Guidebook". Voltage flicker percentage is referenced to generator pre-synchronize or motor pre-start conditions. Holy Cross consumers 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 consumers.

The Producer is responsible for all associated damage caused to the equipment of other Holy Cross consumers 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.

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

### **A. Codes**

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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 engineering. 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. PV and 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.

### **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.

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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.

## **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

# ***HOLY CROSS ENERGY***

*June 1, 2008*

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 born by the Producer.

Generation facilities greater than one (1) MW may 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.

## **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:

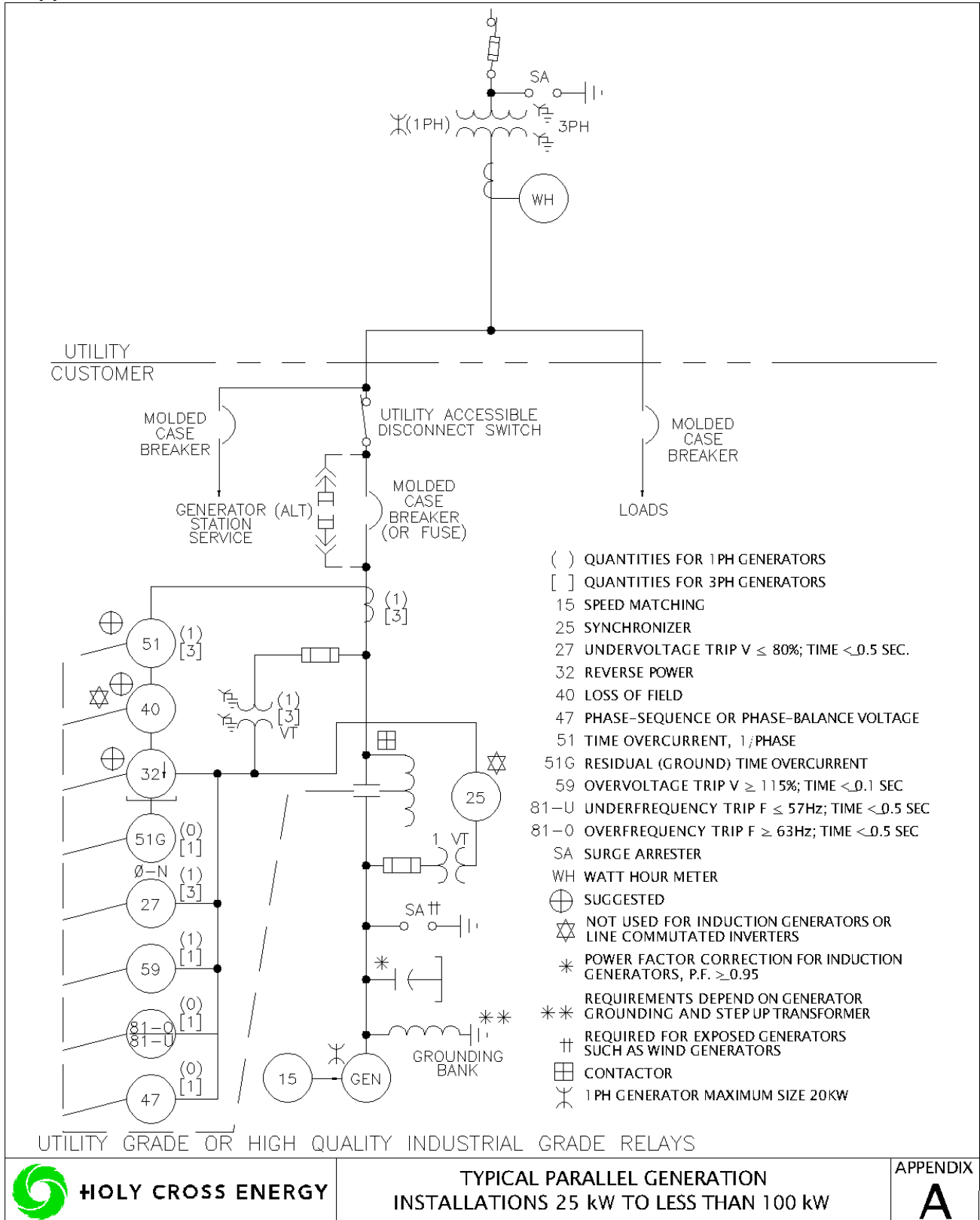
1. Written description of normal startup and shutdown procedures.
2. Written description of emergency shutdown procedures.
3. Physical description of the location of the facility.
4. Phone number, for voice communications, at the facility.
5. Name, phone number and address of owner.
6. Name, phone number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

# HOLY CROSS ENERGY

June 1, 2008

## APPENDIX A

(Typical Parallel Generation Installations 25 kW to less than 100 kW)

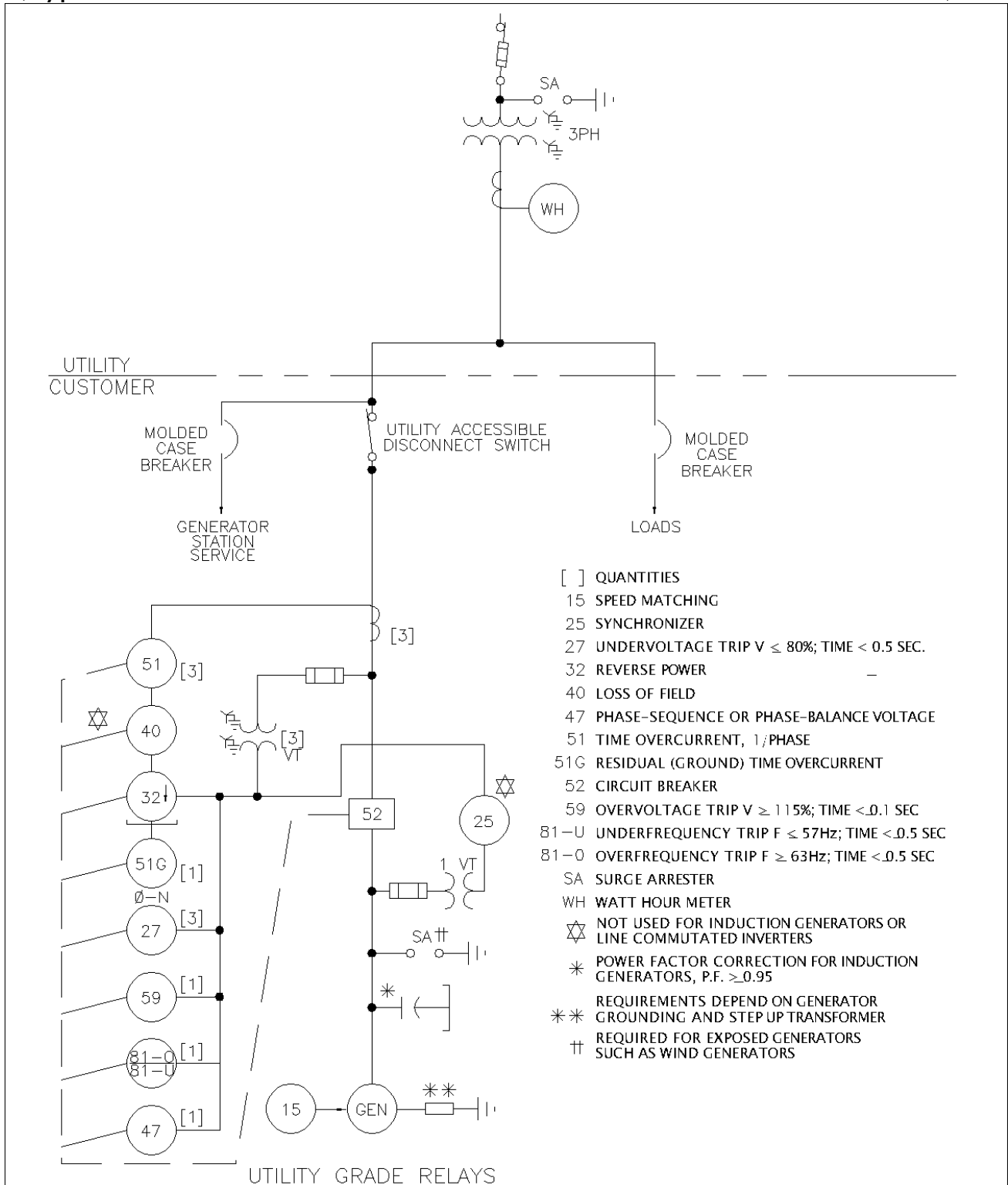


# HOLY CROSS ENERGY

June 1, 2008

## APPENDIX B

### (Typical Parallel Generation Installations 100 kW to less than 1 MW)



TYPICAL PARALLEL GENERATION  
INSTALLATIONS 100 kW TO LESS THAN 1 MW

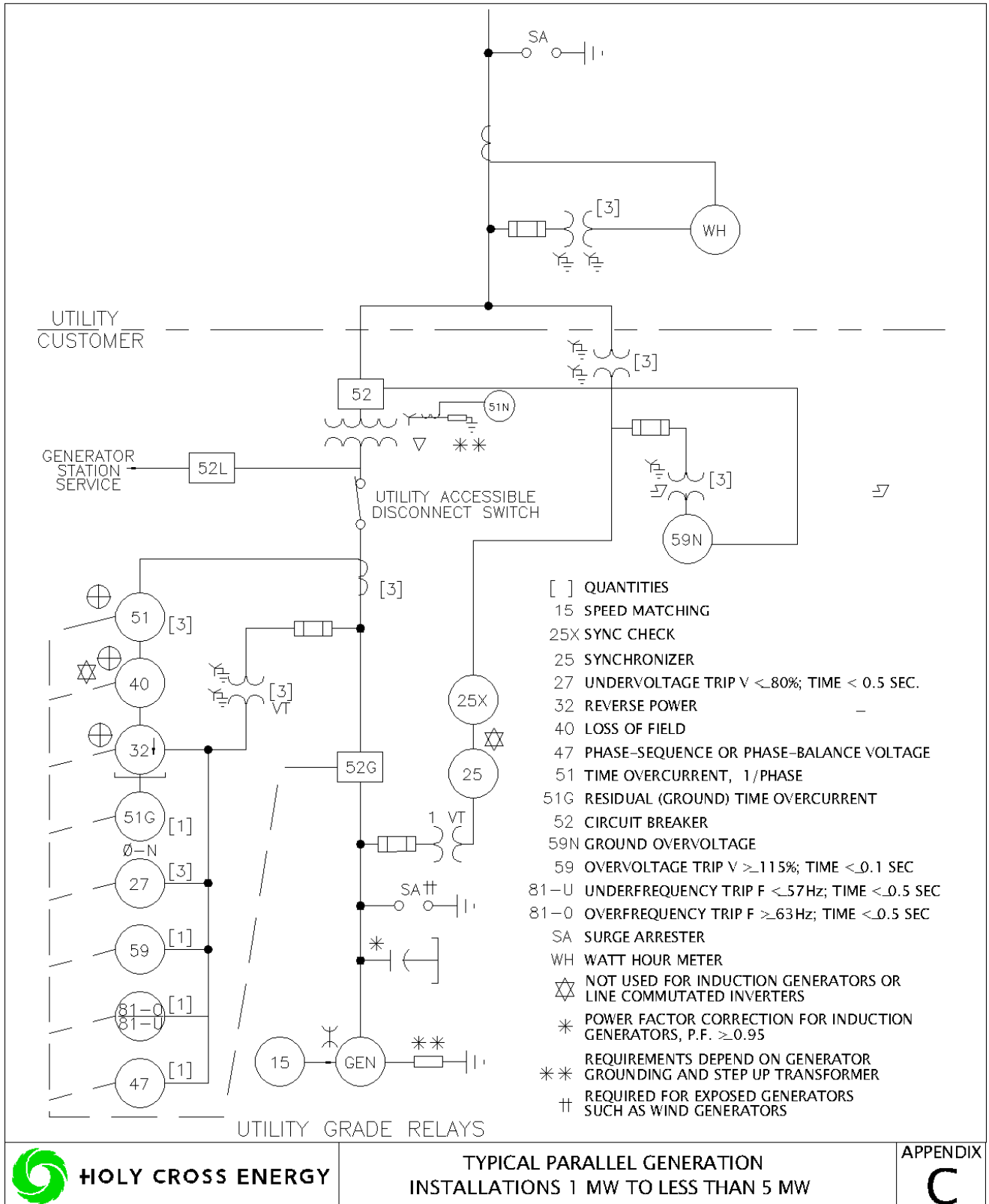
APPENDIX  
**B**

# HOLY CROSS ENERGY

June 1, 2008

## APPENDIX C

### (Typical Parallel Generation Installations 1 MW to less than 5 MW)



TYPICAL PARALLEL GENERATION  
INSTALLATIONS 1 MW TO LESS THAN 5 MW

APPENDIX  
**C**