

Section G5: ENERGIZATION AND SYNCHRONIZATION REQUIREMENTS FOR TRANSMISSION GENERATION ENTITIES

PURPOSE

The following is PG&E's procedure for performing pre-parallel inspections and preparing to energize and synchronize the generator to the PG&E transmission system. All time requirements must be met for PG&E to provide the Generation Entity with timely service.

Any inspections required by local government agencies must be completed and permits signed off prior to the pre-parallel date. Failure to meet the succeeding requirements within the timeframes specified may result in a delay to successful operations parallel to the PG&E system.

G5.1. TEST RESULTS AND/OR INFORMATION REQUIRED PRIOR TO PRE-PARALLEL INSPECTION (PPI)

All tests outlined through sections G5.1.1- G5.1.8. must be complete and an electronic or hard copy of the test reports submitted to a PG&E representative a minimum of thirty (30) business days before the requested pre-parallel inspection date. All test reports require header information reflecting the equipment identification matching the one or three line diagrams. DC schematics, one line and three line diagrams of the facility are required with the test reports. Pre-parallel inspection dates will be scheduled a minimum of ten (10) business days after all test reports are approved by PG&E. Failure to meet PG&E approved test requirements will result in delay of pre-parallel inspection and testing of generation entity's equipment.

G5.1.1. Proving Insulation

For any of the megger tests referred to below, follow IEEE 43, "Recommended practice for Testing Insulation Resistance of Electrical Machinery", Section 5.3, Table 1 – "Guidelines for direct voltages to be applied during insulation resistance test". In most cases, a 5,000 volt DC megger or hi pot will be required.

- All transformers connected to the primary bus and the main transformer must be meggered winding to winding and each winding to ground. For purposes of this document, "primary bus" is defined as the source-side bus or conductor from the primary interrupting device to the generating plant.
- All circuit breakers and circuit switchers connected to the primary bus and at the interconnection point must be meggered in the following manner: Breaker open - each pole to ground, pole 1-2, pole 3-4, pole 5-6; breaker closed - pole 1-ground, pole 3-ground, pole 5-ground and if the poles are in common tank or cell, pole 1-3, pole 3-5, pole 5-1.

- All buses and cables shall be meggered phase-to-phase and phase-to-ground.
- The main transformer(s) and main breaker(s) shall have a dielectric test performed on the insulating medium (gas or oil). This does not apply to factory-sealed circuit switcher interrupters.
- The generator(s) must be meggered or hi-pot tested phase-to-phase and phase-to-ground.

G5.1.2. Proving Ratios

All ratios of transformers connected to the primary bus must be proven using either a turns ratio tester or a voltage ratios test. The main transformer must be tested on the final operating tap. This tap shall be recommended by PG&E to best match current transmission system operating voltages.

G5.1.3. Circuit Breakers and Circuit Switchers

- A minimum to trip at 70 percent or less of the nominal DC control voltage must be performed on all circuit breakers and/or circuit switchers that are operated by PG&E-required relays.
- A Micro-Ohm test must be performed on all circuit breakers and circuit switchers.
- A timing test showing the time from trip initiation to main poles opening is required.
- A timing test showing the time from close initiation to main poles closing is required.

G5.1.4. Current Transformers and Current Circuits

- A saturation check should be made on all current transformers (CTs) associated with the required PG&E relays. If this is not possible, a manufacturer's curve is acceptable.
- The connected ratio of all CTs must be proven either by using current (primary to secondary) or voltage (secondary to primary).
- CT circuits must be checked for proper connections and continuity by applying primary or secondary current and reading in the relays. Each test (primary or secondary) must be performed in all combinations to prove proper connections to all phase and ground relays. Current must be applied or injected to achieve a secondary reading of 5 amps in each relay to ensure that no loose wiring or parallel current paths exists.
- A single-phase burden check must be made on each phase of each current circuit feeding PG&E-required relays.
- A megger check of the total circuit with the ground wire lifted must be done to prove that only one ground exists.

G5.1.5. Relays

All relays¹ must be field tested on site to their specified settings to verify the following:

- Minimum operating point at which relay picks up (minimum pickup).
- Time delay at three different current test points, in integral multiples of minimum pickup, that closely characterize the relay time-current curve.
- Phase angle characteristic of directional relay.
- Pickup points at maximum torque angle (MTA) and ± 30 degrees of MTA on impedance relays using the approved settings.
- Slip frequency, voltage matching, phase angle acceptance and breaker compensation time on synchronizing relays.
- PG&E tolerances are listed below:
 - Current/Voltage/Time: ± 10 percent
 - Impedance/Phase Angle: ± 5 percent
 - Frequency: ± 0.05 Hz

If a pilot relay system is required by PG&E, signal level checks must be performed to PG&E standard.

G5.1.6. Primary Disconnect Switch

The primary disconnect switch at the point of interconnection shall be assigned a PG&E number by PG&E. The switch, platform, and switch number plate bracket must be constructed to PG&E's Engineering Standard 034851 and Engineering Design Standard 454092, see Appendix D. A switch number plate bracket shall be furnished by PG&E (Appendix D).

G5.1.7. RTU/RIG/DPU

The final RIG/DPG/RTU database shall be provided to PG&E at least 30 calendar days prior to scheduled energization date.

G5.1.8. Station Battery

When a battery is installed, proof of discharge testing is required to ensure that the battery has the capacity to support the load and trip (see [Appendix T](#)).

G5.2. PRE-PARALLEL INSPECTION (PPI)

The Generation Entity is responsible for ensuring that all relays, data telemetry and other protective devices are adjusted and working properly, as approved by PG&E, prior to the pre-parallel inspection. The relay settings submitted to and approved by PG&E

¹ Please see Section G-2 specifically Table G2-5 for information on relay requirements.

must be demonstrated. If problems arise with equipment during testing, the PG&E protection representative may elect to cancel the PPI and reschedule.

All pre-parallel inspections should be scheduled to begin at 8:00 AM and completed by 6:00 PM, Monday through Friday only. Functional tests shall be performed by the Generation Entity and all tests shall be observed by PG&E as outlined below. The Generation Entity shall provide all test equipment and qualified personnel to perform the required tests. PG&E recommends third party testers to be InterNational Electrical Testing Association (NETA) certified. PG&E shall be there strictly as an observer. [Form G5-1](#) shall be completed by the PG&E representative on site at the time of the pre-parallel inspection.

Typically, pre-parallel inspections can be performed within a normal working day. PG&E shall dedicate one full work day to observe the test. If a test cannot be completed by 6:00 PM, the PG&E representative may cancel the remainder of the test and reschedule it. In this case, the Generating Entity shall incur additional costs for the pre-parallel inspection.

Before the unit is paralleled to the System to complete tests that require parallel operation, a "permission to parallel for test purposes" letter must be obtained from PG&E's Grid Operations department. This letter would typically be issued after the tests as described in [Section G5.2](#) sub-sections are completed, but before the remaining tests that require the unit to be paralleled begin.

G5.2.1. Functional Tests

The following functional tests shall be performed after the equipment has been energized, but before the generator is paralleled with PG&E's system:

- Check that each protective relay trips the appropriate generator breaker and/or main breaker. This may require injecting a signal. Jumpering across contact on the back of the relay is not acceptable.
- When first energized, check that proper secondary potential is applied to all voltage and frequency relays.
- Check the synchronizing meter, synchronizing equipment and phasing panel (if used) with the paralleling breaker closed and the generator off-line. This typically requires lifting the generator leads. The equipment should show an "in-phase" condition.
- Check the generator phase rotation. (PG&E's phase rotation is A-C-B counterclockwise). All three phases must be checked using hot sticks with a phasing tool or a phasing panel provided by the Generation Entity. The synchronizing equipment typically checks one phase only. Any other method of demonstrating correct phasing and phase rotation shall be approved by PG&E in writing prior to conducting the test. Alternative methodologies to check phasing and phase rotations must be submitted to PG&E fifteen business days in advance of scheduled pre-parallel test. PG&E must approve the methodology three business days in advance of pre-parallel test date.

- Check Direct Transfer Trip or Special Protection Scheme (if applicable)

G.5.2.2. Data Telemetry Tests

PG&E Grid Operations must verify the following prior to any Parallel Operations.

- Communications circuits meet Appendix F specifications and are functioning properly.
- RIG/DPG/RTU data is mapped correctly to PG&E EMS and SCADA systems.
 - Scaling on all analog data points is correct.
 - Point to Point check on all status points is verified at PG&E electric control centers.

G5.3. REQUIREMENTS FOR PARALLEL GENERATOR OPERATION

G5.3.1. Permission to Parallel for Testing Purposes Only

A Permission to Parallel for Test Purposes letter must be obtained from the PG&E Grid Operations department prior to initial parallel of the unit to the System. The letter can be issued once the testing outlined in Section G5.2 has been completed. Once permission to parallel is granted, the unit is allowed to parallel with the system and complete the remainder of the tests listed below to achieve commercial operation or permission to operate (for Rule 21 projects). The generator may operate in accordance with the previously executed Generation Interconnection Agreement for a maximum of 90 days, or a period previously approved by PG&E.

G5.3.2. Notification of Parallel Operation (For Testing Purposes Only)

The Generating Entity must notify the Grid Control Center prior to paralleling generation for testing purposes.

G5.3.3. Impedance and Directional Relay Tests

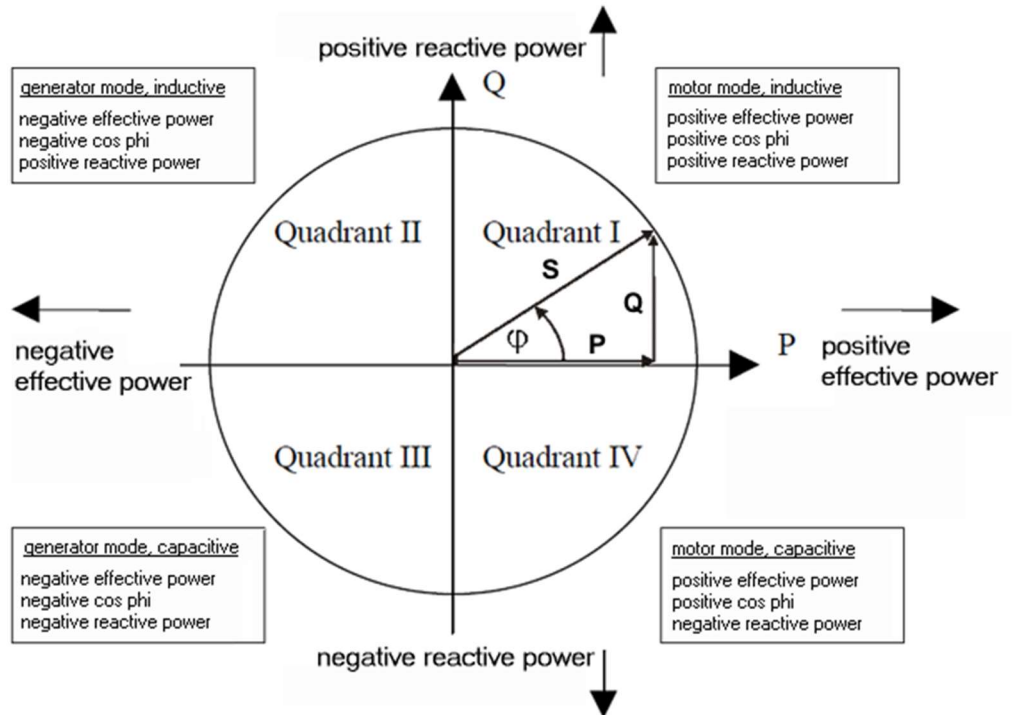
During the Parallel Operation for Testing period direction check all PG&E required impedance and directional relays by doing the following:

- Bring up load on the plant and/or generator.
- Verify direction of power flow.
- Measure the phase angle between the current and potential applied to the relay.
- Observe the current action of the directional contacts according to the direction of power flow. Reverse either the potentials or current to prove contact operation for reverse power flow.

G5.3.4. Generator Load Tests

For generators, the following load tests shall be performed after the generator picks up load:

- For synchronous generators, verify operation of the generator at 90 percent lagging power factor and at 95 percent leading power factor at rated output measured at the generator terminals.
- For asynchronous generators, verify operation of the generating facility meets power factor requirements specified in the Interconnection Agreement (IA) and Section G3.1.
 - An exception can be made in the case of solar generation, where testing occurs during low sunlight situations (e.g. winter or cloudy day) such that the solar output cannot meet full nameplate MW rating. In this case, the generation facility must demonstrate it can deliver full nameplate MVAR ratings at the reduced total available MW output.
 - Example: Nameplate MW rating = 100 MW, and nameplate PF = 0.95, that calculates to MVAR output of 32.8 MVAR. The generator must demonstrate it can delivery 32.8 MVAR at the fullest possible maximum MW output that day.



- For energy storage project, the power factor requirements shall be demonstrated in all modes of operation (full charge, standby, and full discharge)

- Verify functionality of operating schemes if applicable (e.g. export limiting scheme)
- Verify operation of the generator at 95 percent and 105 percent of per unit voltage while delivering rated output measured at the generator terminals or the low side of the GSU bank.
- Load check all PG&E required differential relays. The load current must balance to zero in all differential relays.
- Load check voltage restraint overcurrent relays to prove correct connection of currents and potentials ([Form G5-2](#)).

G5.3.5. Power System Stabilizer (PSS)

During the Parallel Operation for Testing period, the Power System Stabilizer shall be calibrated and tested in accordance with the latest WECC standard calibration and test procedures as outlined in [Appendix H](#). The test report shall be submitted for review to AreaCoordinator@pge.com and TSGEN@pge.com.

Adequate testing of the PSS can only occur on the generating unit(s) after pre-parallel inspection has been satisfactorily completed and the units are paralleled and supplying load. Official approval of PSS tuning comes from WECC. In support of system reliability, PG&E will review the test report and provide comments to the Generation Entity.

Failure of the Generation Entity to maintain its PSS could adversely impact system operation. PG&E reserves the right either to disconnect from, or refuse to parallel with, any Generation Entity which does not operate and maintain its generator control systems in accordance with applicable reliability criteria.

The PSS Reports shall include a minimum of the following:

- Description of unit including ratings.
- Excitation system type and ratings.
- PSS type, inputs, and available setting ranges for adjustable parameters. Include description of failure detection system if provided.
- Modifications required to provide final settings.
- List of final settings, including:
 - Limit settings + and – gain.
 - Lead and lag time constants.
 - Washout time constant.
 - Any included filtering (fixed or settable).
- Models:
 - PSS model and parameters in GE PSLF format, using the latest WECC approved dynamic models.

- Excitation model and parameters in GE PSLF format, using the latest WECC approved dynamic models.
- Bode plots:
 - Excitation response with unit connected to electrical system without PSS in service (See Figure 7 of Appendix H).
 - PSS response alone (See Figure 8 of Appendix H).
 - Excitation response with PSS in service and unit connected to electrical system. This plot can be either via test or calculated based on previous two plots.
 - If settings are developed through simulations, actual excitation response versus excitation model response used in simulation. (See Figure 3 of Appendix H).

- Time plots:
 - Step response showing generator terminal voltage, field voltage, field current, power, PSS output, AVR output with PSS in service and out of service. (See Figure 5 of Appendix H).

PG&E will not grant permission for a generating facility to commence commercial operations until PSS Test Reports have been submitted to PG&E for review.

G5.3.6. Model Testing and Validation Report

Following WECC guidelines, generation equipment shall be tested to verify that data submitted for steady-state and dynamics modeling in planning and operating studies is consistent with the actual physical characteristics of the equipment. The data to be verified and provided shall include generator gross and net dependable capability, gross and net reactive power capability, voltage regulator controls, speed/load governor controls, and excitation systems.

G5.3.7. Signage Requirements

Signage requirements are found in Appendix D – Engineering Numbered Documents, TD-1013B-005, “PG&E Substation Signage for 3rd Party Interconnections”.

G5.3.8. Stand Alone Testing (Inverter based units)

Inverter based projects shall not be capable of stand-alone operation and must be demonstrated by the operation of the undervoltage relay or onboard inverter protection operation.

G5.4. PERMISSION TO COMMENCE COMMERCIAL OPERATION

Written permission for commercial operation shall be sent to the Generation Entity via U.S. First Class Mail. The letter shall be issued after PG&E has verified the following:

- All proper contracts and documents have been executed and are in place.
- The pre-parallel test reports have been reviewed and approved by PG&E;
- The pre-parallel inspection (PPI) has been completed;
- EMS and SCADA links to Vacaville Grid Control Center and Rocklin System Dispatch are operational.
- Power factor and AVR testing – The power factor test results have been accepted by PG&E based on system conditions at the time of testing.
- If applicable, the Power System Stabilizer tests and calibration have been completed.

- All other outstanding issues have been resolved, including rights-of-way, deeds of conveyance, insurance verification and operating agreements.
- PG&E has received final copies of the single line diagram and elementary diagrams that show "As-Built" changes made during construction, as well as a completed finalized generator data sheet ([Appendix M](#)).

G5.5. GENERAL NOTES

- The PG&E system has A-C-B counterclockwise rotation.
- Any changes to PG&E required protection equipment or major equipment (transformer, breaker, generator, etc.) must be submitted to the PG&E representative for review and approval by the appropriate PG&E engineer prior to the changes being made. In order to energize new equipment, the Generation Entity must follow the pre-parallel inspection process.
- Protective Relays: Routine maintenance on PG&E required protective relays, batteries and breaker(s) must meet PG&E's maintenance and test practices. After completion of these tests, test reports must be submitted to the PG&E protection specialist for review and approval by the appropriate PG&E engineer. A PG&E technical representative may come to the customer's facilities and verify the settings.
- Customers who's load changes due to economic market conditions or any other related condition are still required to maintain their protective devices and can be subject to a pre-parallel inspection upon request by PG&E.
- **Idle Facilities** - If customers are idle for an extended period of time and do not maintain proof of maintenance for their applicable protective equipment they will be required to separate from PG&E and lock the high side disconnect with a PG&E lock. Prior to restoration of transmission service, the customer will must complete a PPI and/or any applicable transmission load reviews deemed required by PG&E.

Form G5-1

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Rev. 01-04/27/2017

PG&E LOG _____

Date Approved _____

JOB ORDER _____

PG&E Approving Engineer _____

D&C _____

PACIFIC GAS AND ELECTRIC COMPANY GENERATION PRE-PARALLEL INSPECTION

Name of Project: _____

Location: _____

PM# _____

Transmission Line No. _____

Distribution Circuit No. _____

1. Maintenance Data:

Generation Customer's Maintenance Chief _____

Telephone Number _____

Generation Customer's Regular Maintenance Interval _____

Electrical Contractor _____

2. Test Reports Attached: Yes _____ No _____

If not, who has the reports: _____

3. Generation Facility Manual Disconnect Device for PG&E Line Clearances:

Manufacturer _____

Model Number _____

PG&E Device Number _____

4. Designated PG&E Electric Control Center _____

5. PG&E Inspector _____

	NAME	PHONE NO.
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Date Inspection Performed (Witness Testing/PPI): _____

Date Load Checks Performed (Energization): _____

Date Facility Placed on 30 Day Test Released (Permission to Parallel for Test Purposes): _____

Date Facility Completed Operational Testing: _____

Distribution:

- PG&E Designated Electric Control Center (1)
- Division Project Coordinator (1)
- Marketing Services (1)
- Power Contracts (1)
- GM&C Area Engineering (1)
- System Dispatch (1)

Form G5-1(Synchronous / Induction Generators)

(Page 2 of 9) PG&E LOG _____
 JOB ORDER _____
 D&C _____

PACIFIC GAS AND ELECTRIC COMPANY GENERATION PRE-PARALLEL INSPECTION

1a. Generator Nameplate: _____ kW _____ Volts _____ Pf _____ 1φ _____ 3φ

b. Generator Type: _____ Synchronizing: _____ Connection: _____
 _____ Synchronous _____ Auto _____ WYE-Ground
 _____ Induction _____ Manual w/ Relay _____ WYE-Ungrounded
 _____ Delta

Manufacturer _____ Serial No. _____

c. Generator Prime Mover:

Steam _____ Water _____

Other, specify _____

d. Generator Breaker or Contactor:

Manufacturer _____ Serial No. _____

_____ Thermal/Magnetic Overcurrent
 _____ Undervoltage Release (optional under 40kW)
 _____ DC Shunt Trip (required over 40kW) w/battery _____ Capacitor Trip _____
 _____ Control Voltage _____ (Not acceptable for use)

2. Dedicated Transformer: Yes _____ 3φ _____ 1φ _____ 3-1φ _____
 No _____ Bank of 3-1φ _____

Customer owned _____ PG&E owned _____
 Bank Rating: _____ KVA Transformer _____ % _____ MVA Base

Transformer Connection: Primary _____ volts
 Secondary _____ volts

Protected by: Fuse Size _____ Amps _____ Other _____

3. Ground Protection Required: Yes _____ No _____

If Yes, type of ground detection (check type):

- _____ Ground Bank with overcurrent relay.
- _____ Broken Delta Ground Bank with low pick up overvoltage relay.
- _____ Ground Overcurrent relay in neutral or dedicated transformer.
- _____ Low voltage pick-up overvoltage relay in elevated neutral of dedicated transformer.
- _____ Other

Form G5-1 (Wind Turbine Generators)

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PG&E LOG _____
JOB ORDER _____
D&C _____

PACIFIC GAS AND ELECTRIC COMPANY GENERATION PRE-PARALLEL INSPECTION

1a. Generator Nameplate: _____ kW _____ Volts _____ Pf _____ 1φ _____ 3φ

b. Wind Generator Type: _____ Synchronizing: _____ Generator Connection: _____
Type II _____ Auto _____ WYE-Ground _____
Type III _____ Manual w/ Relay _____ WYE-Ungrounded _____
Type IV _____ Delta _____

Manufacturer _____ Model _____

d. Generator Breaker or Contactor at the Interconnection:

Manufacturer _____ Serial No. _____

_____ Thermal/Magnetic Overcurrent
_____ Undervoltage Release (optional under 40kW)
_____ DC Shunt Trip (required over 40kW) w/battery _____ Capacitor Trip _____
_____ Control Voltage _____ (Not acceptable for use)

2. Collector / Unit Transformer: Yes _____ 3φ _____ 1φ _____ 3-1φ _____
No _____ Bank of 3-1φ _____ Quantity _____

Bank Rating: _____ KVA Transformer _____ % _____ MVA Base

Transformer Connection: Primary _____ volts
Secondary _____ volts

3. Dedicated / Interconnecting Transformer: Yes _____ 3φ _____ 1φ _____ 3-1φ _____
No _____ Bank of 3-1φ _____

Customer owned _____ PG&E owned _____
% _____ MVA Base

Bank Rating: _____ KVA Transformer _____

Transformer Connection: Primary _____ volts
Secondary _____ volts

Protected by: Fuse Size _____ Amps _____ Other _____

PG&E Transmission Interconnection Handbook

4. Inverter Details (for Type IV Wind turbines)

Manufacturer: _____ Model: _____ kW: _____ Quantity: _____

Firmware: _____ Max. fault current: _____

5. Capacitors (if any)

kVARs: _____ Quantity: _____

6. Grounding Bank (if any)

Bank rating (kVA): _____ % Impedance: _____ Base MVA: _____

7. Ground Protection Required: Yes _____ No _____

If Yes, type of ground detection (check type):

- _____ Ground Bank with overcurrent relay.
- _____ Broken Delta Ground Bank with low pick up overvoltage relay.
- _____ Ground Overcurrent relay in neutral or dedicated transformer.
- _____ Low voltage pick-up overvoltage relay in elevated neutral of dedicated transformer.
- _____ Other _____

Form G5-1 (Solar / Battery / Fuel Cells)

(Page 5 of 9)

PG&E LOG _____
JOB ORDER _____
D&C _____

PACIFIC GAS AND ELECTRIC COMPANY GENERATION PRE-PARALLEL INSPECTION

1a. Generator Nameplate: _____ kW _____ Volts _____ Pf _____ 1 ϕ _____ 3 ϕ

b. Generator Type: _____ Generator Connection _____
Solar _____ WYE-Ground: _____
Battery Energy Storage Systems (BESS) _____ WYE-Ungrounded: _____
Solar / BESS DC coupled _____ Delta: _____
Fuel Cells _____
Others _____

Manufacturer _____ Model _____

d. Generator Breaker or Contactor at the Interconnection:

Manufacturer _____ Serial No. _____
_____ Thermal/Magnetic Overcurrent
_____ Undervoltage Release (optional under 40kW)
_____ DC Shunt Trip (required over 40kW) w/battery _____ Capacitor Trip _____
_____ Control Voltage _____ (Not acceptable for use)

2. Collector / Unit Transformer: Yes _____ 3 ϕ _____ 1 ϕ _____ 3-1 ϕ _____
No _____ Bank of 3-1 ϕ _____ Quantity _____

Bank Rating: _____ KVA Transformer _____ % _____ MVA Base _____

Transformer Connection: Primary _____ volts
Secondary _____ volts

3. Dedicated / Interconnecting Transformer: Yes _____ 3 ϕ _____ 1 ϕ _____ 3-1 ϕ _____
No _____ Bank of 3-1 ϕ _____

Customer owned _____ PG&E owned _____

Bank Rating: _____ KVA Transformer _____ % _____ MVA Base _____

Transformer Connection: Primary _____ volts

PG&E Transmission Interconnection Handbook

Secondary _____ volts

Protected by: Fuse Size _____ Amps _____ Other _____

4. Inverter Details

Manufacturer: _____ Model: _____ kW: _____ Quantity: _____

Firmware: _____ Max. fault current: _____

5. Capacitors (if any)

kVARs: _____ Quantity: _____

6. Grounding Bank (if any)

Bank rating (kVA): _____ % Impedance: _____ Base MVA: _____

7. Ground Protection Required: Yes _____ No _____

If Yes, type of ground detection (check type):

- _____ Ground Bank with overcurrent relay.
- _____ Broken Delta Ground Bank with low pick up overvoltage relay.
- _____ Ground Overcurrent relay in neutral or dedicated transformer.
- _____ Low voltage pick-up overvoltage relay in elevated neutral of dedicated transformer.
- _____ Other _____

Form G5-1

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GENERATION PRE-PARALLEL INSPECTION

PROTECTIVE DEVICES:

RELAY	Standard Device Number	Required Yes/No (Will be filled in by PG&E)	Mfr and Model	Settings	Specific Breaker Tripped	Lockout Relay Required	Date of Function Test	PG&E Inspector Initials
Zone 1 Distance	21Z1							
Zone 2 Distance	21Z2							
Directional Phase O.C.	67							
Directional Ground O.C.	67N							
Non-directional O.C.	50/51							
Ground or Neutral O.C.	50/51N							
Overvoltage Ground	59N							
Overcurrent with voltage restraint	51V / 51C							
Underfrequency	81U							
Overfrequency	81O							
Synchronizing	25							
Auto Synchronizing	15/25							
Undervoltage	27							
Overvoltage	59							
Transfer Trip From:								
Reclose Block at:								
Required Interlock								
Block Close								
ATS Proper Operation Open Transition								
Closed Transition ATS Protections								

Event recording					
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Form G5-1

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GENERATION PRE-PARALLEL INSPECTION

SPECIAL INSTRUCTIONS and/or VARIANCES:

- (A). Additional information needed for testing: PG&E inspector initials _____
- (B). Additional information needed for testing: PG&E inspector initials _____
- (C). Additional information needed for testing: PG&E inspector initials _____

GENERATORS OPERATION¹:

(A)	Verify POI Protection is Cut-in and operating properly (Verify at Energization): PG&E inspector initials	
(B).	Verify Phase and Rotation, prior to Permission to Parallel (non-inverter): PG&E inspector initials	
(C).	Verify Generator Protection is Cut-in and operating properly (Verify at first Sync): PG&E inspector initials	
(D).	Verify proper load checks, at ½ amp secondary current: PG&E inspector initials	
(E).	Verify operation of the generator(s) at 0.90 (or applicable) P.F. lag and at 0.95 P.F. lead, while delivering rated output: PG&E inspector initials	
(F).	Verify operation of the generator(s) at 1.05 per unit voltage, while delivering rated output: PG&E inspector initials	
(G).	Verify generators with active anti-islanding enabled properly performs anti-islanding operations, in less than 2 seconds: PG&E inspector initials	

¹ See Section G5.3.3, "Generator Load Tests"

(H)	Verify that inverter based generation is not capable of standalone operation: PG&E inspector initials	
(I)	Verify the default settings for Inverter Based Generation as per Table G2-5: PG&E inspector initials	

Figure G5-1

SIMPLIFIED FLOW CHART OF PRE-PARALLEL INSPECTION (PPI) / TEST PROCEDURE

