Protection & Controls Test Policy for Non-Exporting, Behind-the-Meter Customer-Owned Generation (Excluding Large Load)

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Protection and Controls
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This Test Policy is subject to periodic revision. The current version will be available on GPC's Distributed Generation Website (https://www.georgiapower.com/business/products-programs/business-solutions/commercial-solar-solutions/distributed-generation.html)

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SCHEDULE OF DEFINED TERMS

This Test Policy uses the terminology described in this Schedule and the rules of construction identified in this Schedule.

Access Route: The suitable, all-weather access route from the nearest public roadway to the change of ownership that is acceptable to GPC and that will be available to GPC at all times (24/7/365(366)) throughout the Agreement term to facilitate GPC's provision of construction, operation, or maintenance of the Interconnection Facilities or other related GPC activity.

Agreement: The service and interconnection agreement between GPC and the Customer Generator with terms and conditions for Facility interconnection and operation of the Facility while connected to the Distribution System.

Air-Break Disconnect: A switch used in electrical systems to isolate a circuit or component from all possible energy sources during maintenance or repair.

Customer Generator: The counterparty to GPC in the Agreement and customer on whose property the Facility that is the subject of the Agreement is located. "Customer Generator" in this Test Policy is equivalent to "**DER Owner**" in the Southern Company Policy.

Customer-Owned Generation: For purposes of this Test Policy, a system in which Customer Generator's Facility is or will be located and that: (i) interconnects to the Distribution System at a GPC-owned, dedicated substation or via a dedicated circuit; and (ii) if applicable, is or will be part of Customer Generator's electric system.

Distribution System: Electric System facilities owned by GPC that operate at a nominal operating alternating current (AC) voltage below 40 kV, as further defined in the Agreement.

Distribution Test Policy: The ***GPC Distribution Test Policy*** or any successor policy, publicly available on the GPC Distributed Generation Website (https://www.georgiapower.com/content/dam/georgia-power/pdfs/residential-pdfs/solar/distribution-test-policy.pdf), or any successor policy.

Electric System: The network of electric generation, transmission, or distribution facilities owned or operated by GPC or other electric utilities.

Facility: The complete Non-Exporting facility comprising the electric energy generating equipment, battery system (if applicable), up to the POI, including Customer Generator's electric system, if applicable, and all ancillary equipment that is or will be connected to the Electric System. "Facility" in this Test Policy is equivalent to "**Distributed Energy Resource**" or "**DER**" in the Southern Company Policy.

GPC: Georgia Power Company.

Impact Study: GPC's study of a proposed Facility to determine how its installation and operation will interact with the existing Electric System and whether equipment, upgrades, or services are required to interconnect the Facility.

Interconnection Facilities: As further defined in the applicable Agreement, the physical facilities, installed or modified to allow interconnected operations of the Facility with the Distribution System, that are additional to the physical facilities that would otherwise have been installed or modified absent Customer Generator's interconnection request.

Initial Synchronization (Initial Synch): Initial energization at the POI to allow trial parallel operation of the Facility with the Electric System.

Intertie Protective Relaying: Utility-grade Relays that monitor Facility operating parameters and communicate with protective devices.

kW: Kilowatt (AC).

MW: Megawatt (AC).

Large Load: Facilities interconnecting to the Transmission System and typically sized greater than 50 MW (based on long-term projected demand), with the final determination (made by Southern Company Transmission) regarding whether a Facility should be considered Large Load being subject to additional considerations based on operating

characteristics, location, and proximity to other large loads. Southern Company Transmission may consider loads below 50 MW to be Large Load.

Microgrid: An interconnected system of loads and energy resources, potentially including distributed energy resources, energy storage, demand response tools, or other management, forecasting, and analytical tools, within a clearly defined electrical boundary that can act as a single, controllable entity, and can connect to, disconnect from, or run in parallel with, the Distribution System, or can be managed and isolated to withstand larger disturbances and maintain electrical supply to connected critical infrastructure.

Non-Exporting: A Facility operating in parallel with the Electric System: (i) that is not designed or authorized to push energy back onto the Electric System; and (ii) for which Customer Generator will not be compensated for any excess energy that is generated.

Point of Interconnection (POI): The point where the Facility interconnects to the Distribution System, as further defined in the applicable Agreement.

Southern Company Policy: Southern Company *Operation of Distributed Energy Resources (DER) in Parallel with the Distribution System Policy*, available at https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/solar-pdfs/SOCO_Interconnection_Policy_Binder_06-15-2021.pdf, or any successor policy.

Test Policy: This ***Protection and Controls Test Policy for Non-Exporting, Behind-the-Meter Customer-Owned Generation (Excluding Large Load)*** or any successor policy, publicly available on the GPC Distributed Generation Website (see *Resource*s section for additional information).

Transmission System: Electric System facilities owned by GPC and operated at greater than 40 kV.

Witness Test or Witness Testing: Live testing of the Facility while operating in parallel with the Electric System in accordance with this Test Policy, whether performed by GPC, SCS, or a third-party installer, manufacturer, or supplier.

Rules of Construction:

In this Test Policy: (i) whenever the term "**include**," "**including**," or "**e.g.**" is used, in connection with a listing of items included within, or as an example of, the prior reference, the listing will be interpreted as illustrative only and not as a limitation on, or as an exclusive listing of, the items included in the prior reference (e.g., "**include**" means "include, but is not limited to"; "**including**" means "including, without limitation"); and (ii) "**or**" means either or both (i.e., "A or B" means "A or B or both A and B").

Unless otherwise specified, reference to: (a) an agreement or document includes any exhibit, attachment, appendix, or schedule; and (b) an applicable law, agreement, document, policy, procedure, standard, or provision is to the law, agreement, document, policy, procedure, standard, or provision as modified, amended, supplemented, or restated, and then-effective or current.

A defined term may be singular or plural, as the context requires. Captions are for convenience only and do not affect interpretation.

PROTECTION & CONTROLS TEST POLICY FOR CUSTOMER-OWNED GENERATION

Witness Testing is required under the applicable Agreement and by the Southern Company Policy (incorporated by this reference), which policy is included in the technical requirements applicable to a Facility. This Test Policy addresses general requirements for Witness Testing concerning Customer-Owned Generation.[1]

PART 1. GUIDELINES FOR NON-EXPORTING FACILITIES CONNECTED TO A GPC SUBSTATION

Non-Exporting Facilities are designed to operate in parallel with the Electric System without exporting power to the Electric System. These Facilities are typically used to offset local loads. Interconnection for Non-Exporting Customer-Owned Generation requires careful consideration of protection, control, and operational requirements to ensure safe and reliable operation.

PART 2. SCHEDULING CONSIDERATIONS

GPC will witness the Customer Generator-owned Witness Test of a Facility between 8:00 a.m. and 3:00 p.m. **Witness Testing requires appropriate weather conditions. Customer Generator should pay attention to the weather forecast and postpone scheduled Witness Testing if needed**. Customer Generator must contact (by phone and confirming email) the designated GPC representative at least two business days before the scheduled Witness Test start time to cancel the Witness Test because of weather or any other concerns.

GPC reserves the right to cancel and re-schedule Witness Testing at any time. If GPC cancels Witness Testing for GPC's convenience, there will be no charge to Customer Generator for the re-scheduled test.

Before scheduling a Witness Test for a new Facility, all on-site Facility construction must be complete, and the Facility must be synchronized, commissioned, and fully operational. It is the Customer Generator's responsibility to ensure that all Facility equipment works correctly before requesting any Witness Test. Additionally, Customer Generator must:

- Provide and maintain an Access Route and ensure GPC has unfettered permanent access to the Facility.
- Ensure the Access Route is maintained with proper vegetation management and maintenance.
- Submit all required documents and data timely, including: (i) the final and approved detailed one-line diagram for the Facility; (ii) the Agreement; and (iii) all other data required by the Southern Company Policy.

Before requesting Initial Synch, Customer Generator must have timely submitted all required documents and data.

PART 3. INITIAL SYNCHRONIZATION

Following completion of all prerequisites identified in this Test Policy and the Agreement, Customer Generator and GPC will schedule an Initial Synch date. GPC requires at least 10 business days' advance notice to schedule the Initial Synch date. For reasons of safety, if the period of Initial Synch and trial operation exceeds 10 days, GPC reserves the right to temporarily disconnect the Facility and de-energize GPC's Interconnection Facilities. In that event, GPC reserves the right to determine when to reconnect the Facility and re-energize

[1] This Test Policy does not apply to Large Load or a standard Distribution System interconnection that is not considered Customer-Owned Generation. If you have a standard Distribution System interconnection, please reference the Distribution Test Policy for testing requirements. If you have a Large Load Facility, please contact GPC Interconnections Planning at G2INPLTRANS@southernco.com.

the Interconnection Facilities to proceed with Witness Testing. Advance payment would be required as provided in Part 8 (*De-Energization/Re-Energization Fee*).

PART 4. WITNESS TESTING FEES

Witness Testing fees are provided in Table 4.1 (*Witness Testing Fees by Day*). If additional testing or re-testing is required, GPC will coordinate the scheduling with Customer Generator. Customer Generator must pay applicable Witness Testing fees and submit to GPC all requested documentation before GPC will schedule the Witness Test. Billing and payment will be as described in Part 8 (*De-Energization/Re- Energization Fee*).

Table 4.1: Witness Testing Fees by Day

Facility Size	Weekday Fee	Weekend Fee
≥ 250 kW & < 1MW	$3,900	$4,400
≥ 1 MW	$3,200	$3,700

PART 5. REPRESENTATIVES REQUIRED AT WITNESS TESTING

If the Facility has a battery or transformer-rated metering, Customer Generator must be present at Witness Testing to operate the Customer Generator-owned equipment.

PART 6. INTERCONNECTION REQUIREMENTS

The Facility will be permitted to operate in parallel with the Distribution System so long as the Facility does not have a negative impact on the safe operation of the Electric System or the level of service GPC provides to other customers. To achieve the goals described in the preceding sentence, Customer Generator must install certain protective devices (e.g., relays, circuit breakers) to promptly disconnect the Facility from the Electric System whenever a fault or abnormality occurs. The determination of what types of protective devices are required depends primarily on the following factors:

- The type and size of the generating equipment.
- The Facility's location on the Distribution System.
- The operational parameters of the Facility's protective scheme.

In addition to the protective devices, certain modifications may be required to the Facility or the Distribution System because of the Facility's interconnection. Each request will be handled individually, and GPC will make the final determination based on the results of an Impact Study. GPC will work with the Customer Generator to achieve an installation that meets the requirements of both the Customer Generator and GPC.

Before the parallel operation of a Facility with the Electric System, GPC personnel will perform an inspection and Witness Test to ensure the proper installation and operation of the interconnection protective devices.

So long as the Facility is connected to the Electric System, Customer Generator must appropriately maintain and test all Customer Generator's interconnection protective devices (as determined by the Impact Study). The maintenance and testing requirements are described in the following sections:

A. Circuit Breakers.

(i) Visual Inspection. Visual inspection of bushings for issues, including cracks, leaks, discoloration due to heating. Read and record operation counter.

(ii) Operational Inspection. General inspection of breaker including lubrication of operating mechanisms. Check oil levels and bushings, trip test breaker.

(iii) Major Inspection. All requirements of an operational inspection plus megger test of insulation, mechanical/hydraulic/pneumatic system check, electrical connection checks, oil sample testing, tank removal and inspection of contact alignment, operation and wear, filtration/replacement of oil.

B. Protective Relays.

(i) Visual Inspection: All interconnection protective relays must be visually inspected (**not** removed from their case or physically disturbed) for any obvious signs of damage or inoperability. Customer Generator must immediately report to GPC any indication of Relay inoperability, and GPC may require the temporary suspension of generation. Customer Generator must immediately report to GPC the operation of any Relay target (in accordance with instructions provided on the equipment).

(ii) Operational Inspection: Relays must be tested by applying appropriate currents, voltages, or frequencies to verify proper operation. Items to be checked include, but are not limited to:

(a) Minimum pickup value:

(i) Time delay at specified multiples of minimum pickup

(ii) Phase angle characteristics

(b) All Relays are to meet the following tolerances:

(i) Voltage: plus/minus 3%

(ii) Current: plus/minus 3%

(iii) Time: plus/minus 5%

(iv) Frequency: plus/minus 0.2 Hz

(v) Phase angle: plus/minus 3 degrees

C. Control Batteries.

(i) Visual Inspection. Visual inspection of all cells for cracked jars, cracked plates, leaking electrolyte, condition of terminal posts, connections and cell electrolyte levels. Add water to cells with low electrolyte levels.

(ii) Operational Inspection. For testing and maintenance purposes, Customer Generator must perform a check of electrolyte specific gravity and temperature, voltage of each individual cell and total battery, and charging current. must be performed. Customer Generator must immediately correct any abnormal conditions.

The activities described in this Part 6 (*Interconnection Requirements*) are to be part of a scheduled cycle of routine maintenance. Customer Generator must maintain copies of all test reports from operational and major inspections. GPC has the right to verify on demand the calibration and operation of all protective equipment. GPC has the right to temporarily disconnect the Facility if Customer Generator: (a) fails to meet the maintenance requirements described in this Test Policy; or (b) modifies, without GPC's approval, the agreed upon Intertie Protective Relaying and safety schemes. GPC reserves the right to disconnect the Facility or service, as needed, to protect the Electric System.

PART 7. TESTING SCOPE

Inverter-Based Test (If Applicable): This test is applicable if the Facility has an inverter-based generating resource. Customer Generator must conduct an inverter test for the Facility. This test may align with the Distribution Test Policy. Customer Generator must acknowledge that their site follows the most recent IEEE and UL Standards. Please refer to Attachment 2 (*Pre-Witness Test Checklist Inverter Information (If Applicable*)) for additional requirements.

Intertie Protective Relaying Tests: This test applies to Customer Generator-owned equipment. Customer Generator must conduct this test with GPC engineer(s) participating as a witness. Please refer to Attachment 1 (*Witness Test Checklist*) for additional requirements.

The test excludes any protection installed for the sole purpose of protecting the Facility. Customer Generator is responsible for complying with applicable local electrical and safety codes. Any inspection or testing by GPC representatives to verify compliance with GPC requirements is solely for the protection of the Electric System.

GPC Substation Test (If Applicable). This test is required when Intertie Protective Relaying schemes include devices within a GPC substation integrated with Customer Generator-owned protective device. Any communication channels or interface relaying must be installed and functional to perform this test. This test will include verification that Customer Generator-owned Intertie Protective Relaying is properly integrated with GPC-owned protective relaying.

Microgrid Sequence of Operations Test (If Applicable). This test is required when the Facility serves as a Microgrid. GPC and Customer Generator will develop additional testing procedures that will include additional testing requirements that are specific to the Facility. This test will include scenarios like: (i) loss of GPC electric service; and (ii) restoration of GPC electric service.

PART 8. DE-ENERGIZATION / RE-ENERGIZATION FEE

If the Facility requires de-energization from the Electric System, or re-energization onto the Electric System, additional fees will be required to cover the expense of the GPC resources performing the service. The cost for the initial energization of the Facility is included in the Interconnection Costs paid under the Agreement and is not subject to any additional fee.

If there is the need for a Facility de-energization or re-energization at any time, whether during initial Witness Testing or otherwise during the term of the Agreement, GPC will determine the GPC resources needed to safely satisfy the request. Once the GPC resources are identified, GPC will determine the cost according to GPC accounting guidelines.

GPC will inform Customer Generator of the applicable fee, by mail or email, with an attached bill from the GPC invoicing system. Customer Generator must pay the bill, in full, before the de-energization or re-energization request can be fulfilled.

The invoice will identify acceptable forms of payment, which include wire transfer (GPC's preferred method) or cashier's check. If Customer Generator desires to pay with a cashier's check, Customer Generator must first arrange with the designated GPC representative. Payments submitted by regular check could cause delays in scheduling the desired service due to check processing times. GPC will not accept cash payments. Regardless of payment method, GPC cannot schedule the desired service until payment is processed and cleared.

PART 9. FACILITY CHANGES AND ADDITIONAL WITNESS TESTING

As required by the Agreement and the Southern Company Policy, once a Facility has been successfully tested and interconnected to the Distribution System, Customer Generator must notify GPC in advance of any change desired in Facility design or equipment. GPC retains the right to determine whether the desired change is permitted and whether additional Witness Testing is required after the change. GPC also reserves the right to conduct periodic Witness Testing to confirm compliance with the Agreement and the Southern Company Policy.

ATTACHMENT 1 – WITNESS TEST CHECKLIST ITEMS

GPC Project No.:	
Facility Tester Name:	
GPC Customer Name:	
Witness Test Date:	

Pre-Witness Test Checklist Items		
Item	**Engineer Check**	
	(Yes, No, N/A)	**Notes and Corrective Actions:**
Customer Generator is responsible for Witness Test plans and has developed and submitted to GPC (for review) Witness Test plans at least two weeks before the Witness Test date. **Note:** This timeline may be extended if the Witness Test plan requires further revisions.		
Customer Generator is responsible for Facility maintenance schedule and has developed and submitted to GPC for review Facility maintenance schedule at least two weeks before the Witness Test date for GPC to review.		
As part of the Customer Generator developed work plan and to facilitate the Witness Test, Customer Generator has either scheduled outages of in-service loads or prepared to prevent trips to in-service loads (as needed).		
Customer Generator has performed and acknowledged Inverter test.		
All Customer Generator equipment has been installed and no anticipated modifications.		
All GPC equipment installations and modifications are complete.		
Preliminary and final application information match installed equipment.		
Customer Generator has completed wiring checks and functional tests before Witness Test.		
Pre-Witness Test meeting with GPC complete (if required, please see Attachment 2 for requirements).		
Visible Air-Break Disconnect in accessible area.		
Inspection has been completed and received for this installation.		
A voltage control source has been installed and secured by Customer Generator (if needed).		

Witness Test Checklist Items		
Interface Relaying		
Item	**Engineer Check**	
	(Yes, No, N/A)	**Notes and Corrective Actions:**
Relay style and model numbers as specified.		
Customer Generator has provided lockout relay brand, model number, and the respective relay specifications sheets.		
Proper tap settings applied to protective relays and timing devices.		
Proper labels and tags on interface protection equipment.		
Instrument Transformers		
Item	**Engineer Check**	
	(Yes, No, N/A)	**Notes and Corrective Actions:**
Current transformer (“CT”) ratios and class as specified.		
Location and polarity of CTs as specified.		
Correct wiring connection to CTs.		
Power transformer (“PT”) ratios and burden rating as specified.		
Location and direction of PTs as specified.		
Operational Testing		
Item	**Engineer Check**	
	(Yes, No, N/A)	**Notes and Corrective Actions:**
Relays respond to applied voltages and currents.		
The timing relays operate as approved.		
Intertie Protective Relaying trips circuit breaker(s).		
Lockout relays block the closing of circuit breaker(s).		
Interface protective systems operate as specified.		
Customer Generator must demonstrate reverse power function is programmed to trip via dedicated output contact; output contact cannot be used for any other function.		
Customer Generator must demonstrate all other required intertie protection functions to trip intertie breaker directly.		
Customer Generator must demonstrate reverse power condition trips manual reset lockout relay.		
Customer Generator must demonstrate relay is programmed to display trip targets for each Intertie Protection function.		
Customer Generator must demonstrate interconnection breaker(s) shares control power with reverse power relay or trips interconnection when reverse power relay control power is off.		

Witness Test Checklist Items		
Customer Generator must demonstrate the interconnection breaker cannot close when reverse power relay power is off.		
Customer Generator must demonstrate relay triggers and records events on activation of any Intertie Protection function.		
Open Transition Testing (if OTT, please select one of the two options)		
Item	**Engineer Check**	
	(Yes, No, N/A)	**Notes and Corrective Actions:**
Option 1: A mechanical interlock of the switching devices to prevent inadvertent paralleling of any sources due to failure of the switching device(s).		
Option 2: A dedicated standalone minimum open time delay relay that supervises the closing of any switching device capable of paralleling sources.		
Closed Transition Testing		
Item	**Engineer Check**	
	(Yes, No, N/A)	**Notes and Corrective Actions:**
Customer Generator provided intertie protection (including relays, power circuit breakers, and instrument transformers, amongst others).		

Acknowledgments on Next Page

On behalf of the Customer Generator, I have performed Witness Testing that meets GPC's specifications and testing procedure listed above. I acknowledge that should there be any noted discrepancies or required corrective actions, a follow-up Witness Test may be required before GPC grants Permission to Operate (PTO) in accordance with the Agreement.

Tested by Customer Generator:

By: _____

Name Printed: _____

Title: _____

Date: _____

On behalf of GPC, I have witnessed the Witness Test of the protective relaying systems, and they comply with the established and approved testing procedure listed above. These tests are to safeguard GPC's power Electric System. The Witness Test does not certify that the entire Facility has been tested because the Facility is considered Customer-Owned Generation.

Witnessed by GPC:

By: _____

Name Printed: _____

Title: _____

Date: _____

ATTACHMENT 2 – PRE-WITNESS TEST CHECKLIST INVERTER INFORMATION (IF NEEDED)

GPC Project No.:	
Facility Tester Name:	
GPC Customer Name:	
Witness Test Date:	
Inv. Make(s):	
Inv. Model(s):	
Firmware No. :	
Software No. :	

Operating Parameters*					
Nominal Operating Voltage					
Operating Voltage Range					
Operating Frequency Range					
Operating Power Factor		Absorbing	☐	Injecting	☐
Maximum DC Power (kW)					
Maximum AC Power per Inverter (kW)					
Total Maximum AC Power (kW)					
DG Reconnection Startup Time Delay (min)					
Generation Start-Up Ramp Rate (kW/Sec)					

Inverter Trip Parameters*	**Pickup**	**Time Delay**
Over-Voltage 2 (OV2)		
Over-Voltage 1 (OV1)		
Under-Voltage 2 (UV2)		
Under-Voltage 1 (UV1)		
Over-Frequency (OF)		
Under-Frequency (UF)		

Ride-Through Options*				
Voltage Ride-Through Available	Yes	☐	No	☐
Voltage Ride-Through	Enabled	☐	Disabled	☐
Frequency Ride-Through Available	Yes	☐	No	☐
Frequency Ride-Through	Enabled	☐	Disabled	☐

**** Customer Generator must set all inverters per Southern Company Policy and other project specific requirements.***

Inverter I.D.	Inverter Serial Number	Inverter I.D.	Inverter Serial Number
1.		27.	
2.		28.	
3.		29.	
4.		30.	
5.		31.	
6.		32.	
7.		33.	
8.		34.	
9.		35.	
10.		36.	
11.		37.	
12.		38.	
13.		39.	
14.		40.	
15.		41.	
16.		42.	
17.		43.	
18.		44.	
19.		45.	
20.		46.	
21.		47.	
22.		48.	
23.		49.	
24.		50.	
25.		51.	
26.		52.	
Comments:			

As a reminder, following submission of final paperwork (including this form) in preparation for Witness Testing, Customer Generator may not make any change to the Facility without obtaining GPC's express prior written consent.

Submitted by Customer Generator:

Authorized Signature _____

Name Printed: _____

Title: _____