National Grid Witness Test Guidelines

National Grid requires a complete witness test procedure document for the commissioning testing as defined in IEEE Standard 1547” for Interconnecting Distributed Resources with Electric Power Systems (and subsequent standards).

a) The documents shall include the testing company letterhead; it shall be in a suitable format to be used by National Grid on the field to witness the test and should include the testing steps in chronological order.

b) Each step should have a pass/fail field, a description of the action(s) required field and a description of the anticipated result field and a comment field.

c) The customer must contract a third party Electrical Testing firm to conduct the required tests which might include:
   1. Operation of a Direct Transfer Trip System (DTT)
   2. Operation of utility grade relays

d) Working with this third party firm, the customer must draft a witness test procedure using this document (Witness Test Doc) as a guideline.

e) The customer must submit a set of proposed relay settings, either printed from the relay itself, or gathered in a separate document for review and approval by National Grid Protection Engineering prior to conducting the witness test. Each relay element used would need to be tested and field verified.

f) This witness test includes an additional fee that will be outlined in the interconnection checklist and is required to be paid in full prior to conducting the witness test.

g) Please see National Grid's Witness Test Procedure document for further guidance.

The MDPU 1320 and RIPUC 2163 state the following:

4.2.4 Protection System Testing and Maintenance

The Company shall have the right to witness the commissioning testing as defined in IEEE Standard 1547-2003 at the completion of construction and to receive a copy of all test data. The Facility shall be equipped with whatever equipment is required to perform this test.

Testing typically includes, but is not limited to:

- CT and CT circuit polarity, ratio, insulation, excitation, continuity and burden tests,
- CT and VT circuit polarity, ratio, insulation and continuity tests,
- Relay pick-up and time delay tests,
- Functional breaker trip tests from protective relays,
- Relay in-service test to check for proper phase rotation and magnitudes of applied currents and voltages,
- Breaker closing interlock tests, and
- Paralleling and disconnection operation.

National Grid requires that protective relay system be installed, wired, set (programmed) with approved settings by National Grid Protection Engineering and tested. The test results should be included in the test report along with the final approved settings and sent to National Grid for Review by the Protection Operations group and Protection Engineering. Changes to settings must be reviewed and authorized by National Grid Protection Engineering. Any changes to the relay settings after the testing is completed will require the relays to be re-tested with a new test report issued.

List of the major steps to be witnessed* on the day of the test by a National Grid Technician:

- As left settings from the relay which can be in either a hard copy or the settings file format. These settings should match the test report provided.
- A visual inspection of the relays, PTs, CTs will be performed. Model numbers, serial numbers and ratings may be recorded.
- All analog inputs will need to be measured for magnitude and phase angle in order to verify correct signal levels and frequency are being provided to the relay and directional elements of the protection are connected for proper trip direction if utilized.
- All relay elements required by National Grid (Under/Over Voltage, Under/Over Frequency, instantaneous/ time over current, Alarm, Directional Power...) will have to be triggered and the anticipated output should act accordingly on the correct device as shown in the one line.
- A hard or electronic copy of the settings download and the final certified test report will also be required after the completion of the witness test.

*National Grid personnel will not operate any equipment; a trained and certified professional provided by the customer will conduct all the tests and National Grid's personnel will witness the procedures and results. Please make sure the certified Electrical Testing Company will use precise testing equipment. This document is subject to change without notice.

These guidelines are illustrative only.
Please consult IEEE Standard 1547 for more detail regarding requirements.