Open and Short Circuit Saturation Procedure

[Insert Unit Name]

[Insert Three Letter Code]

Version 0.1



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# DOCUMENT VERSION History

|  |
| --- |
| **Document Revision History** |
| **Revision**  | **Date** | **Comment** | **Name** | **Company** |
| 0.1 | Xx/xx/xxxx | XX | User | User |
|  |  |  |  |  |
| 1.0 | Xx/xx/xxxx | Revised to Major version for onsite testing and signoff |  | SONI |

# Introduction

The Unit must submit the latest version of this test procedure as published on the SONI website[[1]](#footnote-1).

All yellow sections must be filled in before the test procedure will be approved. All grey sections must be filled in during testing. If any test requirements or steps are unclear, or if there is an issue with meeting any requirements or carrying out any steps, please contact Generator\_Testing@soni.ltd.uk .

On the day of testing, suitably qualified technical personnel are required on site to assist in undertaking the tests. The personnel shall have the ability to:

1. Set up and disconnect the control system and instrumentation as required;
2. Ability to fully understand the Unit’s function and its relationship to the System;
3. Liaise with CHCC as required;
4. Mitigate issues arising during the test and report on system incidents.

The availability of personnel at CHCC will be necessary in order to initiate the necessary instructions for the test. CHCC will determine:

1. If network conditions allow the testing to proceed.
2. When the tests will be carried out.

On completion of this test, the following shall be submitted to Generator\_Testing@soni.ltd.uk:

|  |  |
| --- | --- |
| **Submission** | **Timeline** |
| A scanned copy of the test procedure, as completed and signed on site on the day of testing | 1 working day |
| Test data in CSV or Excel format | 1 working day |
| Test report | 10 working days |

**Note:**

**The NI Power System is a live, dynamic, constantly changing system on which major changes or disturbances can occur without warning. All testing has the potential to impact the NI Power System and must be treated as such.**

**Prior to testing taking place SONI Control Room must be informed as soon as practically possible. SONI Control Room Staff reserve the right to suspend any testing if it may have a detrimental impact on the NI Power System and/or prevailing system conditions call for it.**

**Tests must be undertaken in accordance with this procedure however should a test in the procedure:**

* **have potential for a detrimental impact on the NI Power System,**
* **result in damage to the Generator’s and/or TO’s Plant and Apparatus,**
* **does not adequately demonstrate Generator Plant performance,**

**an equivalent test procedure or demonstration of Generating Unit capability[[2]](#footnote-2) agreed between SONI and the Generator may be undertaken to validate Grid Code compliance.**

# Abbreviations

CHCC Castlereagh House Control Centre

Mvar Mega Volt Ampere – reactive

MW Mega Watt

TSO Transmission System Operator

MEC Maximum Export Capacity

RPM Revolutions Per Minute

kV kilovolt

EDIL Electronic Dispatch Instruction Logger

# Unit DATA

|  |  |
| --- | --- |
| Unit Test Coordinator | Unit to Specify Name, Company and contact details. |
| Unit name | Unit to Specify |
| Associated Station | Unit to Specify |
| Unit connection point | Unit to Specify |
| Unit connection voltage | Unit to Specify |
| Unit Fuel Type:  | Primary Fuel / Secondary Fuel. |
| Registered Capacity | Unit to Specify |
| Contracted MEC | Unit to Specify |
| House Load (estimated) | Unit to Specify |
| Block Load (estimated) | Unit to Specify |

# SONI Grid Code references

|  |  |
| --- | --- |
| Grid Code Version:  | Unit to specify |

CC.S1.3.2 (iii) of the Grid code states that generating units should have an SCR of not less than 0.5

# site Safety requirements

The following is required for the SONI witness to attend site:

|  |  |
| --- | --- |
| Personal Protective Equipment Requirements1. Site Safety boots
2. Hard Hat with chin strap
3. Hi Vis
4. Arc Resistive clothing
5. Safety Glasses
6. Gloves
 | 1. Yes / No
2. Yes / No
3. Yes / No
4. Yes / No
5. Yes / No
6. Yes / No
 |
| Site Induction requirements | Yes / No (If Yes, Unit to specify how and when the induction must carried out) |
| Any further information | Unit to specify |

# Test Description and Pre Conditions

## Purpose

The test results will be used to verify the design value of short circuit ratio (SCR), where

$$SCR=\frac{Open Circuit Field Current to obtain 1pu Terminal Voltage}{Short Circuit Field Current to obtain 1pu Terminal Current}$$

## Pass Criteria

* Demonstration of the Generating Units SCR being less than 0.5

# Test Steps

This test is carried out by the Generator to verify the generator field current saturation characteristics.

The test should be carried out prior to synchronisation, and results sent to SONI in CSV or Excel 1 working day afterwards.

**Results Required:**

* Graphical and tabular representations of per unit Terminal Voltage versus per unit Field Current on Open Circuit
* Graphical and tabular representations of per unit Terminal Voltage versus per unit Field current on Short Circuit

Results should be legible, clearly labelled, and should have appropriate scaling in engineering units.

|  |
| --- |
| **Comments:**  |
| Unit Witness signoff that this test has been carried out according to the test procedure above.Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date / Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| SONI Witness signoff that this test has been carried out according to the test procedure above.Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date / Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. <https://www.soni.ltd.uk/how-the-grid-works/grid-codes/conventional-generator-co/index.xml> [↑](#footnote-ref-1)
2. For example simulation of the Generator performance characteristics under the test procedure [↑](#footnote-ref-2)