

Grid Code Review Panel -

Grid Code Requirement for System to Generator Operational Intertripping Schemes

Summary

1. This paper proposes changes to the Grid Code to ensure the Grid Code is consistent with how system to generator operational intertripping schemes have been implemented for generators connected to Relevant Transmission Licensees systems.
2. The proposed change relates to:
 - the definition of "System to Generation Operational Intertripping Scheme" in the Grid Code.

Introduction

3. During 2008, National Grid raised F/08¹, a Grid Code Amendment Consultation to clarify the technical requirements that may be specified in a generator's bilateral agreement as part of a system to generator operational intertripping scheme requirement.
4. The Consultation proposed changes to the Grid Code to amend the:
 - Definition of system to generator operational intertripping schemes to reflect changes to the CUSC (to extend payment arrangements to power park modules);
 - Connection Conditions to explain the additional content of a bilateral agreement that specifies a system to generator operational intertripping scheme requirement; and
 - Connection Conditions to provide generic technical information relevant to system to generator operational intertripping schemes.
5. In March 2009, the Authority issued a decision letter² approving the proposals which were consequently implemented shortly after. The letter noted that the existing Grid Code arrangements for intertripping schemes had been developed under the expectation that the generator would be tripped on receipt of an intertripping signal by a circuit breaker owned by that generator. However, it was observed that it was feasible that the generator could be tripped by an intertrip signal to a transmission licensee owned circuit breaker.
6. The Authority asked National Grid to review the system-to-generator operational intertripping scheme descriptions in the Grid Code, in light of this scenario.

Summary of Current Grid Code Requirements

7. The Grid Code contains the following definitions:

"System to Generator Operational Intertripping":

¹ <http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/consultationpapers/2008/>

² <http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/consultationpapers/2008/>

“A **Balancing Service** involving the initiation by a **System to Generator Operational Intertripping Scheme** of automatic tripping of the **User’s** circuit breaker(s) resulting in the tripping of **BM Unit(s)** or (where relevant) **Generating Unit(s)** comprised in a **BM Unit** to prevent abnormal system conditions occurring, such as over voltage, overload, **System** instability, etc, after the tripping of other circuit-breakers following power **System** fault(s)..”

"System to Generator Operational Intertripping Scheme":

A **System to Generating Unit** or **System to CCGT Module** or **System to Power Park Module Intertripping Scheme** forming a condition of connection and specified in Appendix F3 of the relevant **Bilateral Agreement**, being either a **Category 1 Intertripping Scheme**, **Category 2 Intertripping Scheme**, **Category 3 Intertripping Scheme** or **Category 4 Intertripping Scheme**.

8. The Grid Code has the following two relevant clauses within the Connection Conditions:

CC.6.3.17 **NGET** may require that a **System to Generator Operational Intertripping Scheme** be installed as part of a condition of the connection of the **Generator**. Scheme specific details shall be included in the relevant **Bilateral Agreement** and shall, in respect of **Bilateral Agreements** entered into on or after 16th March 2009 include the following information:

1. the relevant category(ies) of the scheme (referred to as **Category 1 Intertripping Scheme**, **Category 2 Intertripping Scheme**, **Category 3 Intertripping Scheme** and **Category 4 Intertripping Scheme**);
2. the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** to be either permanently armed or that can be instructed to be armed in accordance with BC2.8;
3. the time within which the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** circuit breaker(s) are to be automatically tripped;
4. the location to which the trip signal will be provided by **NGET**. Such location will be provided by **NGET** prior to the commissioning of the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)**.

Where applicable, the **Bilateral Agreement** shall include the conditions on the **National Electricity Transmission System** during which **NGET** may instruct the **System to Generator Operational Intertripping Scheme** to be armed and the conditions that would initiate a trip signal.

CC.6.3.18 The time within which the **Generating Unit(s)** or **CCGT Module** or **Power Park Module** circuit breaker(s) need to be automatically tripped is determined by the specific conditions local to the **Generator**. This ‘time to trip’ (defined as time from provision of the trip signal by

NGET to the specified location, to circuit breaker main contact opening) can typically range from 100ms to 10sec. A longer time to trip may allow the initiation of an automatic reduction in the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** output prior to the automatic tripping of the **Generating Unit(s)** or **CCGT Module(s)** or **Power Park Module(s)** circuit breaker. Where applicable **NGET** may provide separate trip signals to allow for either a longer or shorter 'time to trip' to be initiated.

The Issue

9. The Grid Code currently defines a system to generator operational intertripping scheme as making use of "the User's circuit breaker(s)". It has been found that this is not always the case, both onshore and offshore.
10. Several of the transitional offshore generator connections have been implemented with intertripping schemes which operate via the Offshore TO circuit breaker. At the time these schemes were designed, these circuit breakers would have been treated as User circuit breakers under the Grid Code. Since the confirmation of the enduring offshore regime this has not been replicated and therefore the number of such connections is not expected to increase.
11. In addition there are examples of onshore generators where operational intertripping schemes make use of the Relevant Transmission Owner circuit breaker.

Proposed Solution

12. It is proposed that the definition of System to Generator Operational Intertripping definition is amended to cater for intertrip schemes which make use of Relevant Transmission Owner's circuit breakers in circumstances where all the relevant parties have agreed to this solution.

Way Forward/ Next steps

13. GCRP members are invited:
 - To consider the issue described in this paper;
 - To agree that National Grid should proceed to a one month industry wide consultation on the proposed changes.
 - To note that National Grid will respond to the Authority's letter, indicating the proposed way forward.

ANNEX: Proposed Changes to Grid Code Text

This annex contains the suggested changes to the Grid Code text that will give effect to the proposal contained within this paper.

Glossary and Definitions

‘System to Generator Operational Intertripping’:

“A Balancing Service involving the initiation by a System to Generator Operational Intertripping Scheme of automatic tripping of the User’s circuit breaker(s), or Relevant Transmission Licencee’s circuit breaker(s) where agreed by NGET, the User and the Relevant Transmission Licensee, resulting in the tripping of BM Unit(s) or (where relevant) Generating Unit(s) comprised in a BM Unit to prevent abnormal system conditions occurring, such as over voltage, overload, System instability, etc, after the tripping of other circuit-breakers following power System fault(s)..”