

Operation Codes: OC5 - Operational Liaison

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Presentation Objectives

- ❑ To provide a basic understanding on the contents of the Operational Codes No. 5 (OC5).
- ❑ To highlight the key points within OC5.

OC5.1 Introduction

- Operating Code No. 5 (OC5) sets out the requirements for maintaining communication and for the exchange of information in relation to the **operations** and or **Events** on the Grid System or a User System which have had or may have an **Operational Effect** on the Grid System or other User Systems.

OC5.2 Objectives of OC5

The objectives of OC5 are:

- (1) to provide for the exchange of information that is needed in order that possible risks arising from the **Operations** and or **Events** on the Grid System and or User Systems can be assessed and appropriate action taken;
- (2) to detail the communication facilities required between the GSO and each category of User;
- (3) provide a framework for information flow and discussion for Commissioning Tests and Compliance tests; and
- (4) to detail the general procedures that will be established to authorise personnel who will initiate or carry out operations on the User System

OC5.3 Scope of OC5

OC5 applies to the GSO and the following Users:

- (1) Generators with CDGUs;
- (2) TNB Transmission;
- (3) Network Operators;
- (4) Distributors;
- (5) Directly Connected Customers where the GSO considers it necessary; and
- (6) Interconnected Parties.

OC5.4 Terminologies

Within the OC5:

- the term “**Operation**” means a previously planned and instructed action relating to the operation of any Plant or Apparatus that forms a part of the Grid System.
- the term “**Event**” means an unscheduled or unplanned (although it may be anticipated) occurrence on, or relating to, a System including faults, incidents and breakdowns, and adverse weather conditions being experienced.
- the term “**Operational Effect**” means any effect on the operation of the relevant System which will or may cause the Grid System or other User Systems to operate (or be at a materially increased risk of operating) differently to the way in which they would or may have normally operated in the absence of that effect.

OC5 in Simple Terms

1. OC5 addresses the needs to establish effective modes of communications among all grid-connected players in the context of informing each other about events and actions (operations) believed to have impacts on others.
2. Examples of events: adverse weather condition, tripping, reduced capacity
3. Examples of actions: dispatch instruction, CB open/close, planned outage, confirmation of an outage, outage cancellation
4. Notification must have sufficient details but not necessarily to state the cause and must be followed up by other agreed communication channels.
5. OC5 requires that such notifications shall be provided within three (3) Business Days OR as soon as practicable after the Event is known or anticipated by the issuer – OC5.6.3.2
6. An event can be considered as significant by the GSO. Significant Incident reporting is covered in OC6:- voltage/frequency outside statutory limits, system instability

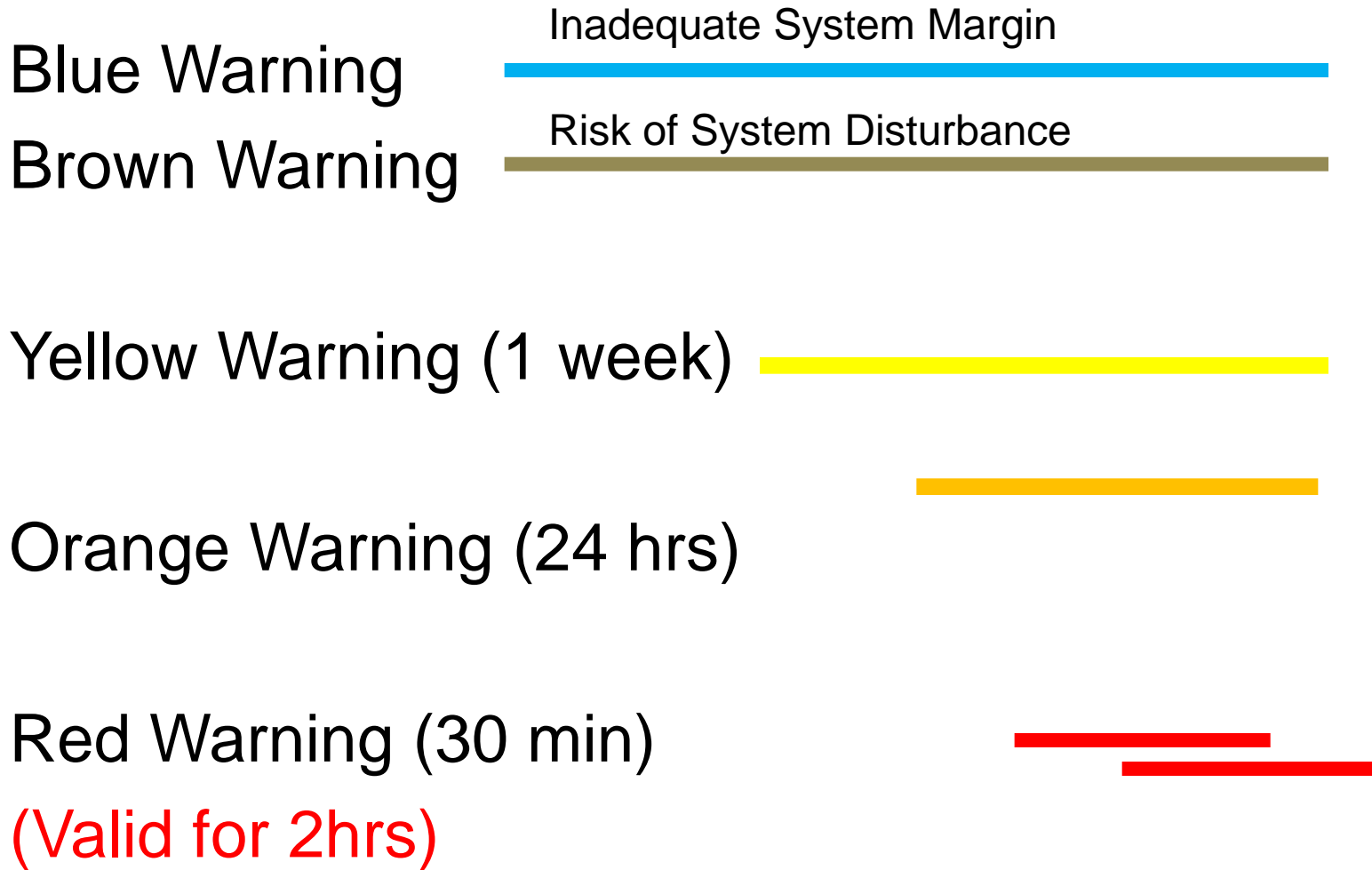
OC5 in Simple Terms ... cont.

7. GSO System Warnings are intended to alert users to possible Grid System problems. One of the impacts to users can be in the form of Demand Reduction.
8. Recipients of Warnings should take such preparatory actions as they deem necessary – OC5.8.3.1
9. For a Network Operator, Demand Control should only be employed under the instruction of the GSO unless it is deemed necessary to preserve the integrity of the Network Operator's System. [OC5.8.3.2]
10. GSO System Warning will be issued by telephone instructions, by fax, or by such electronic data transmission facilities as have been agreed. [OC5.8.3.3]
11. Confirmations will be sent to Users by fax. [OC5.8.3.4]
12. OC5 also deals with information flow regarding Commissioning Tests and Compliance Tests. [OC5.9.1.1]

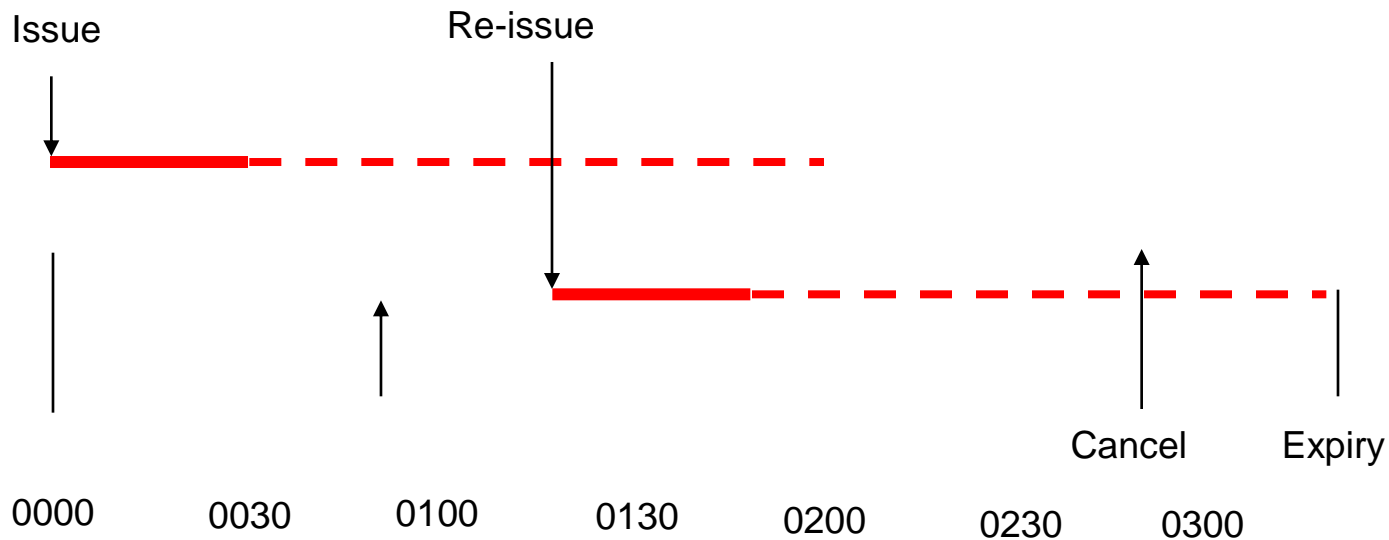
OC5 in Simple Terms ... cont.

13. For a Commissioning Test, notification must be made if in the reasonable judgment of the party conducting the test that it can potentially cause an Operational Effect on the System. [OC5.9.1.3]
14. For a Compliance Test, notification of the requirement will be made by the GSO to the User – OC5.9.1.4
15. For both types of Tests, OC5 states the minimum information requirements to be included in the notification. [OC5.9.2.2] & [OC5.9.2.3]
16. The recipient of notification of a Compliance Test must respond within a reasonable timescale. [OC5.8.3.3]
17. The response from the recipient must be either (1) accept as it is (2) accept conditionally with minor modifications (3) do not agree but provide alternative. [OC5.9.2.5]
18. Whenever the elements of testing change during the Commissioning or Compliance Test, there must be discussion between the appropriate parties to identify whether Tests should continue. [OC5.9.4.3]

GSO System Warnings



Red Warning



- Issued when Demand Reduction is expected within the next 30 minutes.
- Remains valid until 2 hours. Before 2 hours, GSO must cancel or re-issue.
- Red Warning need not be preceded by any other GSO System Warning.



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OC5.5 Procedures fo Operational Liaison

- The GSO and Users shall nominate persons and contact locations and agree on the communication channels to be used in accordance with the Connection Code (CC) for the necessary exchange of information to make effective the exchange of information required by the provisions of this OC5. There may be a need to specify locations where personnel can operate, such as Power Stations, control centres etc., and manning levels to be required, for example, 24 hours, official holiday cover etc. These arrangements may have been agreed upon producing the Site Responsibility Schedule pursuant to the CC. [OC5.5.1]
- In general, all Users including Network Operators will liaise with the GSO to initiate and establish any required communication channel between them. [OC5.5.2]

OC5.5 Procedures for Operational Liaison...cont.

- SCADA equipment, remote terminal units or other means of communication specified in the CC may be required at the User's site for the transfer of information to and from the GSO. As the nature and configuration of communication equipment required to comply with will vary between each category of User connected to the System, it will be necessary to clarify the requirements in the relevant Agreement. Information between the GSO and the Users shall be exchanged on the reasonable request from either party. [OC5.5.3]

OC5.6 Situations Requiring Notifications

- While in no way limiting the situations and or conditions requiring notification, the GSO and Users shall agree to review from time to time the Operations and Events which are required to be notified. [OC5.6.1.1]
- Examples of **Operations** where notification by the GSO or Users may be required under OC5 are: [OC5.6.1.2]
 - 1) the implementation of planned outage of Plant or Apparatus pursuant to OC2;
 - 2) issue of dispatch instruction;
 - 3) the operation of circuit breaker or isolator/ disconnectors;
 - 4) confirmation of planned outage

OC5.6 Situations Requiring Notifications...cont.

- Examples of **Events** where notification by the GSO or Users may be required under this OC5 are: [OC5.6.1.3]
 - 1) the operation of Plant and/or Apparatus in excess of its capability or may present a hazard to personnel;
 - 2) activation of alarm or indication of an abnormal operating condition;
 - 3) adverse weather condition;
 - 4) breakdown of, or faults on, or temporary changes in, the capability of Plant and/or Apparatus;
 - 5) increased risk of unplanned protection operation;
 - 6) abnormal operating parameters, such as a governor problem, fuel system trouble, or low/high temperatures; and
 - 7) loss of communication - SCADA

OC5.6 Situations Requiring Notifications...cont.

- A notification under this OC5 shall be of sufficient detail to describe the Operation or Event that might lead or have led to an Operational Effect on the relevant Systems, although it does not need to state the cause. This is to enable the recipient of the notification to reasonably consider and assess the implications or risks arising from it. The recipient may seek to clarify the notification. [OC5.6.2.1]
- This notification may be in writing if the situation permits it, otherwise, the other agreed communication channels in OC5.4 shall be used. [OC5.6.2.2]

OC5.6 Situations Requiring Notifications...cont.

- A notification under OC5 for Operations which will have or may have an Operational Effect on the relevant Systems shall be provided as far in advance as practicable to allow the recipient to consider the implications and risks which may or will arise from it. [OC5.6.3.1]
- A notification under this OC5 for Events which will have or may have or have had an Operational Effect on the relevant Systems shall be provided within **three (3) Business Days** after the occurrence of the Event or as soon as practicable after the Event is known or anticipated by the person issuing the notification. [OC5.6.3.2]

OC5.7 Significant Incidents

- Where an Event on the Transmission System has had or may have had significant effect on the User System or when an Event on the User System has had or may have had a significant effect on the Transmission System or other User Systems, the Event shall be deemed a Significant Incident by GSO in consultation with the User. [OC5.7.1]
- Significant Incidents shall be reported in writing to the affected party in accordance with OC6. [OC7.7.2]
- Without limiting the general description set out in this OC5.7, a Significant Incident will include Events having an Operational Effect which result in, or may result in, the following: [OC5.7.3]
 - (1) Voltage outside statutory limits;
 - (2) Frequency outside statutory limits; or
 - (3) System instability.

OC5.8 GSO System Warnings

OC5.8.1 Roles of GSO System Warnings

GSO System Warnings as described below provide information relating to System conditions or Events and are intended to:

[OC5.8.1.1]

- (1) alert Users to possible Grid System problems and/or Demand Reductions;
- (2) inform of the applicable period;
- (3) indicate intended consequences for Users; and
- (4) enable specified Users to be in a state of readiness to react properly to instructions received from GSO.

OC5.8 GSO System Warnings ... cont.

OC5.8.2 Recipients of GSO System Warnings

- Where GSO System Warnings are applicable to System (except those relating to Demand Control Imminent) conditions or Events which have widespread effect, GSO will notify relevant Users under this OC5.8. [OC5.8.2.1]
- Where in the considered opinion of the GSO, System conditions or Events may only have a limited effect, the GSO System Warning will only be issued to those Users who are or may in the judgement of the GSO be affected. [OC5.8.2.2]
- Where a GSO System Warning - Demand Control Imminent is issued it will only be sent to those Users who are likely to receive Demand Control instructions from the GSO. [OC5.8.2.3]

OC5.8.3 Preparatory Action

- Where possible, and if required, recipients of the warnings should take such preparatory action as they deem necessary taking into account the information contained in the GSO System Warning. All warnings will be of a form determined by the GSO and will remain in force from the stated time of commencement until the cancellation, amendment or reissue, as the case may be, is notified by the GSO. [OC5.8.3.1]

OC5.8.3 Preparatory Action... cont.

- Where a GSO System Warning has been issued to a Network Operator and is current, Demand Control should not (subject as provided below) be employed unless instructed by the GSO. If Demand Control is, however, necessary to preserve the integrity of the Network Operator's System, then the impact upon the integrity of the Total System should be considered by the Network Operator and where practicable discussed with the GSO prior to its implementation. [OC5.8.3.2]

OC5.8.3 Preparatory Action... cont.

- GSO System Warnings will be issued by telephone instructions, by fax, to the facsimile number(s) and locations agreed between GSO and Users, or by such electronic data transmission facilities as have been agreed.
[OC5.8.3.3]
- Users may at times be informed by telephone or other means of GSO System Warnings and in these circumstances confirmation will be sent to those Users so notified, by fax as soon as possible. [OC5.8.3.4]

OC5.8 GSO System Warnings ... cont.

OC5.8.4 Types of GSO System Warnings

- GSO System Warnings include warnings related to the conditions of the Grid Systems as well as the colour coded warnings associated with Demand Controls as specified in OC4.4. [OC5.8.4.1]

OC5.8 GSO System Warnings ... cont.

OC5.8.4 Types of GSO System Warnings ...cont.

- System Warnings related to the conditions of the system are:
 - (1) Blue Warning - Inadequate System Margin.
 - (2) Brown Warning - Risk of System Disturbance
[OC5.8.4.2]
- System Warnings related to Demand Controls are:
 - (1) Yellow Warning - Probable Risk of Demand Reduction;
 - (2) Orange Warning - High Risk of Demand Reduction; and
 - (3) Red Warning - Extremely High Risk of Demand Reduction or Demand Control Imminent [OC5.8.4.3]
- The above warnings are specified in OC4.4.

OC5.8.5 Issuance of System Warnings

- A Blue Warning - Inadequate System Margin may be issued to Users in accordance with OC5.8.2, at times when there is inadequate System Margin. It will contain the following information: [OC5.8.5.1]
 - (1) the period for which the warning is applicable; and
 - (2) the availability shortfall in MW; and
 - (3) intended consequences for Users.

OC5.8.5 Issuance of System Warnings ...cont.

- An Orange Warning - High Risk of Demand Reduction may be issued to Users in accordance with OC5.8.2 at times when there is inadequate System Margin, as determined and in the judgement of GSO there is increased risk of Demand Reduction being implemented under OC4.5. It will contain the following information in addition to the required information in a Blue Warning - Inadequate System Margin: [OC5.8.5.2]
 - (1) the possible percentage level of Demand Reduction required; and
 - (2) Specify those Users who may subsequently receive instructions under OC4.5

OC5.8 GSO System Warnings ... cont.

OC5.8.5 Issuance of System Warnings ...cont.

- An Orange Warning - High Risk of Demand Reduction may also be issued by the GSO to those Users who may subsequently receive instructions under OC4.5 relating to a Demand Reduction in circumstances not related to inadequate System Margin (for example Demand Reduction required to manage System overloading) [OC5.8.5.3]
- The Orange Warning - High Risk of Demand Reduction will specify the period during which Demand Reduction may be required and the part of the Total System to which it applies [OC5.8.5.4]

OC5.8 GSO System Warnings ... cont.

OC5.8.5 Issuance of System Warnings ...cont.

- Whenever the GSO anticipates that a protracted period of generation shortage may incur a Blue or an Orange Warning - Inadequate System Margin or High Risk of Demand Reduction may be issued, to give as much notice as possible to those Users who may subsequently receive instructions under OC4.5. An Orange Warning - High Risk of Demand Reduction will in these instances include an estimate of the percentage of Demand Reduction that may be required and the anticipated duration of the Demand Reduction. It may also include information relating to estimates of any further percentage of Demand Reduction that may be required.

[OC5.8.5.5]

OC5.8 GSO System Warnings ... cont.

OC5.8.5 Issuance of System Warnings ...cont.

- The issue of the GSO System Warnings is intended to enable recipients to plan ahead on the various aspects of Demand Reduction. [OC5.8.5.6]

OC5.8 GSO System Warnings ... cont.

OC5.8.5 Issuance of System Warnings ...cont.

- A Red Warning - Demand Control Imminent, relating to a Demand Reduction under OC4.5, will be issued by the GSO to Users in accordance with OC5.8.2. It will specify those Users who may subsequently receive instructions under OC4.5. The Red Warning need not be preceded by any other GSO System Warning and will be issued when a Demand Reduction is expected within the following thirty (30) minutes, but will not cease to have effect after thirty (30) minutes from its issue. However, the GSO will either reissue the Red Warning or cancel the Red Warning no later than two (2) hours from first issue, or from re-issue, as the case may be. [OC5.8.5.7]

OC5.8 GSO System Warnings ... cont.

OC5.8.5 Issuance of System Warnings ...cont.

- A Brown Warning - Risk of System Disturbance will be issued by the GSO to Users who may be affected when the GSO knows there is a risk of widespread and serious disturbance to the whole, or part of, the Grid System. The Brown Warning will contain such information as the GSO deems appropriate. [OC5.8.5.8]

OC5.8 GSO System Warnings ... cont.

OC5.8.5 Issuance of System Warnings ...cont.

- For the duration of the Brown Warning, each User in receipt of the Brown Warning shall take the necessary steps to warn its operational staff and to maintain its Plant and/or Apparatus in the condition in which it is best able to withstand the anticipated disturbance. During the period that the Brown Warning is in effect, Scheduling and Dispatch will need to take account of the System conditions in accordance with the provisions of the SDCs.

[OC5.8.5.9]

OC5.8.6 Cancellation of GSO System Warning

- The GSO will give notification of a Cancellation of GSO System Warning to all Users issued with the GSO System Warning when in the judgement of the GSO, System conditions have returned to normal. [OC5.8.6.1]
- A Cancellation of GSO System Warning will identify the type of GSO System Warning being cancelled and the period for which it was issued. The Cancellation of GSO System Warning will also identify any GSO System Warnings that are still in force. [OC5.8.6.2]

OC5.8 GSO System Warnings ... cont.

OC5.8.7 General Management of GSO System Warning

- GSO System Warnings remain in force for the period specified unless superseded or cancelled by the GSO. A GSO System Warning issued for a particular period may be superseded by further related warnings. [OC5.8.7.1]

OC5.8 GSO System Warnings ... cont.

OC5.8.7 General Management of GSO System Warning

- In circumstances where it is necessary for the period of a GSO System Warning to be changed:
 1. the period applicable may be extended by the issue of a GSO System Warning with a period which follows on from the original period, or
 2. revised or updated GSO System Warnings will be issued where there is an overlap with the period specified in an existing GSO System Warning, but only if the revised period also includes the full period of the existing GSO System Warning. In any other case the existing GSO System Warning will be cancelled and a new one issued.

. [OC5.8.7.2]

OC5.8.7 General Management of GSO System Warning

- A GSO System Warning is no longer applicable once the period has passed and to confirm this GSO will issue a Cancellation of GSO System Warning.
[OC5.8.7.3]

OC5.9 Procedure for Information Flow During Commissioning and Compliance Tests

OC5.9.1 General

- This section of the Grid Code deals with information flow during Commissioning Tests and Compliance Tests. It is designed to provide a framework for the exchange of relevant information and for discussion between the GSO and certain Users in relation to Commissioning Tests and Compliance Tests. [OC5.9.1.1]

OC5.9 Procedure for Information Flow During Commissioning and Compliance Tests ...cont.

OC5.9.1 General ...cont.

- Commissioning Tests and Compliance Tests are carried out in accordance with the provisions of this OC5.9, at a User site or NLDC, and will normally be undertaken during commissioning or recommissioning of Plant and/or Apparatus. [OC5.9.1.2]

OC5.9.1 General ...cont.

- In the case of a Commissioning Tests, notification must be made where the test may, in the reasonable judgement of the person wishing to perform the test, cause, or have the potential to cause, an Operational Effect on a part or parts of the Total System but which with prior notice is unlikely to have a materially adverse effect on any part of the Total System, and may form part of an agreed programme of work. [OC5.9.1.3]
- In the case of a Compliance Tests, notification of the requirement will be made by the GSO to the User. [OC5.9.1.4]

OC5.9.2 Notification

- In order to undertake a Commissioning or Compliance Test, the User or the GSO or the Single Buyer, as the case may be, (the proposer) must notify the other (the recipient) of a proposed Commissioning or Compliance Test. Reasonable advance notification must be given, taking into account the nature of the test and the circumstances which make the test necessary. This will allow recipients time to adequately assess the impact of the Commissioning or Compliance Test on their System. [OC5.9.2.1]

OC5.9.2 Notification ... cont.

- The notification of the Commissioning Test, the test should be incorporated as part of any overall commissioning programme agreed between the GSO and the User, and must normally include the following information:
 - (1) the proposed date and time of the Commissioning Test;
 - (2) the name of the individual and the organisation proposing the Commissioning Test;
 - (3) proposed programme of testing; and
 - (4) such further detail as the proposer reasonably believes the recipient needs in order to assess the effect the Commissioning Test may have on relevant Plant and/or Apparatus. [OC5.9.2.2]

OC5.9.2 Notification ... cont.

- The notification of the Compliance Test must normally include the following information:
 - (1) a proposed period in which the GSO or the Single Buyer proposes that Compliance Test should take place;
 - (2) a proposed programme of testing.

The recipient of notification of a Compliance Test must respond within a reasonable timescale prior to the start time of the Compliance Test and will not unreasonably withhold or delay acceptance of the Compliance Test proposal. [OC5.9.2.3]

OC5.9.2 Notification ... cont.

- Where the GSO receives notification of a proposed Commissioning Test from a User, the GSO will consult those other Users whom it reasonably believes may be affected by the proposed Commissioning Test to seek their views. Information relating to the proposed Commissioning Test may be passed on by the GSO with the prior agreement of the Test Proposer. However it is not necessary for the GSO to obtain the agreement of any such User as Commissioning Tests should not involve the application of irregular, unusual or extreme conditions. The GSO may however consider any comments received when deciding whether or not to agree to a Commissioning Test.

[OC5.9.2.4]

OC5.9.2 Notification ... cont.

- The response from the recipient, following notification of a Commissioning Test must be one of the following:
 - (1) to accept the Commissioning Test proposal;
 - (2) to accept the Commissioning Test proposal conditionally subject to minor modifications such as date and time;
 - (3) not to agree to the Commissioning Test, but to suggest alterations to the detail and timing of the Commissioning Test that is necessary to make the Commissioning Test acceptable. [OC5.9.2.5]

OC5.9.3 Final Confirmation

- The date and time of a Commissioning or Compliance Test will be confirmed between the GSO, the User, and / or the Single Buyer together with any limitations and restrictions on operation of Plant and/or Apparatus. [OC5.9.3.1]
- The Commissioning or Compliance Test may subsequently be amended following discussion and agreement between the GSO, the User, and / or the Single Buyer. [OC5.9.3.2]

OC5.9.4 Execution

- Commissioning or Compliance Tests may only take place when agreement has been reached and must be carried out in accordance with the agreed programme of testing and the provisions of the relevant Agreement. [OC5.9.4.1]
- The implementation of a Commissioning or Compliance Test will be notified in accordance with OC5.9.2. [OC5.9.4.2]

OC5.9 Procedure for Information Flow During Commissioning and Compliance Tests ...cont.

OC5.9.4 Execution ...cont.

- Where elements of the programme of testing change during the Commissioning or Compliance Test, there must be discussion between the appropriate parties to identify whether the Commissioning or Compliance Test should continue. [OC5.9.4.3]