GRID CODE – OPERATIONS CODE

	Prepared by	Controlled by	Approved by
Name of Company	KOSTT	KOSTT	ERO
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Chapter 7: Operations Code

1 Introduction

1.1.1.1 The **Operations Code** is not a single entity but is made up of a number of separate sub-codes. These sub-codes consist of the following:

- Testing and monitoring code
- Operational liaison and **event** information supply code
- Safety co-ordination code
- Contingency planning code
- Demand control code
- **Plant and apparatus** identification code
- System tests code

2 Testing and Monitoring Code

2.1 Introduction

2.1.1.1 This testing and monitoring code specifies the procedures to be followed by the **TSMO** in carrying out testing and monitoring with regard to the following:

- Monitoring of **generating units** against their scheduled output;
- Monitoring of **generating units** against their obligations under the **grid code** for load-frequency control and voltage/reactive power control;
- Compliance by **users** with the **connections code** and their **connection agreement**;
- Their compliance with their **ancillary services agreements** and their actual provision of these **ancillary services**;
- **Black start** tests (see section 5.8.11 as well);
- Any other tests required by the provisions of this **grid code**:

2.2 Objective

2.2.1.1 The objectives of this testing and monitoring code are to confirm that **users** comply with all aspects of this **grid code** unless specifically relieved from the particular and that they meet **market participants** fulfil their scheduled obligations.

2.3 Scope

2.3.1.1 This testing and monitoring code applies to the following:

- The **TSMO;**
- **Generators** including **generators** with **generating units** having an output greater than 5 MW connected to the **distribution system;**
- DSOs;
- **Demand customers** directly connected to the **transmission system**;
- **Suppliers**:

2.4 Monitoring

2.4.1.1 The **TSMO** will monitor the performance of all **market participants** against their final scheduled input or output derived from daily schedule, their compliance with the **connections code** and their **CA** and their provision of **ancillary services**.

2.4.1.2 **Users** are obliged to make available to the **TSMO** all relevant information and real-time measurements necessary to perform successful monitoring of the performances listed under 2.4.1.1.

2.4.1.3 If the **TSMO** decides that a **market participant** continually fails to fulfil their obligations with regard to their energy input or output, frequency response or the provision of **ancillary services** then the relevant **party** will be informed of their failures by the **TSMO**.

2.4.1.4 In case of ancillary services provision, either as mandatory obligation or under **ancillary services agreement**, the **TSMO** is entitled to acquire additional services on the account of the **party** that failed to fulfil its obligations.

2.4.1.5 The informed **party** will, as soon as practicable, provide the **TSMO** with an explanation of the reasons for the failure and details of the action that it proposes to take to enable it to meet its obligations under this **grid code**.

2.4.1.6 The **party** involved may wish to take a number of temporary steps before putting in place the final solution and each of these steps must be agreed with the **TSMO**.

2.5 Testing

2.5.1.1 The **TSMO** may at any time require a **user** to carry out a test, provided the **TSMO** has reasonable grounds to justify it.

2.5.1.2 The reason may be because of a change of performance notified by a **user** or monitoring or the completion of actions carried out as per section 2.4 or for some other reason.

2.5.1.3 Any test that is carried out should be solely to confirm or not that the conditions under question can be met.

2.5.1.4 Under normal circumstances the **TSMO** should give the **party** involved at least two weeks notice of the time and date of the test but in exceptional circumstances this notice period can be reduced to 48 hours.

2.5.1.5 If the **party** involved considers the proposed time and date of the test to be unreasonable then it can ask for the test to be postponed and the **TSMO** should make reasonable endeavours to meet this request.

2.5.2 Conduct of Test

2.5.2.1 The test should be undertaken by the **TSMO** or agents carrying it out on their behalf. However at all stages the **party** whose plant is being tested should be fully involved and must be given the opportunity to witness the test.

3 Operational Liaison and Event Information Supply Code

3.1 Introduction

3.1.1.1 This code sets out the requirements on the **parties** that are connected to the **transmission system** for the following:

- The exchange of information in relation to operations and/or **events** that have caused or will cause or may cause an operational effect;
- Reporting in writing and more fully, where appropriate, those **significant incidents** that were initially reported to the **TSMO** verbally;
- The mechanisms for joint investigations of such **events**:

3.2 Objective

3.2.1.1 The objectives of this section in relation to an operation and/or **event** are as follows:

- To provide for the exchange of information;
- To assess the possible risks arising from the operation and/or **event**;
- To confirm that appropriate action is being taken by the relevant **party** in order to maintain the integrity of the system;
- To carry out an investigation after the **event**:

3.3 Scope

3.3.1.1 This section applies to the following:

- The **TSMO**;
- **DSOs**;
- **Generators** including **generators** with eligible **generating units** connected to the **distribution system**;
- **Demand customers** directly connected to the **transmission system**:

3.4 Operations and Events

3.4.1 General

3.4.1.1 The general requirements of this section are to provide a free and open timely exchange of information and for post incident review and investigation where appropriate. These aims are intended to achieve the following:

- to allow the implications of an operation and/or **event** to be considered;
- to facilitate the assessment of any possible risks arising and enable appropriate action to be taken in order to maintain the integrity of the system;
- to set out the level of detailed information required;
- provide a written report of the operation and/or **event**;
- procedure for reports of **significant incidents**;
- procedure for joint investigations;
- maintain confidentiality/transparency of information;
- procedure for registering and agreeing commissioning procedures:

3.4.1.2 In general operations are planned actions that have to be notified in advance by a **user** to the **TSMO**. These are actions that are carried out routinely but have the potential to affect the system.

3.4.1.3 **Events** are incidents or potential incidents that are unplanned and have the potential to affect the **power system**.

3.4.1.4 **Significant incidents** are **events** that have had a serious effect on the system affecting more than one **party** and require an investigation.

3.4.2 Communication Facilities

3.4.2.1 In order to enable the communication to take place all the **parties** must ensure that they have suitable communication facilities in order to allow the required information to be exchanged with the **TSMO**. The basic requirements are as follows:

- a dedicated direct dial telephone;
- a FAX;
- a dedicated e-mail account:

In addition to this other electronic means of communication could be added as described in the **connections code**.

3.4.2.2 For **DSO** control centres, 400 kV and 220 kV substations, eligible **power plants** and **demand users** connected at 110 kV and above two separate communication routes are required.

3.4.3 Operations

3.4.3.1 Whilst in no way limiting the general requirement to notify in advance the following are example of operations where notification in accordance with this section shall be required:

- The planned operation of any circuit breaker or disconnector or any sequence or combination of the two;
- The implementation of a scheduled **outage** of **plant and/or apparatus** that has been arranged pursuant to the **outage planning code**;
- **Generating unit** synchronising and de-synchronising;
- **Generating unit** reaching its self-dispatch level;
- **Generating unit** change of output of more than 10MW, if not in accordance with **approved schedule**;
- Instruction on frequency and **active power** control;
- Instruction on voltage control;
- System protection changes;
- Commissioning procedures:

3.4.3.2 A notification of an operation under this section will be of sufficient detail to describe the operation and to enable the recipient of the notification reasonably to consider and assess the implications and risks arising. The notification will include the name of the individual reporting the operation on behalf of the **TSMO** or the **user**, as the case may be. The recipient may ask questions to clarify the notification.

3.4.4 Form and Timing of an Operation Notification

3.4.4.1 A notification must be given as far in advance as practicable and in any case shall be given in sufficient time as will reasonably allow the recipient to consider and assess the implications and risks arising.

3.4.4.2 The notification shall be given in writing whenever possible and only if there is insufficient time before the operation is scheduled to take place for notification to be given in writing shall it be given orally. Notifications given orally should be reinforced by a written notification.

3.4.4.3 In certain circumstances the written notification will be reinforced by a verbal notification immediately prior to the **event**.

3.4.4.4 Any notification given verbally only shall be repeated back by the recipient to ensure that it has been fully and correctly understood.

3.4.4.5 Commissioning notices will always be given in writing with at least two weeks notice and reinforced by a verbal warning on the day.

3.4.5 Events

3.4.5.1 Whilst in no way limiting the general requirement to notify in advance as set out in this section the following are examples of **events** for which notification will be required;

- Problems with **plant and apparatus** including alarms, abnormal operating conditions and temporary capability changes;
- Failures of control, communications or metering equipment;
- Problems with protection including automatic devices and overload protection and including protection maloperations;
- Any disturbances in the normal operation, failures and trips of major facilities;
- Electricity supply disturbances;
- Disruptions in the approved **active power** and **reactive power** schedules;
- Warnings of supply scarcity;
- Breaches of safety or potential hazards and including accidents affecting people;
- Fires, environmental pollution, and other emergency **events** that may have an adverse effect on normal operation;
- Adverse weather conditions being experienced or forecast:

3.4.5.2 An **event** notification under this paragraph shall be of sufficient detail to describe the **event** and to enable the recipient of the notification reasonably to consider and assess the implications and risks arising. The notification will include the name of the

individual reporting the **event** on behalf of the **TSMO** or the **user**, as the case may be. The recipient may ask questions to clarify the notification and the notifying **party** shall use its reasonable endeavours to provide the necessary information.

3.4.6 Form and Timing of an Event Notification

3.4.6.1 An **event** notification must be given as soon as practicable in order to reasonably allow the recipient to consider and assess the implications and risks arising from the unexpected **event.** In the event of an unplanned or unexpected **event** occurring then the notification must be given as soon as possible after the occurrence of the **event**.

3.4.6.2 The notification shall be given orally and, except in the case of emergency, if either **party** requests, it shall be repeated back by the recipient to ensure that it has been fully and correctly understood.

3.5 System Warnings

3.5.1 General

3.5.1.1 System warnings will be required for all **significant incidents**. **Significant incidents** fall into three categories. These three categories constitute the two categories described in the UCTE OH P5, both of which describe abnormal system operation and have the potential to cause a disturbance and unstable system operation. These two stages – viz alert and emergency – are described in the following sections together with the actions that should be taken. The third category are **significant incidents** that are not directly **power system** related but could potentially lead to **power system** problems if no actions are put in place.

3.5.2 Alert

3.5.2.1 In this situation the **power system** is stable but all operational reserves (for **transmission** and **generation** balance) have to be mobilised. It is not clear if, or when, it will be possible to fully return to security limits. The system is viable and operated within the acceptable operating constraints but very close to or just beyond the security limits. The system operators have serious uncertainties about returning to a normal state due to existing system or load/**generation** margin constraints and the situation is potentially dangerous.

3.5.2.2 In alert situations the following may have occurred or have a serious risk of occurring:

- Tripping of **plant and/or apparatus** either manually or automatically;
- Voltage outside normal limits as per the **voltage control code** in part of the system;

- System not operated to the security standards;
- System instability;
- Potential risk of system overloads:

3.5.3 Emergency

3.5.3.1 In this situation the system is not stable and the 'natural' progression due to cascade tripping, frequency fall, loss of synchronism, power cuts, islanding will bring it to an insecure and uncontrollable situation. Global security of the whole interconnected **power system** is endangered. Exceptional actions such as load shedding may be necessary to limit the spread of the dangerous situation and prevent the collapse of part or all of the **power system**. In this state, the system goes rapidly towards highly dangerous conditions of operation with the system parameters out of the operational security limits.

3.5.3.2 In emergency situations the following may have occurred or have a serious risk of occurring:

- Tripping of **plant and/or apparatus** either manually or automatically;
- Widespread problems with voltage outside normal limits as per the **voltage control code**;
- System frequency outside levels for a significant **event** as per the **frequency control code**;
- System instability;
- System overloads:

3.5.4 Other Serious Situations

3.5.4.1 Other serious situation that require a system warning include the following:

- Serious communication **system** failures affecting the operation of the marke**t** or the system;
- Accidents involving loss of life:

3.5.5 Significant Incident Reporting

3.5.5.1 In the event of a significant incident as listed in sections 3.5.2 to 3.5.4 where there is a risk of widespread and serious disturbance to the whole, or a part of, the system, then the **TSMO** will issue a system warning to all **users** who could be affected. This

warning should be given verbally and in writing, if possible, and will contain such information as the **TSMO** deems appropriate.

3.5.5.2 For the duration of the **system warning** being in place each **user** in receipt of the **system warning** shall take all necessary steps to warn its operational staff and maintain its **plant and apparatus** in the condition in which it is best able to withstand the anticipated disturbance.

3.5.5.3 All **significant incidents** that require a system warning need a report in writing. If there is a dispute as to whether or not an **event** constitutes a **significant incident** then the **TSMO** shall decide. This will apply to an **event** on any part of the Kosovan **Power System** including the **distribution system**.

3.5.5.4 Where a **party** notifies the **TSMO** under this section of an **event** that the **TSMO** considers has had or may have had a significant effect on the **transmission system**, the **TSMO** may require that **party** to report that **event** in writing in accordance with the provisions of this section. In this case the **TSMO** will inform the **party** involved accordingly.

3.5.5.5 Where the **TSMO** notifies a **user** of an **event** under this section that the **user** considers has had or may have had a significant effect on that **user**, then that **user** may require the **TSMO** to report that **event** in writing in accordance with the provisions of this section. In this case the **user** will inform the **TSMO** accordingly.

3.5.5.6 In either case above the **party** on whose system the **event** has occurred will prepare within four hours a brief written factual report of the **event**. Where a written report is required it should be started within one week and completed within one month.

3.5.5.7 Where the **significant incident** involved more than one system then either all the **parties** should provide a report or a joint report should be provided as per paragraph 3.5.6.

3.5.6 Joint Investigations

3.5.6.1 Where a **significant incident** has been declared and a written report under this section has been provided by the **TSMO**, a **DSO** or a **user** any of these **parties** may request, in writing, that a more detailed joint investigation of the **significant incident** should be carried out. Any of the **parties** may also request that other affected **parties** be included in the joint investigation

3.5.6.2 The terms of reference and all matters relating to the joint investigation shall be agreed before the commencement of the joint investigation.

3.5.6.3 The joint investigation will commence within two weeks of the initial request and be completed within two months of the initial request.

3.6 Written Reports

3.6.1 General

3.6.1.1 The overall purpose of the written report should be to establish what happened and why it happened. The report should answer the six 'Ws' viz who, what, why, where, when and how.

3.6.2 Contents of the Written Report

3.6.2.1 The report whether it as the result of a joint investigation or an investigation by one **party** should, as a minimum, contain those matters specified in this paragraph. This is not intended to be an exhaustive list. Any recipient of a written report may raise questions to clarify any issues and the report provider will, in so far as it is able, provide answers to these issues.

3.6.2.2 The contents of the written report should be as follows:-

1. Standard front sheet with executive summary;
2. Location;
3. Summary of **event**;
4. Date and time of significant incident;
5. Injuries;
6. Staff, contractors or members of the public involved;
7. Equipment damaged;
8. Demand and/or **generation** affected to include MW, and number of customers involved;
9. Investigation team;
10. **Events** leading to the incident;
11. Action immediately following the incident;
12. Conclusions (main and subordinate if applicable);
13. Cause of the incident (immediate and basic causes);

14. Recommendations;

15. Further action

Appendices These should include terms of reference and copies of relevant documents such as switching logs, **event** logs, safety documentation, system diagrams, photographs etc. In order to maintain anonymity the copies should be altered to remove names from reports to be widely circulated.

4 Safety Co-ordination Code

4.1 Introduction

4.1.1.1 This code specifies the standard procedures to be used by all **parties** that are connected to the **transmission system** for the co-ordination and implementation of the **safety precautions** that are required on HV apparatus on the systems of the other **parties** in order to meet the legal requirements, when work and/or testing is to be carried out.

4.1.1.2 This code is not intended to introduce specific **safety rules** for the **TSMO** and other **users**[1]. The **TSMO** and each individual **user** shall themselves develop their **safety rules** but these shall be compatible with the requirements specified in.

4.2 Objective

4.2.1.1 The objective of this code is to achieve the basic principle of personnel protection against the impact of the system when work and/or testing of **plant or apparatus** is being carried out that requires the provision of **safety precautions** on another system on HV apparatus up to a **connection point**.

4.2.1.2 The **safety precautions** are necessary when work and/or testing is to be carried out on **plant and/or apparatus** of the **TSMO** or a **user** and where **isolation** on and/or **earthing** of the other's system is required. This code does not apply to **system tests** or where **safety precautions** need to be agreed solely between **users**.

4.3 Scope

4.3.1.1 This section applies to the following **parties**:

- **TSMO**;
- **DSOs**;
- **Generators** with connections to the **transmission system**;
- **Demand customers** directly connected to the **transmission system**;

[1] In this code the **DSOs** are treated as a **user** of the **transmission system**.

4.4 General Arrangements

4.4.1 Safety Management Responsibilities

4.4.1.1 The **TSMO** and all **users** who carry out HV work and/or testing on the Kosovan **transmission system** shall have in place a **safety management system** and **safety rules** designed to protect personnel against the dangers of the **power system**. In doing so, all the measures being taken shall comply with the relevant Kosovan legislation.

4.4.2 Approved Safety Management System

4.4.2.1 The **safety management system** shall specify the principles and procedures, and where appropriate, the documentation to be applied so as to ensure the health and safety of all who are liable to be working or testing on the **transmission system** or on **plant and apparatus** connected to it. It will be established by the **TSMO** and other **users** as specified in this code.

4.4.2.2 This **safety management system** should include provisions for requesting and recording the extent of the work or testing necessary and the associated **safety precautions** at a **connection point** and the timing of notifications that will normally be required.

4.4.3 Procedure for Adoption of Safety Rules

4.4.3.1 A copy of their **safety rules** will be exchanged by each **user** and the **TSMO** with whom they have a **connection point** within six months from the signing of the **connection agreement** (**CA**) and at least three months before the new connection is commissioned. Prior to connection, the **TSMO** shall review and agree the **user**'s **safety rules** in relation to **isolation** and **earthing**. Any change to the **safety rules** of one **party** shall be communicated to all relevant **parties**, as soon as practicable. Any change shall also be reviewed and agreed by the **TSMO**.

4.4.3.2 If all the **parties** involved at a **connection point** use the same **safety management procedure** and the same **safety rules** then exchange of these documents is not required.

4.4.4 Working boundaries

4.4.4.1 At **connection points**, where an **operational boundary** exists, the **parties** involved will decide jointly which **safety management system** is to be adopted. In all instances the **safety management system** adopted will enable the recording and maintenance of **safety precautions** when:

- Work and/or testing is to be carried out on HV **plant and apparatus** across the operational boundary; and

- **Isolation** and/or **earthing** of the system of the other **party** is required:

4.4.5 Safety Co-ordinators

4.4.5.1 The **TSMO** and every **user** shall appoint **safety co-ordinators** who will be responsible for the safe operation and co-ordination of the implementation of the **safety management system**. They will ensure that the appropriate **safety precautions** are taken. This includes the processes of switching, **isolation**, **earthing** and work permit issue as agreed in the **CA** in order to meet the timescale for repairs that would affect other **users**. **Users** can use trained operators to switch out and make safe circuits before the nominated persons are available on site. The **safety co-ordinator** will be responsible for the co-ordination of safety pursuant to these safety co-ordination rules.

4.4.5.2 Only persons appropriately trained and educated are permitted to carry out the above roles on the Kosovan **transmission system**. Safety training and briefing shall be continuous and multi-levelled. The **TSMO** and each **user** has a responsibility to ensure that all relevant personnel are checked and examined on their **safety rules** and **safety management system**.

4.5 Procedure

4.5.1 General

4.5.1.1 The organisation of safe operations for both work and testing, with respect to HV equipment, for the Kosovan **transmission system** shall comply with the relevant Kosvan Laws and rules. These shall be complied with by the **TSMO** and all **users** operating on the Kosovan **transmission system**.

4.5.1.2 The procedures detailed in SCOEI cover both work and/or testing internally for the **TSMO** or any **user** and also work and/or testing across a **connection point** where more than one **party** is involved.

4.5.1.3 SCOEI[2] specifies the arrangements for switching, **isolation**, **earthing** and the production and issue of permits for work and/or testing. It also specifies the procedure to be followed when the work and/or testing is complete and the equipment is ready to be restored to service.

[2] SCOEI - Switching Coordination Earthing and Isolation

4.5.2 Notification

4.5.2.1 To agree an **outage** for work and/or testing at a **connection point** an application in writing must be made to the other **party** no later than two weeks before the **outage** is required. For the **outage** to go ahead the application must be approved by the technical manager of the other **party**. Within one week of receiving the request the **party** receiving the request must agree to the **outage** taking place or propose another time schedule.

4.5.2.2 In the event of unplanned work and/or testing that requires the above level of **safety precautions**, the safety co-ordination can be arranged by telephone and confirmed with the standard request document provided all the **parties** involved agree.

4.5.3 Implementation of Safety Co-ordination

4.5.3.1 For each **connection site** the appropriate safety documentation shall be prepared by the **requesting safety co-ordinator**. It will stipulate the sequence of the necessary actions, including switching, **isolation**, **earthing** and the actions needed to restore to service the equipment after completion of the work and/or testing.

4.5.3.2 The safety documentation will be agreed by the **requesting safety co-ordinator** with the **implementing safety co-ordinator**.

4.5.3.3 All the switching must be carried out in accordance with the sequence stated in the switching programmes or forms that include the agreement of **isolation** points and **earthing** points. For restoration of the initial configuration of the relevant equipment to service the above sequence will be carried out in reverse.

4.5.4 Work on Both Sides of a Connection Point

4.5.4.1 Where **safety precautions** are being provided to enable work and/or testing to be carried out on both sides of a **connection point** then both **parties** must agree the arrangements and must produce and issue the appropriate documentation.

4.5.5 Agreement of Isolation

4.5.5.1 Once the circuit or plant has been de-energised both **safety co-ordinators** will agree the location at which **isolation** is to be established. This agreement will be recorded in writing by both **parties**.

4.5.5.2 If agreement cannot be reached on the location of **isolation** then the work shall not proceed.

4.5.6 Implementation of Isolation

4.5.6.1 Following the agreement of the **safety precautions** in accordance with paragraph 4.5.5 the **parties** shall then establish the **isolation**.

4.5.6.2 The **parties** will confirm to each other that the agreed **isolation** has been established and confirm the identity of the HV **apparatus**, up to the **connection point**, for which the **isolation** has been provided. The confirmation shall specify the following:-

- the identity by means of HV **apparatus** name, nomenclature and numbering or position of each point of **isolation**;
- whether **isolation** has been achieved by an isolating device in the isolating position or by an adequate physical separation;
- where an isolating device has been used whether the isolating position is either:-
  - immobilised and locked with the safety key being secured in a key safe and the key safe key being retained in safe custody;
  - maintained and/or secured in position by such other method that must be in accordance with the **safety rules** of the relevant **party**;
- where adequate physical separation has been used that it will be in accordance with, and maintained by, the method set out in the **safety rules** of the **TSMO** or the **user** as the case may be:

4.5.6.3 The confirmation of **isolation** shall be recorded in writing by both **parties**.

4.5.7 Agreement of Earthing

4.5.7.1 Following the confirmation of **isolation** by both **parties** the **requesting safety co-ordinator** may then request the implementation of **earthing** by the **implementing safety co-ordinator**. If this is required it will be confirmed that it will be carried out at the location agreed previously. This confirmation will be recorded in writing by both **parties**.

4.5.7.2 If agreement cannot be reached on the location of **earthing**, the work shall not proceed.

4.5.8 Implementation of Earthing

4.5.8.1 Both **safety co-ordinators** shall then establish the agreed **earthing** and confirm that it has been established successfully. They will also confirm the identity of the

requesting safety co-ordinator's HV **apparatus**, up to the **connection point**, for which the **earthing** has been provided. The confirmation shall specify the following:-

- The identity by means of HV **apparatus** name, nomenclature and numbering or position of each point and type of **earthing**;
- The type of **earthing** device used, whether it is:-
  - Immobilised and locked in the **earthed** position and where the **earthing** device has been bllokuar with a safety key, that the safety key has been secured in a key safe and the key safe key will be retained in safe custody;
  - Maintained and/or secured in position by such other method that must be in accordance with the **safety rules** of the relevant **party**.

4.5.8.2 The confirmation of **earthing** shall be recorded by both **parties**.

4.5.9 Safety Reporting

4.5.9.1 All the actions executed by the respective **safety co-ordinators** must be agreed between them and reported to one another, repeated verbatim and recorded appropriately in writing.

4.5.9.2 Both **parties** will agree the identity of the plant on which the **safety precautions** have been taken. The work permit that shall be completed by the **requesting safety co-ordinator** must fulfil the following basic requirements:

- It must be legible and no records in pencil or amendments are allowed in the work permit;
- Numbering is at the discretion of the **TSMO** or **user**;
- Dates must use the standard format viz dd-mm-yyyy;
- Names must include initials and authorisation level;
- The work permit shall include the identification number of the **plant or apparatus**;
- In the event of more space on a work permit being required then a second work permit referenced back to the first one may be used:

4.5.10 Authorisation

4.5.10.1 After the relevant work permit is signed, permission for preparation of the work site is obtained and the **safety precautions** are complete then the work can commence. The **requesting safety co-ordinator** is then free to authorise the work but not testing. Where testing is to be carried out, the procedure set out below in paragraph 4.5.11 shall be implemented. The procedure for carrying out the work is entirely an internal matter for the **party** that the **requesting safety co-ordinator** is representing.

4.5.11 Testing

4.5.11.1 Where the **requesting safety co-ordinator** wishes to authorise the carrying out of a test to which this safety co-ordination code (within the **Operations Code**) applies he may not do so and the test will not take place unless the following procedures are followed and confirmation of completion has been recorded in writing:

- Confirmation is obtained from the **implementing safety co-ordinator** that no person is working on, or testing, or has been authorised to work on, or test, any **plant and apparatus** within the points of **isolation** agreed for the proposed test, and will not be so authorised until the proposed test has been completed or cancelled and the **requesting safety co-ordinator** has notified the **implementing safety co-ordinator** of its completion or cancellation and thereby the cancellation of the requirements;

4.5.11.2 The **requesting safety co-ordinator** will return control to the **implementing safety co-ordinator** as soon as the test has been completed or cancelled. If prior to testing, removal of **earthing** is necessary for the purposes of the test and this **earthing** is not subsequently reapplied, this fact will be recorded by both **parties**.

4.5.12 Restoration Procedure

4.5.12.1 After completion of the work and/or testing the **requesting safety co-ordinator** will report to the **implementing safety co-ordinator** that the associated **safety precautions** are no longer required.

4.5.12.2 Each **safety co-ordinator** shall then record this in writing confirming the cancellation of the need to secure the recorded **safety precautions** and accordingly their removal is approved.

4.5.12.3 The sequence of the switching and removal of the **safety precautions** are executed as set out in the approved plan as stated above and the reporting and logging of each stage is to the same detail as used for their application.

4.5.12.4 Neither **safety co-ordinator** shall instruct the removal of any **isolation** forming part of the **safety precautions** until it is confirmed to each other that all **earthing** has been removed.

4.5.12.5 Once it is confirmed that all **earthing** has been removed the **implementing safety co-ordinator** is then free to arrange the removal of the **isolation**, the procedure to achieve that being entirely an internal matter for the **party** the **implementing safety co-ordinator** is representing.

4.6 Interrelated Requirements

4.6.1 Loss of integrity (reliability) of precautionary measures

4.6.1.1 In any instance when any **safety precautions** may be ineffective for any reason the **implementing safety co-ordinator** shall inform the **requesting safety co-ordinator**, without delay, of the situation and, if requested, of the reasons why.

4.6.2 Environmental security

4.6.2.1 Arrangements shall be made to ensure that the environmental site safety and security standards are met.

4.6.2.2 All **parties** shall ensure that personnel are warned by an appropriate means of hazards, specific to any site, before entering any area of the site. This shall include hazards that may be temporary or permanent. Where these risks include contamination or similar, suitable de-contamination facilities and procedures shall be provided.

4.6.3 Inspections

4.6.3.1 Arrangements shall be made to facilitate inspections by the associated **parties** management and safety representatives to connection sites.

4.6.4 System control

4.6.4.1 The **TSMO** and the **users** shall jointly agree and set down in writing schedules specifying the responsibilities for system control of equipment. These shall ensure that only one **party** is responsible for any item of **plant or apparatus** at any one time.

4.6.5 Preparation of documentation

4.6.5.1 The **TSMO** and the **users** shall maintain a suitable system of documentation that records all relevant operational **events** that have taken place on the **transmission system** or any other system connected to it and the co-ordination of relevant **safety precautions** for work and/or testing.

4.6.5.2 The **TSMO** and the **users** shall hold all documentation relevant to the **safety co-ordination** under this code including a chronological record of all messages relating to it and details of the **safety precautions** taken, for work and/or testing, for a period of not less than five years.

4.6.6 System diagrams

4.6.6.1 The **TSMO** and the appropriate **user** shall exchange diagrams illustrating sufficient information for control personnel to carry out their duties.

4.6.7 Communications

4.6.7.1 Where the **TSMO** reasonably specifies the need, suitable communication systems shall be established between the **TSMO** and **users** to ensure the control function is carried out in a safe and secure manner.

4.6.7.2 Where the **TSMO** reasonably decides a back up or alternative routing of communication is necessary to provide for the safe and secure operation of the **transmission system** the means shall be agreed with the appropriate **users**.

4.6.7.3 Schedules of telephone numbers and call signs shall be exchanged by the **TSMO** and the **users** to enable control activities to be efficiently co-ordinated.

4.6.7.4 The **TSMO** and appropriate **users** will establish 24-hour availability of personnel with suitable authorisation where the joint operational requirements require it.

5 Contingency Planning Code

5.1 Introduction

5.1.1.1 This **contingency planning code** sets out the responsibilities and procedures for the provision of contingency and restoration plans following total or partial shutdown of the system in order to enable the restoration of total **demand** in the shortest possible time taking into account **power plant** capabilities and the operational constraints of the system.

5.1.1.2 This **contingency planning code** covers defence plans, the organisation and technical requirements for protection including protection against low/high frequency, **underfrequency load shedding**, over/undervoltage protection and communications and control. It also covers the arrangements for black start including the **black start plan** and its testing and requirements for a plan to cater for the loss of the **TSMO** control centre.

5.2 Objective

5.2.1.1 The overall objective of this code is to provide the following:

- Defence mechanisms that will, as far as possible, avoid system collapse;
- **Power system** restoration procedures following a total or partial shutdown of the system;
- Agreed restoration plans between all the **parties** involved;
- Agreed coordination procedures with neighbouring **TSO**s in dealing with contingencies are in place;
- To ensure that adequate communication routes and arrangements are available to enable senior management representatives of the **TSMO** and the **users** involved in or who may be involved in an actual or potential serious or widespread system disruption that requires or may require urgent senior managerial response 24 hours a day to make binding decisions in such an emergency:

5.3 Scope

5.3.1.1 This section applies to the following:

- The **TSMO**;
- **Distribution system operators (DSOs)**;
- **Generators** including **generators** with **generating units** connected to the **distribution system**;
- **Demand users** directly connected to the **transmission system**:

5.4 Defence Mechanisms

5.4.1 General Principles

5.4.1.1 In a complex and meshed system, disturbances may be propagated over a wide area within a very short space of time. Whatever precautions are applied in system operation, the short-term occurrence of highly precarious operating conditions can never be ruled out. It is possible for a simple incident to degenerate extremely rapidly into a large-scale breakdown. The negative effect of disturbances in the Kosovan **Power System** on neighbouring interconnected systems operating in parallel shall be as limited as possible. System operators, therefore, need to apply any measures required to ensure that, so far as possible, the consequences of this type of incident are contained. The establishment of effective safeguard measures and a **defence plan** are required to ensure this.

5.4.1.2 The **TSMO** is responsible for the secure and stable parallel operation of the electric **power system** in conformity with UCTE rules and must prepare a **defence plan** detailing the key steps that it has taken to ensure this. The **TSMO** is obliged to co-ordinate its **defence plan** with the **DSO**-s and with the other **users**. The measures in the **defence plan** are mandatory for all **parties**.

5.4.1.3 The **defence plan** includes:

- List of measures to be applied under different circumstances;
- System warnings procedures as per the operational liaison and **event** information supply code;
- principles and organisation of the protection system;
- requirements of the technical equipment;

- clear and unambiguous allocation of responsibilities and obligations among the **TSMO** and **users**:

5.5 Protection System Organisation

5.5.1.1 The **TSMO** has the responsibility for ensuring that the **transmission system** is adequately protected. The protection systems and equipment employed on the system must have the requirements detailed in the following.

5.5.2 Relay Protection Systems

5.5.2.1 In order to prevent the propagation and deterioration of an incident, protective devices must be installed for the rapid elimination of faults affecting any element of the **power system**.

5.5.2.2 Protection in this context includes protection signalling equipment and the associated communications.

5.5.2.3 In order to ensure the rapid reconnection of overhead lines after transient faults all circuits should be equipped with auto-reclosing equipment.

5.5.2.4 The requirements for speed of operation and numbers of protections on each circuit are detailed in the **connections code**.

5.5.3 System Stability and Overloading

5.5.3.1 The **transmission system** must at all times, except under an emergency situation be operated, to conform to the following:

- Adherence to the maximum and minimum permissible voltages and system maximum loadings;
- Maximum currents on the system equipment and agreed system short-circuit powers on the individual system nodes and the interfaces;
- Operation to a voltage profile in the system that is as balanced as possible and generally high in order to reduce transmission losses and improve system stability:

5.5.3.2 Under normal operation the system has the following characteristics:

- All customers are supplied;
- All limit values are observed (eg no overloads);

- The **(n-1) criterion** is met at all points.

5.5.3.3 Maintaining the above will ensure that for all credible **events** the system will remain stable and will not suffer from overloads. The **TSMO** shall carry out security studies routinely and on an ad-hoc basis to ensure that system security is achieved and maintained and to check for any operating constraints associated with unusual or abnormal operating conditions. The results of those studies shall be communicated to the regulator in the event of a serious constraint.

5.5.3.4 All system elements that are under risk of being damaged as a consequence of overloading must be equipped with overload protection. It is not required for equipment that could be unloaded by dispatching actions in the short term.

5.5.3.5 The **TSMO** should ensure that the protection installation and operation are planned for secure **power system** operation. This should cater for multiple coincident faults and also prevent cascading fault propagation.

5.5.3.6 **Generating units** shall be equipped with protective relays against loss of synchronism. These are designed to trip the **generating unit** in the event of the **generating unit** losing synchronism with the main system.

5.5.3.7 Data from international cross border lines and other lines within connected states should be made available via the terms of the **interconnection agreements**.

5.5.4 Protection against low/high frequency

5.5.4.1 The **power system** is operated to keep the frequency within the normal limits of 49.95 to 50.05Hz and that it meets the requirements of the **electricity standards code**. The Kosovan frequency control arrangements are detailed in the **frequency control code**. A frequency outside the admissible limits leads to electricity supply quality excursions and can also lead to possible plant damage.

5.5.4.2 When the frequency is outside the range 49.95 to 50.05Hz control actions are necessary in order to restore the frequency to within the normal limits.

5.5.4.3 In the event of the frequency falling below 49.50Hz the emergency actions detailed in Appendix 1 to this **contingency planning code** will take place.

5.5.4.4 In the event of the frequency rising above 50.50Hz the emergency actions detailed in Appendix 2 to this **contingency planning code** will take place.

5.5.5 Underfrequency Load Shedding

5.5.5.1 The **TSMO** has the responsibility for the strategy for the **underfrequency load shedding** arrangements, in accordance with the provisions of the **Demand Control Code**. This includes deciding the following:

- the overall quantities of **demand** to be shed at each frequency step;
- the frequencies at which the **demand** should be shed;
- the time delays, if any, to be set at each frequency step;
- the amount of **demand** at each frequency that will be shed by each **DSO** and/or **demand customers**;
- co-ordination of **underfrequency load shedding** plan with other synchronously – directly and indirectly – connected TSOs:

5.5.6 Overvoltage protection

5.5.6.1 Overvoltage protection in order to protect the electrical equipment of the electric **power system** against inadmissible high voltages has only a limited application on the Kosovan **Power System** and is only employed in a limited number of cases.

5.5.7 Undervoltage protection

5.5.7.1 A major voltage drop could jeopardise the stable parallel operation of the electric **power system**. The stability of the **generating units** could be disturbed and the risk of loss of synchronism increased.

5.5.7.2 The voltage drop is most likely to be as a result of a lack of **reactive power**. A severe shortage of **reactive power** could lead to voltage collapse causing a significant power failure affecting a large number of customers.

5.5.7.3 At all times the **TSMO** will ensure that enough **reactive power** is provided at the appropriate points on the system as per the **voltage control code**.

5.5.7.4 In the event of voltage problems then emergency measures could include the altering of **generating unit** outputs, switching of static reactive compensation plant and disconnection of **demand**.

5.5.8 Communications and Control

5.5.8.1 Loss of telecommunications links or of control systems must not affect the operation of the electricity system. Contingency plans must be available so that control can be transferred to another location in an emergency situation.

5.6 Outline Protection Requirements

5.6.1 General

5.6.1.1 The **TSMO** has the responsibility for ensuring that the **transmission system** is adequately protected. Protection should be provided to protect against all types of faults. The relay protection systems and equipment employed on the system must conform to at least the requirements in the following paragraphs.

5.6.2 Key Requirements

5.6.2.1 The protection equipment should have the following key characteristics:

- Sensitivity – the ability to detect a fault;
- Speed – the capability of disconnecting a faulty element from the **transmission system** as quickly as possible in order to minimise the damaging effects of the fault including avoiding the loss of synchronism of **generating units**;
- Selectivity – the capability of the protection to disconnect from the electricity system only the faulted element;
- Reliability – the ability to operate for internal faults and stabilise for external faults and also when appropriate to provide a backup function:

5.6.3 Fault Clearance

5.6.3.1 The relay protection system must operate with the circuit breakers to automatically disconnect a faulted element from the remaining healthy part of the system.

5.6.4 Fault Analysis

5.6.4.1 The protection system should facilitate the process of collection and analysis of data on system faults including information on the operations and status of the relay protection systems.

5.6.5 Discrimination

5.6.5.1 Each element of a power installation should have protection designed to cater for faults over the whole of the protected element with time limits to permit correct discrimination.

5.6.6 Backup Protection

5.6.6.1 In case of failure of the main protection or circuit breakers of adjoining elements backup protection shall be provided.

5.6.6.2 Where the main protection is a unit protection (eg carrier current protection), then a backup protection system should be installed that provides both local and remote backup.

5.6.7 New Technology

5.6.7.1 Whenever possible the latest technology should be applied in order to achieve some or all of the following benefits:

- facilities for self-verification and self-checking;
- reduced preventive maintenance requirements;
- reduced energy burden;
- more compact equipment;
- possibility of combining several separate functions in a single physical piece of equipment:

5.6.7.2 During the commissioning of new plants and the refurbishment of existing plants the following should be considered:

- the use of modern digital programmed relay protection automation systems, combining functions such as protection with data logging of **events** and fault location;
- the integration of relay protection systems in newly-created multilevel systems with remote facilities for the collection and analysis of information, setting of technical parameters and the operating characteristics:

5.6.8 Transmission Line Protection

5.6.8.1 For all transmission lines the protection arrangements should ensure that if one system is removed from service a fault on that line could be cleared by at least two other systems one of which may not be provided for that line.

5.6.8.2 For 400 kV lines there should be two main protections and each shall provide a high speed clearance for 100% of the line.

5.6.8.3 For 110 kV and 220 kV lines there shall be one main protection system providing a high speed clearance for 100% of the line, unless for stability reasons this is not required, and a backup protection.

5.6.8.4 If high frequency protection or longitudinal differential protection is accepted as the main protection system, the following protection systems should be used as backup:

5.6.8.5 Digital disturbance fault recorders, sequence of **event** recorders and fault locators should be provided for all 400 kV and 220 kV Lines and for all 110 kV substations.

5.6.9 Protection of 400 kV and 220 kV Autotransformers

5.6.9.1 To provide the necessary reliability for these transformers two sets of differential protections should be installed. These protections will provide no backup for remote circuits or equipment. The backup protections should provide remote backup for other circuits.

5.6.10 Busbar Protection

5.6.10.1 To increase reliability, to prevent violations of dynamic stability and improve the arrangements for backup protections of lines, two sets of differential protections for 400 kV shall be installed.

5.6.10.2 For 110 kV and 220 kV busbars a single differential protection for each busbar section with a backup protection shall be installed.

5.6.11 CB Fail Protection

5.6.11.1 CB fail protection should open the circuit breakers adjacent to the failed switch and should inhibit their auto reclosing.

5.6.11.2 The CB fail protection circuits should be designed so that, as far as possible, their accidental operation will not cut off the adjacent circuits.

5.6.11.3 CB Fail protection to guard against a stuck circuit breaker should be provided for all installations of 110 kV and above as per the [existing] Kosovan regulations

5.6.12 Protection Settings

5.6.12.1 Protection settings of interconnector lines shall be agreed between the **parties** in order to ensure the stability and security of the systems involved both individually and collectively. The **TSMO** is responsible for the correct choice of relay protection settings for the **transmission system** of the Kosovan **Power System**.

5.6.12.2 The selection of the protection settings must aim to achieve the following:

- Fast and secure disconnection from the system for any type of fault on the protected element;

- Allowing the permissible power flows in all elements of the **transmission system** in normal, repair and post-emergency modes of operation without maloperation;
- backup to cover for protection or circuit breaker failures;
- circuit breaker auto reclosing from both ends of HV Lines after clearance of the fault;
- ensuring dynamic stability in all accepted operational modes:

5.6.12.3 The choice, co-ordination and change of protection settings should be performed as follows:

- during commissioning of new power plants, substations, etc;
- during refurbishment of relay protection systems;
- to cater for any abnormal system conditions or configuration;

5.6.12.4 Any deviation from the above shall only be allowed with the specific agreement of the **TSMO**.

5.6.13 Relay Protection Maintenance

5.6.13.1 All relay protection systems shall be regularly tested and maintained on the basis of the operating rules and standards of maintenance.

5.7 Emergency Manual Actions

5.7.1.1 The overriding responsibility of the **TSMO** is to maintain the integrity of the Kosovan **Power System**. There may be times when the **TSMO** has to take emergency load reduction measures in order to maintain the integrity of the total system.

5.7.1.2 In the event of these actions being required the **TSMO** shall issue an emergency load reduction instruction. When an emergency load reduction instruction is issued the responsibilities on the various parties are as follows:

- The **TSMO** shall give a clear unambiguous instruction prefixed by the statement explaining that this is an emergency load reduction instruction. An emergency load reduction instruction is a mandatory instruction and will detail the amount of load reduction required. An emergency load reduction instruction will only be issued by the **TSMO** when the instructed action has to be carried out immediately;

- A **user** receiving an emergency load reduction instruction will obey the instruction immediately. The only circumstance that permits the **user** receiving an emergency load reduction instruction to disregard it is if to carry it out would endanger life;

- Emergency load reduction instructions shall be copied to the **regulator**:

5.8 Black Start

5.8.1 Total Shutdown

5.8.1.1 A **total shutdown** is the situation existing when all **generation** has ceased and there is no electricity supply with the result that the electricity system is unable to operate normally and has shutdown. Under these circumstances it is not possible for the system to begin to function again without directions from the **TSMO** pursuant to the **black start** procedure.

5.8.2 Partial Shutdown

5.8.2.1 A **partial shutdown** is the same as a **total shutdown** except that all **generation** has ceased in a separated part of the electricity system and there is no electricity supply from other parts of the electricity system to that part of the electricity system. The result is that part of the electricity system is unable to operate normally and is shutdown.

5.8.3 Total or Partial Shutdowns

5.8.3.1 During a **total shutdown** or **partial shutdown** and during the subsequent recovery the normal security standards set out in the **operations code** or in the **electricity standards code** for the Kosovan **Power System** may not apply. In a **total shutdown** the market will be suspended and will only be restored when the **TSMO** so decides. In a **partial shutdown** the market will not function in that part of the system that is shutdown until the **TSMO** so decides. The **TSMO** may also suspend the market in the other parts of the system that are not shutdown.

5.8.4 Notification

5.8.4.1 In the event of a **total shutdown**, the **TSMO** will inform the **regulator** and all **users** and **interconnected parties** that in the opinion of the **TSMO** need to be informed, that a **total shutdown** exists and that the **TSMO** intends to implement the **black start** procedure.

5.8.4.2 In the event of a **partial shutdown**, the **TSMO** will inform the **regulator** and all **parties** that in the opinion of the **TSMO** need to be informed, that a **partial**

shutdown exists and that the **TSMO** intends to implement the **black start** procedure for that part of the system.

5.8.5 Procedure

5.8.5.1 The procedure necessary for a recovery from a **total shutdown** or **partial shutdown** is known as a **black start** procedure, the main objective of which is the restoration of the system as an integrated whole as soon as possible. The procedure for a **partial shutdown** is the same as that for a **total shutdown** except that it applies only to a part of the system. It is important to take note of the fact that a **partial shutdown** may affect parts of the system that are not themselves shutdown.

5.8.5.2 Recovery from a **total shutdown** or **partial shutdown** is a complex and to some extent indeterminate procedure and therefore this section and the detailed **power system restoration plan** must be sufficiently flexible in order to accommodate the full range of **generating unit** and system characteristics and operational possibilities. This precludes the setting out of concise chronological sequences.

5.8.6 Key Processes

5.8.6.1 At all stages of the process, the following considerations will be taken into account:

- Ensuring that there is more than enough **generation** to match the **demand** at every stage that additional **demand** to be added;
- ensuring enough frequency responsive plant is available;
- controlling the system voltage within the operating limits;
- balancing the need to restore **demand** as quickly as possible against the need to have a relatively secure system:

5.8.7 Key Steps

5.8.7.1 The key steps in the **power system** recovery/restoration are as follows:

- Black out detection, confirming that a total black out has occurred;
- Preparation of the restoration paths;
- Building up viable stable **power islands**;
- Re-synchronisation of the **power islands** to eventually form an integrated system;
- Total restoration of **demand**:

5.8.7.2 **Power system** restoration using **black start** must be planned and executed in such a way that major **generating units** (thermal **power plants**) get supplied within maximum two hours, and the entire demand within maximum 24 hours.

5.8.8 Power System Restoration Plan

5.8.8.1 In the event of a major **power system** failure restoration may be executed either using a voltage supply from one or more neighbouring **power systems** or via **black start**.

5.8.8.2 The procedure for **power system** restoration shall be that specified by the **TSMO** in its **power system** restoration plan as updated from time to time. **Users** shall abide by the instructions of the **TSMO** during a total or partial **blackout** situation, even if they conflict with the general overall strategy and co-operation with the **TSO**s of other states will be the sole responsibility of the **TSMO**. The plan will contain at a minimum the following:

- A detailed list of emergency telephone numbers;
- A check list of the immediate actions that have to be performed:

5.8.9 Power System Restoration Conclusion

5.8.9.1 The conclusion of the total or partial **blackout** situation and the time of the return to normal operation of the system will be determined by the **TSMO** who will declare to all **parties**, that in the opinion of the **TSMO** need to be informed, that the system has been restored to normal operation including the implementation of the balancing procedures.

5.8.10 Total or partial shutdown Post Event Reporting

5.8.10.1 In the event of partial or total shutdown of the Kosovan **Power System**, the **TSMO** shall a post **event** report for the **regulator**, as defined by the operational liaison and **event** information supply code.

5.8.11 Black Start Testing

5.8.11.1 Comprehensive **black start** tests are neither feasible nor possible but partial tests under conditions that are, as close as possible, to those anticipated in practice, must be carried out on a regular basis. For the Kosovan **Power System** these tests must necessarily be limited in scope and it is recommended that more extensive tests are carried out in conjunction with relevant neighbouring **TSO**s. All tests should include tests of substation plant and communications and control as per paragraph 5.8.12.

5.8.12 Black Start Communications and Control

5.8.12.1 Communications and control are fundamental for **power system** restoration after a **total shutdown**. It is essential that all the vital facilities including those supplied by third parties will continue to function for at least 24 hours after the total loss of the electricity system. Some key facilities situated in remote locations will require to have a longer period of operation after the loss of the electricity system.

5.8.12.2 As part of regular **black start** testing the communications and control systems should also be tested at least every two years with the electricity supply failure being simulated.

5.8.13 Staff Training and Familiarisation

5.8.13.1 The staff involved in the process of system restoration shall be periodically trained in the functions and concepts and the practical implementation of the restoration paths. Both **power system** simulators and desktop exercises should be used in the training. It is the responsibility of the **TSMO** to train all its staff involved with system restoration and it is the responsibility of the corresponding **users** to ensure that their operators are well trained and capable of executing the **TSMO**'s instructions under the restoration procedure.

5.8.14 Confidentiality

5.8.14.1 All **users** should treat as confidential all information communicated to them by the **TSMO** under system restoration procedures.

5.9 Loss of Control Centre

5.9.1 General

5.9.1.1 The **TSMO** control centre plays an essential part in providing the **TSMO** with the ability to operate the **power system** to the required levels of security and reliability. In the event of the **TSMO** control centre becoming unusable due to exceptional circumstances then a **control centre crisis plan** for the smooth transfer of the control centre functions, to facilitate the continued safe and secure operation of the total Kosovan **power system**, shall be available.

5.9.2 Control Centre Crisis Plan

5.9.2.1 The **control centre crisis plan** shall be prepared by the **TSMO** and shall include at a minimum the following:

- Details of the emergency communications methods for agreeing the transfer of control centre functions;
- A check list of the actions to be taken and by whom;

- The detailed arrangements for the transfer of the control functions:

5.9.3 Testing of the Control Centre Crisis Plan

5.9.3.1 The **control centre crisis plan** must be tested fully or partially on a regular basis at least every two years to ensure that it is viable, that the necessary information is available in the correct locations and that the staff are fully trained to carry it out.

5.10 Joint System Incident Procedure

5.10.1 General

5.10.1.1 A **joint system incident** is an **event** on the system of one **party** that in the opinion of the **TSMO** has had or may have had a serious and/or widespread effect on the system of another **party**.

5.10.2 Contact Numbers

5.10.2.1 Each **user** will exchange telephone numbers with the **TSMO**[3] and the relevant system service provider, in writing, at which or through which management representatives, who are fully authorised to take binding decisions on behalf of their organisations, can be contacted 24 hours a day when there is a **joint system incident**. For new **users** the telephone numbers will be provided when the **connection agreement** is signed. The numbers provided must be up-dated, in writing, as often as the information contained in them changes.

5.10.3 Event Occurrence

5.10.3.1 On the occurrence of an **event** the following actions shall be taken:

- If it is on the system of a **user**, that **user** shall notify the **TSMO** who in turn will inform any other **party** who is or was or could have been affected;

- If it is on the system of the **TSMO** or on the system of an **interconnected party** and the **TSMO** has been informed by that **interconnected party** then the **TSMO** will inform the **parties** who were or are or could have been affected;

- A notification shall be sent to the **regulator** by the **TSMO**:

5.11 Action Following Event Notification

5.11.1.1 Following notification of an **event** in accordance with paragraph 5.10.3 and the receipt of any additional information requested pursuant to this paragraph, the **TSMO** will

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[3] The **TSMO** will also exchange numbers with other **TSOs** as required by the **interconnection agreements**.

determine whether or not the **event** is a **joint system incident**, and, if so, the **TSMO** may set up a **joint system incident centre** in order to oversee the incident and to deal with all queries relating to it.

5.11.1.2 The **TSMO** shall, as soon as possible, notify all **parties** that a **joint system incident centre** has been established and the telephone numbers for it, if different from those already supplied under paragraph 5.10.2.

5.11.1.3 Once a **joint system incident centre** has been established all communications between the senior management representatives of the relevant **parties** with regard to the **joint system incident** shall be made via the **joint system incident centre**.

Appendix 1 – Actions for a Low System Frequency

Frequency	Action
>49.80 Hz	Normal Operational Limit
49.80 Hz	Start of primary load frequency control
49.75 Hz	Personnel alerted and activation of generation capacities not yet activated
49.50 Hz	Activation of the additional measures for load-frequency control like e.g. demand control
49.20 Hz	First stage of Instantaneous underfrequency load shedding
48.80 Hz	Second stage of Instantaneous underfrequency load shedding
48.40 Hz	Third stage of Instantaneous underfrequency load shedding
48.00 Hz	Fourth stage of Instantaneous underfrequency load shedding
47.50 Hz	Disconnection of the power plants from the system.
	TOTAL SYSTEM COLLAPSE

Appendix 2 – Actions for a High **System** Frequency

Frequency	Action
< 50.20 Hz	Normal Operational Limit
50.20 Hz	Start of primary load frequency control
50.50 Hz	Manually lower generating unit outputs
51.50 Hz	Manually start to shutdown generating units.

6 Demand Control Code

6.1 Introduction

6.1.1.1 This **demand control code** deals with the provisions to be made by the **TSMO** in relation to **demand users** directly connected to the **transmission system** to permit reductions in **demand** in the event of insufficient **generation** being available to meet **total demand**.

6.1.1.2 This **demand control code** also provides for **demand** control provisions to be available to enable the **TSMO** to manage the **total system** in the event of breakdowns and/or operating problems, such as system frequency, voltage or overloading, on any part of the electricity system.

6.1.1.3 The methods for reducing **demand** covered by this **demand control code** include the following:

- Demand management using disconnectable loads;
- Urgent load reduction;
- Automatic low frequency load disconnection;
- Manual load disconnection on a rota basis:

6.1.1.4 The type of **demand control** used in any particular case by the **TSMO** will depend upon the amount of time between the **TSMO** becoming aware of the need for implementing **demand control** and the time at which it needs to be implemented. However in all cases the **TSMO** will decide the total demand reduction required.

6.1.1.5 The procedure set out in this section will include a system of warning notices that will be issued by the **TSMO**.

6.1.1.6 This **demand control code** should be read in conjunction with the **contingency planning code**.

6.1.1.7 **Demand control** shall not, so far as it is possible and practicable, be exercised in respect of **priority customers** such as key infrastructure service providers, hospitals etc and shall be applied subject to this exclusion.

6.1.1.8 Whenever possible, **demand control** shall be exercised equitably in respect of each **DSO** and to customers who are directly connected to the **transmission system**.

6.2 Objective

6.2.1.1 The overall objective of this section is to require the provision of facilities to enable the **TSMO** to achieve reduction in **demand** that will either avoid or relieve operating problems on the whole or part of the **transmission system**. This demand control shall be exercised in a manner that does not unduly discriminate against or unduly prefer any one or group of **DSO**s or **demand customers** directly connected to the **transmission system**.

6.2.1.2 It is also to ensure that the **TSMO** is notified of any **demand control** measures taken by **DSO**s or **users** other than following an instruction from the **TSMO**.

6.3 Scope

6.3.1.1 This section applies to the following:

- the **TSMO**;
- **DSO**s;
- **demand customers** directly connected at 110 kV and above:

6.3.1.2 **Suppliers** should note that this code does not apply to them directly, as the implementation of **demand control** in respect of their customers is not exercisable by them. However their customers may be affected by **demand control**. This will be implemented by the **TSMO** where the customer is connected directly to the **transmission system** and by the **DSO** for other customers. Their contractual arrangements should reflect this.

6.4 Demand Management and Disconnectable Loads

6.4.1 General

6.4.1.1 Disconnectable loads are **demand customers** normally having a **demand** of at least 1MW who have agreed to allow their load to be used for demand management.

6.4.2 Under the Terms of an Ancillary Services Agreement

6.4.2.1 **Demand customers** can make their load available, under the terms of an **ancillary services agreement** to provide frequency control response or reserve. The agreement will state the amount of **demand** available to be disconnected, the amount of time for which the **demand** can be reduced and the length of notice to be given.

6.4.3 As a Voluntary Agreement with a Demand User

6.4.3.1 If a **demand customer** connected at 110 kV and above would like to offer the **TSMO** the ability to use **demand customer** load management for emergency load control purposes, it will notify the **TSMO** in accordance with this **demand control code**. This will be a voluntary service for which there will be no payment.

6.4.3.2 The declaration should be given to the **TSMO** in writing by the end of December in each year. This declaration will confirm that the **demand customer** will, for the following year, comply with **TSMO** instructions relating to **demand customer** load management provided that those instructions are within the parameters set out in the notification. The year will commence on the 1st January in each year.

6.4.3.3 The declaration shall contain the following information:

- The amount of the demand reduction available;
- The notice required to be given to the **demand customer** by the **TSMO**;
- How often it can be used, either number of times or total time or both;
- The length of time that demand reduction can be used on any one occasion;
- Any situations under which the load management specified above may be available as agreed:

6.4.4 As a Voluntary Agreement with a Supplier

6.4.4.1 If a **supplier** would like to offer the **TSMO** the ability to use **demand customer** load management for emergency demand control purposes, it will notify the **TSMO** in accordance with this **demand control code**. This will be a voluntary service for which there will be no payment.

6.4.4.2 The declaration should be given to the **TSMO** in writing by the end of December in each year. This declaration will confirm that the **supplier** will, for the following year, comply with **TSMO** instructions relating to **demand customer** load management provided that those instructions are within the parameters set out in the notification. The year will commence on the 1st January in each year.

6.4.4.3 The declaration shall contain the following information:

- the amount of the demand reduction available;
- the notice required to be given to the **supplier** by the **TSMO**;

- how often it can be used, either number of times or total time or both;
- the length of time that demand reduction can be used on any one occasion;
- any situations under which the load management specified above may be available as agreed:

6.4.5 Warning Notices

6.4.5.1 All load disconnections under this paragraph 6.4 are carried as part of an agreement or declaration and agreed in advance therefore no formal warning notices will be required to be given.

6.5 Emergency Manual Load Reduction Arrangements

6.5.1 General

6.5.1.1 Emergency manual load reduction is used when a loss of **generation** or mis-match of **generation** output and **demand** is such that there is an operational requirement to reduce load at short notice (or no notice). In such circumstances the **TSMO** will need to maintain an operational margin and on other occasions may have to deal with operating problems such as unacceptable voltage levels and thermal overloads.

6.5.1.2 Each **DSO** will arrange to have available, within their respective **distribution system,** plans for manual load reduction. These plans must be communicated to the **TSMO**

6.5.1.3 The arrangements can be called into operation irrespective of **system** frequency, and will be implemented, by instruction from the **TSMO**, and may require progressive load reduction in pre-determined timescales.

6.5.2 Arrangements

6.5.2.1 The **TSMO** shall make such arrangements with the **DSO**s as are necessary such that a three-stage load reduction can be achieved. The arrangements for each stage are detailed below and would apply to the **total system**. In certain cases it could be necessary to apply load reduction to only certain parts of the **system**.

6.5.2.2 The **TSMO** will agree with the **DSOs** the arrangements, within their respective **distribution system** plans, to reduce load in a controlled manner. The load reduction will be achieved by reducing voltage and/or by disconnecting load.

6.5.3 Load Reduction Arrangements

6.5.3.1 The **TSMO** will arrange with the **DSO**s to have available three stages of load reduction as outlined in section 6.5.4.

6.5.3.2 With regard to the load disconnection the **DSO** will be responsible for the detailed arrangements and for load grouping but should take account of any customer priority categories. The final schedule should be agreed with the **regulator**.

6.5.3.3 Emergency load reduction will only be carried out when there are serious **system** problems and the **DSO** should carry out the load disconnection in a way that minimises the effectiveness of the **underfrequency load shedding** scheme.

6.5.4 Load Reduction Stages

6.5.4.1 The three stages of load reduction to be applied to the **total system** are detailed in the following paragraphs.

6.5.5 Stage 1

6.5.5.1 Stage 1 will require a 3% voltage – as per UCTE OH P3-M1 – to be applied to all customers over the **total system** or to the affected area as applicable.

6.5.6 Stage 2

6.5.6.1 Stage 1 will require a 5% voltage – as per UCTE OH P3-M1 – to be applied to all customers over the **total system** or to the affected area as applicable.

6.5.7 Stage 3

6.5.7.1 Stage 3 will normally be applied after stages 1 and 2 and will require load disconnection. The amount of load to be disconnected will be instructed by the **TSMO**.

6.6 Application

6.6.1.1 In all cases the load reduction will be applied as soon as is practicable following the receipt of an instruction correctly given by the **TSMO**. The instruction from the **TSMO** may require the load reduction to be applied by the **DSO** to their whole system or to only some part of it.

6.6.1.2 Before the load reduction is instructed a warning notice may have been given by the **TSMO** as per paragraph 6.8 of this **demand control code**. However under emergency conditions there may not have been sufficient time to provide this notice. Whether or not a warning notice for load reduction has been given each **DSO** will abide fully with the instructions given by the **TSMO** with regard to the amount of load reduction to be achieved and the **DSO** will comply without delay. The load reduction must be achieved as soon as possible but no longer than five minutes from the instruction being given by the **TSMO**.

6.7 Load Restoration

6.7.1.1 Once a load reduction has been applied by the **DSO** following an instruction from the **TSMO**, that **DSO** must, as far as is possible, ensure that the load and/or voltage remains reduced by the required amount. This required load reduction must be maintained until the **TSMO** instructs that **DSO** either to apply further load reduction in accordance with this paragraph or to remove the load and/or voltage reduction and restore the load and/or voltage to its normal value.

6.7.1.2 Each **DSO** will abide by the instructions of the **TSMO** with regard to load reduction under paragraph 6.5 without delay and the instructed load restoration must be achieved without undue delay.

6.8 Warning Notices

6.8.1 General

6.8.1.1 A system of warning notices will be contained within the load reduction arrangements to give notice, wherever practical, of possible implementation. Where there is a shortage of **generation** capacity, or other reason for the exercising of **demand control** is foreseen, the **TSMO** will alert the **DSOs** by means of a load control warning notice.

6.8.1.2 In the event of emergency action having to be taken by the **TSMO** and there is insufficient time to provide a warning notice then the requirements of this paragraph will not apply.

6.8.2 Form of the Load Control Warning Notice

6.8.2.1 When required the following system of warnings will be adopted by the **TSMO** in order to allow the **DSO** to take the necessary preparatory actions that they deem to be necessary in order to carry out the expected instructions of the **TSMO**.

6.8.2.2 All warnings will contain as a minimum the following information:

- the amount of load and/or voltage reduction to be achieved;
- the expected time of implementation;
- the expected time of restoration;

6.8.3 Yellow Warning

6.8.3.1 In the event of a stage 1 load reduction to the **system, TSMO** will issue a yellow warning notice. This will contain the information detailed above and the area that the warning covers if it does not apply to the **total system**.

6.8.3.2 The following **parties** will receive a copy of a yellow warning notice when it is issued:

- the **DSOs** who are affected by it;
- the **regulator**:

6.8.4 Amber Warning Notice

6.8.4.1 In the event of a stage 2 load reduction the **TSMO** will issue an amber warning notice. This will contain the information detailed above and the area that the warning covers if it does not apply to the **total system**.

6.8.4.2 The following **parties** will receive a copy of an amber warning notice when it is issued:

- the **DSO**s who are affected by it;
- the **regulator**:

6.8.5 Red Warning Notice

6.8.5.1 In the event of a stage 3 load reduction the **TSMO** will issue a red warning notice. This will apply to the **total system** and will contain the information detailed above.

6.8.5.2 As a red warning notice applies to the **total system** and can involve load disconnection it will be issued to all **DSOs**, all **generators**, all **suppliers** and the **regulator**.

6.8.6 Cancellation of Warning Notices

6.8.6.1 All warning notices shall remain in force until specifically cancelled by the **TSMO**.

6.9 Post Event Reporting

6.9.1.1 In the event of the **TSMO** having had to issue a warning notice and/or instruct a manual load reduction then the **TSMO** will be required, as soon as possible after the **event**, and in any case within two days, to prepare a brief report of the incident to submit to the **regulator**.

6.10 Underfrequency Load Shedding

6.10.1 General

6.10.1.1 The **underfrequency load-shedding** scheme is designed to protect the interconnected **system** in the event of **system** frequency on the total **system** or on an isolated part of the total **system** falling to 49.00Hz. This could be due to a severe **generation**/demand mis-match caused by a severe and unexpected or uncontainable

event or **events**. Under these circumstances the **underfrequency load-shedding scheme** will operate to disconnect load in blocks.

6.10.1.2 Preparation of **underfrequency load-shedding** scheme and its implementation should be coordinated with neighbouring and other regional TSOs.

6.11 Operation

6.11.1.1 The details of the underfrequency protection scheme are fully covered in the **contingency planning code** but in essence a total of around 55% of the total load is disconnected in four stages from 49.00Hz to 48.00Hz, according to the table[4] below:

	Stage 1 (49.2 Hz)	**Stage 2 (48.8 Hz)**	**Stage 3 (48.4 Hz)**	**Stage 4 (48.0 Hz)**
Single stage load reduction (%)	10	15	15	15
Total Load reduction (%)	10	25	40	55

6.12 Rota Load Shedding

6.12.1 General

6.12.1.1 A planned manual disconnection procedure will be adopted when a **generation** shortfall and/or **transmission system** problems requiring load reduction via disconnection can be clearly forecast for a protracted period. In such circumstances rotation of disconnection under a rota load-shedding procedure may be required to ensure equitable treatment, in so far as is practicable, for all customers. Customers will be disconnected on a rota basis for periods of up to four hours with one period commencing at midnight.

6.12.1.2 The load reduction via disconnection will be implemented in accordance with a **rota load shedding** plan.

6.12.1.3 The **TSMO** and the **DSOs** will agree annually the number of groups required and the expected **demand** relief from each of these groups. This information will be used by the **DSOs** in the preparation of their **rota load shedding** plan.

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[4] These values are from the agreement among SEE TSOs. This agreement also specifies that after Stage 2 each power system should decide independently on disconnection from the regional interconnection.

6.12.2 Rota Load Shedding Plan

6.12.2.1 The **DSOs** will be required to prepare a **rota load shedding** plan. This plan will be reviewed annually and updated as required. It will contain the information detailed in the following paragraph.

6.12.2.2 The **rota load shedding** plan will contain as a minimum the following information:

- The group to which each load reduction point is allocated;
- The expected load reduction at each load reduction point;
- Details of priority customers at each demand location point;
- The switching arrangements at each demand reduction point:

6.12.3 Rota Load Shedding Warning Notice

6.12.3.1 Before **rota load shedding** is implemented, or as soon as possible after it has been implemented, the **TSMO** will send out a rota load shedding warning notice to the **DSOs**, all **generators**, all **suppliers** and the **regulator**. This notice will contain the following information:

- The area to which **rota load shedding** applies;
- The amount of load reduction required for each four hour period;
- The start date and time;
- expected duration:

6.12.4 Application of Rota Load Shedding

6.12.4.1 When the **TSMO** determines that there is a requirement for **rota load shedding** to be implemented he will instruct the affected **DSOs** to begin as per the **rota load shedding** notice previously provided or verbal instruction. A verbal instruction will be reinforced, as soon as possible, by a **rota load shedding** warning notice as per paragraph 6.12.3.

6.12.5 Cancellation of Rota Load Shedding

6.12.5.1 When the requirement for **rota load shedding** no longer exists the **TSMO** will issue a **rota load shedding** cancellation notice and will instruct the **DSOs** accordingly. The **rota load shedding** cancellation notice will be issued to the **DSOs**, all **generators**, all **suppliers** and the **regulator**.

6.12.6 Customer Warnings

6.12.6.1 **Rota load shedding** after the initial commencement will be a planned **event** and customers can be informed as to when for what duration they can expect their supply to be disconnected. The responsibility for this rests with the **DSO-**s who will have to have arrangements in place, as part of their **rota load shedding** plan that can be activated. These can include but are not limited to the following:

- Newspaper advertisements;
- Radio and television announcements;
- Notices available in the offices of the **DSOs**;
- Information on the internet websites of the **DSO** and/or the **TSMO**:

6.13 Compensation

6.13.1.1 In general no compensation will be payable to any party for planned and unplanned manual and automatic disconnection correctly instructed and applied in accordance with this **demand control code,** with the exemption of those cases as per paragraph 6.4.2 above.

7 Plant and Apparatus Identification Code

7.1 Introduction

7.1.1.1 This section sets out the responsibilities and procedures for the identification of **plant and apparatus** to be used at all sites including those having an ownership boundary. It applies to new sites and to existing sites.

7.2 Objective

7.2.1.1 The overall objective of this section is as follows:-

- The need to ensure that all substations, **power plants** and **connection points** are identified by names that are not open to misinterpretation and acronyms that are unique;
- The requirement that, after a **connection agreement** (**CA**) has been signed, all plant in substations at ownership boundaries has a **system** of identification of **plant and apparatus** approved by the **TSMO**. Both the **TSMO** and the relevant **user** will use a common **system** of identification of **plant and apparatus** to allow the safe and effective operation of the **system** and reduce the risk of human error;
- The responsibilities and procedures to be adopted at ownership boundaries for notifying the identification of **plant and apparatus** of new **plant and/or apparatus** and changes to existing identification of **plant and apparatus**:

7.2.1.2 The identification of **Plant and Apparatus** at a **Connection Point** shall be included in the operational diagram prepared for each site having an ownership boundary as per the **connection procedure** in the **connections code**.

7.3 Scope

7.3.1.1 This section applies to the following:

- The **TSMO**;
- **DSOs**;
- **Generators**;
- **Demand** customers directed connected to the **Transmission System**;

7.4 Procedure

7.4.1 Site Names and Acronyms

7.4.1.1 It is essential, in the interests of safety and operational efficiency, that the names of all sites - substations, **power plants** and **connection points** - connected to or forming part of the **transmission system** cannot be subject to misinterpretation and that all acronyms for these sites must be unique.

7.4.1.2 The basic details of all sites at 110 kV and above shall be contained in a database register that shall be maintained and updated by the **TSMO**.

7.4.1.3 When a **User** intends to connect a new site to the **Transmission System** then a name for the new site shall be agreed with the **TSMO** at the earliest opportunity that will not give rise to any confusion. Once the name for the site has been agreed the **TSMO** will provide a unique acronym for the site.

7.4.2 Identification of Plant and Apparatus

7.4.2.1 The identification of **Plant and Apparatus** for all sites shall conform to the requirements of the relevant procedure.

7.4.3 New Apparatus

7.4.3.1 When a **user** intends to install apparatus on a site having an ownership boundary the proposed identification of **plant and apparatus** to be adopted must be notified to the other **parties** at that site.

7.4.3.2 The notification shall be made, in writing, to the relevant **parties** and shall consist of an operational diagram incorporating the proposed new apparatus to be installed and its identification.

7.4.3.3 The notification will be made to the relevant **parties** at least eight months prior to the proposed installation of the apparatus.

7.4.3.4 The recipients of the notification shall respond in writing within one month of the receipt of the notification stating whether the proposed identification of **plant and apparatus** is or is not acceptable and confirming that it could not be confused with existing identification of **plant and apparatus**. If it is not acceptable then the written response will outline what would be acceptable.

7.4.3.5 In the event that agreement cannot be reached between the **TSMO** and the other **parties**, the **TSMO**, acting reasonably, shall have the right to determine the identification of the **Plant and Apparatus** to be applied at that site.

7.4.3.6 **Users** will be provided upon request with details of the standard identification of **plant and apparatus** system as per the identification **of plant and apparatus code** in order to assist them in planning the identification of their **plant and apparatus** at ownership boundary sites.

7.4.3.7 Once agreed the details of the identification of the **plant and apparatus** shall be provided to the **TSMO** for inclusion in the database register.

7.4.3.8 The **TSMO** and every **User** shall be responsible for the provision and erection of clear and unambiguous labelling showing the identification of the **plant and apparatus**.

7.4.4 Existing Apparatus

7.4.4.1 Every **party** on a site including the **TSMO** shall provide every other **Party**, on request, with details of the identification of the **plant and Apparatus** on sites having an ownership boundary.

7.4.4.2 The **TSMO** and every **user** shall be responsible for the provision and erection of clear and unambiguous labelling showing the identification of its **plant and apparatus** on sites having an ownership boundary.

7.4.5 Changes to Existing Apparatus

7.4.5.1 Where the **TSMO** or a **user** requires to or wishes to change the existing identification of any of its **plant and apparatus** on any site having an ownership boundary, the above provisions shall apply with any amendments necessary to reflect that only a change is being made.

7.4.5.2 Where a **user** changes the identification of **plant and apparatus** that **user** will be responsible for the provision and erection of clear and unambiguous labelling.

7.4.5.3 Where the **TSMO** changes the identification of its **plant and apparatus** the **TSMO** will be responsible for the provision and erection of clear and unambiguous labelling.

7.5 Duty of Care

7.5.1.1 No **party** shall install, or permit the installation of, any **plant and/or apparatus** on any site that has a site name or acronym or any numbering and/or nomenclature that is open to misinterpretation.

7.5.1.2 No **party** at any site with an ownership boundary shall install, or permit the installation of, any **plant and/or apparatus** on such a site that has identification that could be confused with that of another **party** nor shall any **party** change any identification without the agreement, in writing, of the other **parties**.

7.5.1.3 The **TSMO** may visit and verify the correctness of labelling and at the same time reserve the right to periodically ensure that the labelling is correct. However, it is the responsibility of **users** at all times to ensure the correctness of their labelling.

8 System Tests

8.1 Introduction

8.1.1.1 This section sets out the responsibilities and procedures for arranging and carrying out **system tests** that have or may have an effect on all or part of the **total system** or on the **systems** of the **TSMO**, a **user** or an **interconnected party**. Where a **system test** proposed by a **user** will have no effect on the **transmission system**, then such a **system test** does not fall within this section and accordingly this section shall not apply to it. A **system test** proposed by the **TSMO** that will have an effect on the **system** of a **user** will always fall within this section.

8.2 Objective

8.2.1.1 The objectives of this section are to ensure that there are procedures in place to allow **system tests** to be arranged and carried out and, so far as is practicable, **system tests**:

- do not threaten the safety of personnel or the general public;
- cause a minimum risk to the security of supplies and the integrity of **plant and/or apparatus**;
- are not detrimental to the **TSMO**, **users** and **interconnected parties**:

8.2.1.2 This section also sets out procedures to be followed for establishing and reporting **system tests**.

8.3 Scope

8.3.1.1 This code applies to the following:

- The **TSMO**;
- **Generators** including **generators** with **generating units** connected to the **distribution system**;
- **DSOs** connected to the **transmission system**;

- **Demand customers** directly connected to the **transmission system**:

8.4 Definition of System Tests

8.4.1 General

8.4.1.1 **System Tests** are tests that involve simulating conditions or the controlled application of irregular, unusual or extreme conditions, on the **total system** or any part of the **total system**.

8.4.1.2 **System tests** include the following but are not limited to:

- effect of harmonics;
- load rejection to test frequency response where the involvement of the **TSMO** is required;
- dynamic stability;
- tests associated with **black start plans**:

8.4.1.3 Except as detailed in paragraph 8.4.1.2 **system tests** do not normally include commissioning or recommissioning tests, tests called routinely by the **TSMO** in order to assess compliance of **users** with their design, operating and connection requirements as specified in each **user's Connection Agreement** and **Ancillary Services Agreements**, or any other tests of a minor nature such as protection testing.

8.5 Procedure

8.5.1.1 In the event that the **TSMO** requires to carry out a test that falls within the above definition of a **system test** then the **TSMO** give at least 14 days notice of the test to the **parties** who will be or might be affected by the test. With this notice the **TSMO** will provide sufficient information so that the **party** receiving the notice can assess the risks to their **system** and plant. If, in their opinion, there is a serious risk to their **system** or plant then they can request that the **TSMO** delays the test. In the event of a failure to agree either **party** can invoke the dispute procedure within this **grid code**.

8.5.1.2 Where a **party** other than the **TSMO** requires to carry out a test that falls within the above definition of a **system test** then that **party** will inform the **TSMO** and a similar procedure to the one laid out in paragraph 8.5.1.2 will be followed.

8.6 Test Programme

8.6.1.1 Once a **system** test has been approved and agreed a test panel will be set up and will issue a draft test programme. All affected parties will have the opportunity to comment on the draft test programme at least seven days before the planned date of the test. Once this programme has been agreed and the final test programme produced and circulated to all affected **parties**, a test panel will be set

8.6.1.2 The general principle applied for allocation of costs among **parties** involved in **system** tests, is that the costs shall be born by the test proposer.

8.6.1.3 In the event of a dispute over the allocation of costs any of the **parties** involved have the right to invoke the dispute procedure contained in the **general conditions code** of this **grid code**.

8.7 System Test Implementation

8.7.1.1 If, on the day of the proposed **system test**, operating conditions on the **system** are such that any of the **parties** involved wishes to delay or cancel the start or continuance of the **system test**, they shall immediately inform the other **parties** of this decision and the reasons for it. The **TSMO** shall then postpone or cancel or continue the **system test** as the case may be. In the event of the test being postponed another suitable time and date shall be arranged in accordance with this section.

8.7.1.2 Reasons for postponement or cancellation include but are not limited to the following:

- adverse weather;
- shortage of plant;
- serious risk of power outages:

8.7.1.3 No **party** shall have the right to have a **system test** postponed or cancelled solely for commercial reasons.

8.7.1.4 In the event of the **system test** being postponed another suitable time and date shall be arranged in accordance with this section.

8.7.1.5 In all cases the **system test** shall be carried out to the approved test programme.

8.7.1.6 If a **system test** properly planned, arranged and agreed to has to be cancelled because one **party** fails to meet its obligations then the **TSMO** shall either arrange an alternative date for the test or shall refer the matter to the **regulator**.

8.8 Final Report

8.8.1.1 At the conclusion of the **system test**, the **TSMO** together with the test proposer shall be responsible for preparing a written report within one month of the completion of the test. The test panel will approve this final report of the **system test** before it is submitted to the **TSMO** for final approval.

8.8.1.2 This final report shall include a description of the **plant and/or apparatus**, tested and of the **system test** carried out, together with the results, conclusions and recommendations.

8.8.1.3 Once approved by the **TSMO** the final report shall only be distributed to affected **parties,** the **regulator**, **MEM** and any other **party** that was represented on the test panel.

8.8.1.4 When the final report has been submitted under this section the test panel shall be dissolved.

8.9 Costs

8.9.1.1 In general **system tests** are carried out for the benefit of all **parties** and unless there are other overriding reasons all **parties** involved with any **system test** should cover their own costs but in any event they should be allocated by agreement.

9 Resources and Documents

9.1 Resources

Nr.	Name of Document
1.	Law on Electricity
2.	Transmission System Operator License
3.	
4.	

9.2 Documents and forms

1. Black Start Procedure
2. Defence Plan

9.3 Revision Information

Version	Date	Description	Preservation time
1.1	27.01.2007	Edition 1, Revision 1	1 year
2.0	14.01.2008	Edition 2	2 years
2.1	10.09.2010	Edition 2, Revision 1	