Status of the Draft and 1st Workshop of 20th April 2012
Operational Security Network Code
Operational Security NC Framework

Key Challenges
- Security Principles
- TSOs’ Roles, Methods
- Data Exchange

Objectives
- To operate the electrical system in a safe, secure, effective and efficient manner
- To enable the integration of innovative technologies
- To apply same principles for different systems
- To make full use of information and communication technologies

Topics
- Operational Security
  - Operational Planning & Scheduling
  - Load-Frequency-Control
  - Staff Training & Certification
  - Emergency & Restoration
  - New Applications

Source: ACER Framework Guidelines on Electricity System Operation (Fig.2, p.8)
• ACER FWGL initially published summer 2011, finalised Dec 2011, slides shows main objectives and the Network Codes to be produced.

• Draft 1 of Op Security NC was released in April to industry by ENTSO-e. Seen as a ‘umbrella’ code for the other Operational NCs. High level principles of System Operation, bit like our GB SQSS.

• OS NC includes chapter on Training and Certification, so may not be a separate Code on this topic as the FWGL request.
Operational Security Code Roadmap

- Start 03/2012, end 03/2013
- 2 approvals by SOC: (i) consultation; (ii) final version
- 4 WS (3x1-day and 1x2-days, during consultation)
• Drafting team for Op Security NC was formed summer 2011.
• Draft 1 of OS NC is early draft, we do expect changes.
• First workshop held 20/4. AM session with DSO expert group, PM session with all industry. ACER video conference into both sessions, EU rep attended.
• Next workshop is early July. With next external draft of OS NC
• Consultation planned Sept-Oct, with whole day workshops
• ACER suggested might need to see the other priority Op Codes done in parallel (NC Op Planning and NC Freq control)
• Setting out clear and objective minimum requirements for the real-time operational security
• Defining goals to be reached to keep the transmission system in continuous operation
• Contributing to a harmonised framework for cross-border exchange of electricity
• Supporting non-discrimination, effective competition and efficient functioning of the Internal Electricity Market
• Drafting team for Op Security NC was formed summer 2011, reps from c.14 TSO, at least one from each sync areas.

• Main objectives of the OS NC are stated
Operational Security NC Structure

**General Provisions:** Subject matter, Definitions, Scope, Regulatory aspects, Confidentiality, Relation with National Law

**Requirements**
- Frequency Control Mgmt.
  - Congestion and Power Flow Management
  - Protection
  - Data Exchange

**Contingency Analysis and Handling**
- Voltage Control and Reactive Power Mgmt.
- System States

**Operational Testing**
- Monitoring and Investigation

**Operational Training**
- and Certification

**Frequency Control Mgmt.**
- Dynamic Stability Mgmt.

**Compliance**
- Articles 31-41

**Derogations**
- Articles 14-16

**Liability**
- Articles 8-13

**Final provisions**
- Articles 10-12

**Regulatory aspects, Confidentiality, Relation with National Law**

**Subject matter, Definitions, Scope, Regulatory aspects, Confidentiality, Relation with National Law**

**General Provisions:** Subject matter, Definitions, Scope, Regulatory aspects, Confidentiality, Relation with National Law

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- Articles 10-12
Slide shows structure of the Op Security NC

N-1 principle is at heart of OS NC. The N-1 terminology differs from common use of N-1 and N-2 in GB. In OS NC the term N-1 includes all contingencies, which can include a double circuit on same towers. OS NC says National Regulators approve which exceptional contingencies (eg double circuits, busbars, switch faults,..) are secured against by their TSO.

Lots of the obligations in OS NC are on TSOs and between TSOs to co-operate and exchange data etc. But some obligations are on DSO and users

Hot topics are probably

- Data obligations
- What is the level of a ‘Significant User’
- Costs allocations/sharing principles between TSOs (to minimise constraints etc)
- Calculation of reliability margin for cross border capacity
Chapter 2: Data Exchange

Essential provisions for Operational Security, Operational Planning, Scheduling, Capacity Calculation:

• Structural, forecast and real-time data between TSOs (Articles 18, 19)
• Structural and real-time data between TSOs and DSOs (Articles 20, 21)
• Structural, scheduled and real-time data of the directly connected system users (Articles 22-24, 29)
• Data between TSOs, DSOs and system users connected to the Distribution System (Articles 25-28, 30)
• These data provision obligations chapters are recent additions into the draft Code, so very early drafts.

• Describes data flows between TSO, from DSO to TSO, and users to DSO / TSOs.

• They are at quite a high level of description of the detail of the data to be provided, not like the detail in say the GB Grid Code under Data Registration Code and the GB GC Ocs which have far more detail.
• These attachment/appendix slides describe in a few bullet points the content of each main chapter in draft OS NC.

• It's possible the chapter (Article 14) on frequency control in the OS NC may get removed as there is a separate NC on frequency control yet to be drafted and released.
Article 7: System States

- System States' monitoring, determination, description
- Operational security limits
- System operation tools & facilities
- Security analysis
- Information → awareness
- System users' support
Article 8: Congestion and Power Flows Management

- Coordination, forecast and real-time analysis
- Common methodology for reliability margins
- Preventive and remedial actions incl. re-dispatch
- Active power reserves, possible adjustments & info
- Transmission system model
- Observability areas
### Article 9: Voltage Control and Reactive Power Mgmt.

- Voltage stability and reactive power „household“
- Reactive power reserves in the Transmission system and from system users
- Reactive power limits at the connection to system users
- Automatic and manual measures
- Preventive and remedial V/Q-control actions

### Article 10: Short Circuit Current Management

- Current limits: circuit breakers capability vs. protection selectivity
- Short-circuit calculation including generators / information
- Considering other Transmission and Distribution Systems
- Prevent / relieve violation of short-circuit limits
- Information and communication to other TSOs and system users
Article 11: Dynamic Stability Management

- Dynamic stability assessment offline studies on:
  - Voltage
  - Rotor angle
  - Frequency
- Dynamic stability influences coordination with affected TSOs
- Dynamic stability vs. steady state operational security limits:
  a) Offline
  b) In Operational Planning when needed
  c) In Operational Planning periodically / daily

Article 13: Protection

- Verify & update protection settings
- Selectiveness, backup, coordination
- System and Special Protection Schemes
- Under-Frequency Load Shedding scheme development and implementation with DSOs (cf. Demand Connection Network Code)
Article 12: Contingency Analysis and Handling

- (N-1)-criterion and operational security limits
- Forecast and real-time parameters, topology
- Preventive and remedial actions + coordination and consideration in/outside of the own system
- Contingency list (int./ext.): ordinary, exceptional, out-of-range
- Common Grid Model
- Re-synchronisation
Article 14: Frequency Control Management
(To be lined-up with the P/f Code)

- Sufficient active power reserve for demand / generation unbalances + procurement in and out of the own control area
- Frequency containment, restoration & replacement reserve
- P/f monitoring, balancing, coordination
- Preventive and remedial actions: control, reserves‘ activation, load shedding
- Technical framework (e.g. ramping) for system users
Article 15: Operational Testing, Monitoring and Investigation

- Monitoring, investigation, testing of system events
- Test plan, standards, compliance at the grid connection point
- Minimize impact on operational security and economic operation
- Always keep normal state!
- Monitoring of provisioning of the ancillary services
- Additional tests and post-incidents investigation

Article 16: Operational Training and Certification

- Normal & exceptional operation
- Continuous training programme, contents & plans
- Training coordinator: qualification, training, documentation, certification, on-the-job training
- Annual review / update
- Coordinate with DSOs and system users to reflect latest development
- Certification, exchange with other TSOs, training in interoperability