

## Garth Graham comments on 25<sup>th</sup> June 2012 ENTSO-E Draft Network Code for Operational Security

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“(10) At a local level, Transmission System Operators should apply voltage control and reactive power management, in order to keep voltages within the Operational Security Limits and to minimize reactive power flows”

What about DSO initiated voltage control? Will this still be permitted? What level of voltage control is being considered; i.e. 5% / 10% (as in GB) or greater than 10%?

The principle of demand control by voltage control / load shedding by DSOs to TSO instruction is I think included in the OS NC (Article 9.10) rather than in the front pages of the document. The specific thresholds are not spelt out. There is also my expectation that this requirement would also be covered in more detail the Emergency Operation NC that is yet to be developed.

### Article 1 (1)

“...applicable to all TSOs, Relevant DSOs, Power Generating Facility Operators and Demand Facilities of significance for the Transmission System”

Where is ‘significance’ defined / specified in this Network Code.

This is an area that needs improving before its ready for consultation.

### Article 1 (4)

Will similar arrangements be available for other islanded networks; such as GB?

My interpretation would be we only need to refer to isolated island networks that involve transmission voltages; I assume the Spanish islands involve transmission level voltage systems albeit small networks, in GB transmission is 400 & 275kv plus 132kv in Scotland, so if there is 132kv in the Shetlands or any other isolated Scottish islands then we probably do need to mention them.

### Article 2

“The definitions of the RfG NC shall also apply.”

This is, on the face of it, very helpful. However, as noted below, and as I mentioned at the meeting on 2<sup>nd</sup> July, there are numerous examples in this Article 2 where different definitions (to those in the RfG Network Code) are used. Put simply there cannot be two definitions for the same thing in the law if you want people to comply – which definition do they comply with?

Entsoe reps and the drafting team know that the definitions need more work to be consistent between codes, I am expecting this to be improved or hopefully resolved by the time it's released for consultation. Many of your subsequent comments are on weaknesses in the definitions, so I have only added a comment against one or two specific areas of the definitions.

“(N-1)-Situation means the situation in the Transmission System in which a

Fault on an element of Transmission System or a Power Generating Facility Operator has happened”

Should this be “...or a Power Generating Facility has happened”? yes

“**Blackout State** means the state where the operation of part of all of the Transmission System is terminated;”

Should this be “...the operation of part **or** all of the...”

“**Common Grid Model (CGM)** means the European-wide or multiple-TSOs-wide data set, created by the TSOs and coordinated within the ENTSO-E, used as a unique basis for security analysis and created through merging of relevant data from year-ahead, month-ahead, day-ahead and intraday timeframes”

The CACM Network Code has a different definition for the Common Grid Model, namely:-

“**Common Grid Model** – a European wide data set used as a unique basis for capacity calculation, created through the European Merging Function”

You might wish to consider referring to the CGM in this Operational Security Network Code as the “Operational Security (OS) Common Grid Model” and use the definition you have used here to make it clear when your using the data set for Operational Security (rather than CACM or other) purposes.

I agree. I am expecting us to clarify that it is a/the common grid model used for operational security as opposed to a/the common grid model being used for interconnection capacity calculations

“**Connection Point** means the location at which the Demand Facility, or Power Generating Facility is connected to a network or at which the Distribution Network is connected to a Transmission Network”

This definition is different to that used in the RfG Network Code (12<sup>th</sup> June 2012 version); namely:-

**“Connection Point** - is the interface at which the Power Generating Module is connected to a transmission, distribution or closed distribution Network according to Article 28 of Directive 2009/72/CE as identified in the Connection Agreement”

However, given that the Operational Security Network Code also relates to demand, you might wish to consider the current draft definition in the Demand Connection Network Code (27<sup>th</sup> June 2012 version); namely:-

**“Connection Point** - is the interface at which the Demand Facility, or Power Generating Module is connected to a Transmission, Distribution or Closed-Distribution Network or at which the Distribution Network is connected to a Transmission Network according to Article 28 of Directive 2009/72/EC and as identified in the connection agreement”

**“Contingency List** means the list of Contingencies to be simulated in the Contingency Analysis in order to test the compliance with the Operational Security Limits a priori or a posterior after a Contingency took place”

There is no definition of what “Contingency Analysis” is. There should be a definition, even if it is just to ‘as defined in Article X’ of this Network Code’.

**“Control Area** means a geographic area for which the imbalance between the sum of physical flows and of scheduled flows is continuously monitored and controlled”

This definition is different to that used in the RfG Network Code (12<sup>th</sup> June 2012 version); namely:-

**“Control Area** - is a part of the interconnected electricity transmission system controlled by a single TSO.”

**“Defence Plan** means the summary of all technical and organisational measures undertaken to prevent the propagation or deterioration of an incident in the Transmission System, in order to avoid a widespread disturbance and Blackout”

The term ‘Blackout’ is not defined. Should this either be ‘Blackout State’ (which is defined) or should a definition of ‘Blackout’ be included in this Network Code?

**“Demand Facility** means a facility which consumes electrical energy and is connected at one or more Connection Points to a Transmission or Distribution Network”

This definition is different to that used in the Demand Connection Network Code (27<sup>th</sup> June 2012 version); namely:-

**“Demand Facility** – is a facility which consumes electrical energy and is connected at one or more Connection Points to the Network. For the

purpose of avoidance of doubt a Distribution Network and/or Auxiliary Supplies of a Power Generating Modules are not a Demand Facility.”

This is related to the point I made at the meeting on the 2<sup>nd</sup> July with respect to Article 28 (1) (does this apply to power generating facilities, such as Types B, C and D?). In my view the DCC version should be used in the Operational Security Network Code.

“**Distribution System Operator (DSO)** means the natural or legal person responsible for operating, ensuring the maintenance of and developing the distribution system in its Responsibility Area and its interconnections with other systems and for ensuring the longterm ability of the system to meet reasonable demands for distribution of electricity”

This definition is different to that used in the RfG Network Code (12<sup>th</sup> June 2012 version); namely:-

“**Distribution System Operator (DSO)** - is a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the distribution Network in a given area and, where applicable, its interconnections with other Networks and for ensuring the long-term ability of the Network to meet reasonable demands for the distribution of electricity.”

“**Dynamic Stability Assessment (DSA)** means the security assessment in terms of Rotor Angle Stability, Frequency Stability and Voltage Stability;”

There is no definition in this Network Code for (a) “Rotor Angle Stability” or (b) “Frequency Stability” or (c) “Voltage Stability”.

“**Grid User** means the natural or legal person supplying to, or being supplied with active and/or reactive power by a TSO or DSO;”

This definition appears to encompass absolutely ever generator and every consumer connected to the TSO or DSO networks across the 27 Member States, without exception. However, when taken with the obligations placed on Grid Users in this Network Code; such as in Article 15 (1), (6), (7), (11) and (12) or Article 31 (1-5) or Article 32 (2) and (4); this appears to be a very wide (to wide?) definition.

This is a key definition that again I expect to be tightened up in the consultation version. I think this code needs only refer to Significant Grid Users and not all Grid Users, and needs significant to be as determined operationally for system security, which then could hopefully addresses many of your later comments.

“**Power Generating Facility** means the indivisible set of installations which can generate electrical energy. If there is more than one unit generating power within a power generating facility, that cannot be operated independently from each other or can reasonably be considered in a combined way, then each of the combinations of these units shall be

considered as one Power Generating Facility. This includes more than one Power Generating Facility in a Combined Cycle Gas Turbines and multiple units in a power parks. A storage device operating in the electricity generation mode is considered to be a Power Generating Facility;”

This definition is different to that used in the RfG Network Code (12<sup>th</sup> June 2012 version); namely:-

“**Power Generating Facility** - is a facility to convert primary energy to electrical energy which consists of one or more Power Generating Modules connected to a Network at one or more Connection Points.”

“**Power Generating Facility Operator** means the natural or legal person which is the owner or operator of one or more power plants or shared power plants, whether connected to the Transmission System or to the Distribution Network, and of relevance for Operational Security of the Transmission System. The different types of Power Generating Facility Operators are defined in Article 3 of the RfG NC – the definition in this Code adheres to the one in the RfG NC, with amendments which were necessary to make it appropriate and applicable for the purpose of this Operational Security Network Code;”

Two points to note.

First this definition, at the start, refers to “...the owner or operator...” - which is it? The obligations in this Network Code relates to the “Power Generating Facility Operators” (presumably, as defined in this code). If two ‘natural or legal person[s]’ could be the “Power Generating Facility Operators”; namely the ‘owner’ or ‘operator’; who is obliged to comply with the obligations in this Network Code, as they both cannot?

Second, this definition, at the end, refers to “...the definition in this Code adheres to the one in the RfG NC, with amendments which were necessary to make it appropriate and applicable for the purpose of this Operational Security Network Code”. Again, as noted above, there cannot be two definitions for the same thing. If the RfG definition is not being used then it should not be referred to here. This is a recipe for confusion.

“**Redispatch** means the measure taken by System Operators by altering the generation pattern in order to change physical flows in the grid and relieve congestion;”

This definition refers to ‘System Operators’. Where is this defined? Is it TSOs? DSOs? TSO and DSOs?

Should ‘...congestion’ be ‘...Congestion’; i.e. the defined term used in this Network Code (on page 7)?

“**Remedial Action** means the measure activated by the TSO manually or automatically to relieve consequences of disturbances and maintain Normal

State or move towards Normal State, which can be applied pre-fault or post-fault and may involve costs;”

As I noted in the 2<sup>nd</sup> July meeting, this definition is different to that used in the CACM Network Code (23<sup>rd</sup> March 2012 version); namely:-

“**Remedial Action** - a measure that relieves or can relieve congestions within the grids;”

This could lead to confusion as to which ‘Remedial Action’ is being taken, and for what purpose (a) ‘to relieve consequences of disturbances and maintain Normal State etc.’, or (b) ‘[to] relieves or can relieve congestions within the grids’. You might wish to amend this definition, in this Network Code, to “Operational Security Remedial Action” to avoid confusion with those taken under the CACM Network Code.

“**Schedule....(c) Demand program** of a particular Consumption Unit or the aggregation of consumption programs of a group of Consumption Units, termed also consumption schedule;”

There is no definition of ‘Consumption Unit’ provided in this Network Code.

“**Significant Grid User** means the Grid User that is able to influence transmission flow patterns beyond the thresholds defined by its TSO as a consequence of the events or actions taken in relation with the equipment under its own responsibility;”

As I indicated at the 2<sup>nd</sup> July meeting, there is a clear requirement to harmonise across all the Network Codes as to which consumers are ‘significant’ (and thus which are not). It will cause tremendous confusion (and problems) going forward if a generator or end consumer is ‘significant’ under some Network Codes and not others, particularly as Article 7 (9) allows each TSO to “define the threshold of significance of the Grid Users”. Agree

As an aside, it was suggested, in the 2<sup>nd</sup> July meeting, that ‘significant’ (for the purposes of this Network Code) could be very small scale domestic consumers. I believe this is not the intention of the drafting team, so the consultation wording needs to be tighten up. If this is the case then how is it proposed that the TSO will “...coordinate Voltage Control actions with the Significant Grid Users...” (as per Article 9 (10)) is this means ‘coordinating’ with most (if not all?) end consumers (as well as “...relevant DSOs and with neighbouring TSOs”)? Clearly impractical and not needed

Equally, where ‘significant’ (for the purposes of this Network Code) could be small scale domestic consumers how will those very large number of end consumers seek the permission of the TSO (and DSO) prior to its

resynchronisation after a desynchronisation (as per Article 12 (19))? I have proposed new wording and hopefully this will get changed before the consultation version is issued, as you say not practical, and I believe not the intention of the drafting team. I did propose amendments after you raised this point at a JESG but the mods I proposed did not make it into version released for the 2<sup>nd</sup> workshop. It is my understanding, from a GB perspective, that the TSO would struggle (with its current number of operational staff on duty 24/7 365) to deal with all the DSO control rooms and the control centres for the large (circa 100MW+) power stations. These number less than 100 – how can they then cope, as a TSO, with 10s if not 100s of thousands of end consumers seeking permission for resynchronisation. Agreed

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When I raised this at the meeting on the 2<sup>nd</sup> July an impression was given that this permission would be 'presumed' (in some way) by the reconnection of that consumer (by the DSO) to the network. If this is the case, then the obligation in Article 12 (19) (and (18)?) should be removed.

**“Stability Limits** means the permitted operating boundaries of the Transmission System in terms of respecting the constraints of Voltage Stability, Rotor Angle Stability and Frequency Stability;”

As with “Dynamic Stability Assessment” above where is the definition in this Network Code for (a) “Rotor Angle Stability” or (b) “Frequency Stability” or (c) “Voltage Stability”?

**“Transmission System Operator (TSO)** see Article 2 of the Directive 2009/72/EC”

This definition is different to that used in the RfG Network Code (12<sup>th</sup> June 2012 version); namely:-

**“Transmission System Operator (TSO)** - is a natural or legal person responsible for operating, ensuring the maintenance of and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transmission of electricity”

### **Article 3 (1)**

“...as well as the principle of optimisation between the highest overall efficiency and lowest total cost for all involved parties.”

Should this be linked to 'social welfare' (as used in other Network Codes)?

Agree, this also needs co-ordination with the CACM code before its finalised.

### **Article 3 (3)**

“Where reference is made to this paragraph, any decision by a Relevant Network Operator and/or a Relevant TSO or any agreement between, on the one hand, a Relevant Network Operator or a Relevant TSO and, on the other, a Power Generating Facility Operator shall be performed under the conditions of the applicable national legal framework and in accordance with the principles of transparency in issues of interest for the market, proportionality and non-discrimination and, as the case may be, with the involvement of the National Regulatory Authority.”

As I stated at the meeting on 2<sup>nd</sup> July it is noticeable that with the exception of a few places; such as the recovery of costs (Article 4), defining ‘significant’ (Article 7 (9)) and a passing reference in Article 26 (2); that there appears to a complete lack of engagement with the National Regulatory Authorities (or ACER) in this Network Code. This is in stark contrast to the substantial engagement with / by the NRA(s) and the Agency in other Network Codes; such as the RfG and CACM. I do expect the consultation version to have more references to clauses which say .....as approved by the NRA

What, for example, happens if a decision relates to more than one TSO (such as Article 9 (2) where “neighbouring TSOs shall define the voltage and/or reactive power flow limits on the Interconnections between their networks”). Which TSO (or NRA) decides on this (approves the costs etc.,).

Also, even if this Article 3 (3) definition were to stand (something I do not support) there is no reference to end consumer who are (as ‘Grid User’ or ‘Significant Grid User’) being obliged to undertake additional tasks with (it would appear) no right of appeal, to their NRA, of the TSO (or DSO) decisions etc.

With this in mind, and borrowing from Article 11 (3-7) of the CACM Network Code (23<sup>rd</sup> March 2012 version) I think there could merit in considering adding something along the following lines into the Operational Security Network Code (which I refer to, elsewhere in this document, as ‘Article #’) namely:-

**‘Article #’**

1. Each System Operator (be that TSO or DSO or both) shall submit (and publish on their website) [x] to their National Regulatory Authority for approval.
2. Within 4 months of receiving a proposal pursuant to (1), National Regulatory Authorities shall accept or reject the proposal.
3. In the event that National Regulatory Authorities reject the proposal they shall publish on their website the grounds for their decision based on the objectives of [xyz].
4. Within 4 months of a rejection from the National Regulatory Authority, System Operators shall resubmit a proposal to National Regulatory Authorities consistent with the objectives specified in [xyz].
5. In the event of approval, System Operators shall use the approved [x] from a point no later than 6 months after the National Regulatory Authorities’ decision or such lesser period as the National Regulatory Authorities’ specify in that decision.



6. In the event of urgency the System Operator may submit (and publish on their website) a request to the National Regulatory Authority that the timeframes in (2) and / or (4) be reduced.

7. The National Regulatory Authority will consider any request submitted under (6) expeditiously and shall publish on their website the grounds for their decision to approve or reject the request.

8. In the event of a request submitted under (6) the National Regulatory Authority may substitute a shorter or longer period of time to that requested by the System Operator provided that the timeframe does not exceed that specified in (2) or (4) respectively.

#### **Article 5 (2) (second line)**

“...sensitive information obtained in the course of carrying out its activities, , each TSO shall...”

Is there a typo vis the double commas?

There are a number of typos and weak English in the version released for the 2<sup>nd</sup> workshop, which I should be able to get corrected before the consultation version is issued.

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#### **Article 7 (6)**

“If its Transmission System is not in a Normal State, a TSO shall:.... (c) inform the neighbouring TSOs and where necessary DSOs and Grid Users involved in the system defence and restoration, if there is a risk of an Emergency State.”

Given the obligation on Grid Users in Article 15 (12) this should be amended as follows:-

(d) inform Grid Users where the System State no longer remains Normal State or changes to Alert State or Emergency State.”

This will allow Grid Users to comply with their Article 15 (12) obligations. I think this is okay, 15.12 effectively says TSO may tell a significant grid users to stop a test if the system conditions require it to be stopped.

#### **Article 7 (8 )**

“When preparing and implementing a Remedial Action, a TSO shall cooperate with the neighbouring TSOs to assess the impact of its Remedial Action within and outside of its Responsibility Area and coordinate with other TSOs in order to increase the social welfare.”

What is the definition of ‘social welfare’? That used in the CACM Network Code (23<sup>rd</sup> March 2012 version)?

Agree, more consistency with the CACM code is needed.

### **Article 7 (9) (second line)**

“...cooperate with the Significant Grid users and DSOs.” Typo, should be ‘User’.

### **Article 7 (9) (sixth-eight lines)**

As noted above, allowing each TSO to define ‘Significant Grid User’ will cause substantial confusion.

Notwithstanding that, the NRA approval process etc., should be defined. I suggest this (9) be amended along the following lines:-

“Each TSO shall define the threshold of significance of the Grid Users and this definition shall be submitted to the relevant National Regulatory Authority for approval in accordance with Article# [see above], depending on the following parameters of the Transmission System under the TSO’s responsibility:”

### **Article 7 (13 )**

“Each TSO shall adopt an Emergency Plan which shall be reviewed and updated at least annually or following any significant change of critical tools and facilities or relevant system operation provisions. Each TSO shall adopt its first Emergency Plan”

This plan should be subject to NRA approval, I don't think this is needed or that the NRAs would necessarily want to approve it, same for the Security Plan. There may also be an operational reason why all or part of the plan should be made more widely available Agree, I will ask for a change. I suggest Art.7 (13) be amended along the following lines:-

“Each TSO shall submit an Emergency Plan to the National Regulatory Authority for approval in accordance with Article # [see above]. Each TSO shall review, update and submit an Emergency Plan to the National Regulatory Authority for approval at least annually or following any significant change of critical tools and facilities or relevant system operation provisions. Each TSO shall submit its first Emergency Plan to the National Regulatory Authority for approval by [ ]. For the avoidance of doubt the Emergency Plan, in whole or in part, shall not be placed on the TSO or NRA website [or provided to Grid Users specified by the NRA] without the express permission of the NRA.”

### **Article 7 (15)**

“Each TSO shall establish a confidential Security Plan containing a risk assessment of critical TSO assets to major physical or cyber threat scenarios to be conducted by the Member State with an assessment of the potential impacts.”

As with my comments on Article 7 (13) above, there should be either NRA and / or Member State oversight of the Security Plan. I suggest Art. 7 (13) be amended along the following lines:-

“Each TSO shall submit a confidential Security Plan [to the National Regulatory Authority] [to the organisation specified by the Member State] containing a risk assessment of critical TSO assets to major physical or cyber threat scenarios to be conducted by the Member State with an assessment of the potential impacts. [The National Regulatory Authority] [The organisation specified by the Member State] shall approve or reject the confidential Security Plan submitted by the TSO. Where the confidential Security Plan is rejected the TSO shall resubmit a confidential Security Plan [to the National Regulatory Authority] [to the organisation specified by the Member State] in accordance with any direction received from [the National Regulatory Authority] [the organisation specified by the Member State] and comply with the timescale(s) specified (in the direction). Each TSO shall have in place organizational....”

#### **Article 7 (15)**

“Each TSO shall perform operational Security Analysis based on....”

Where is ‘Security Analysis’ defined?

Its not defined, the last drafting team meeting decided not define it, so the text should be lower case in the consultation version when its issued. Instead the plan is to explain what is meant by security analysis in the supporting paper. I expect the supporting paper to explain the difference between my on-line security analysis software running my N-1 assessment in real-time and my off-line security analysis modelling which is running my base case and N-1 assessment under my future forecast conditions.

#### **Article 8 (7)**

“In case of exchange of reserves between TSOs, the TSO provider(s) of the reserve, the TSO receiver(s) of the reserve and other affected TSOs shall carry out a common Operational Security analysis to check that the expected cross-border flows are compatible with the Operational Security Limits and apply any measures necessary to maintain the Operational Security Limits.”

I have already pointed out this is poorly worded, so the next version I see will hopefully make better sense before its released for consultation.

Two points to note.

First, is this compatible with respect to what is set out in some of the other Network Codes regarding the provision of reserves (by Grid Users etc.) to neighbouring TSO(s).

Second, what happens if the TSOs disagree with respect to the 'Operational Security analysis' (not defined – see comments under Art. 9 (3) below).

#### **Article 9 (2) and (4)**

"In accordance with Article 7(3)" (Art. 9(2)) and "range defined by Article 7(3)" ((Art. 9(4))

As I mentioned at the meeting on 2<sup>nd</sup> July it is not clear what relevance these have to Article 7 (3):-

"Each TSO shall operate its Transmission System within the Operational Security Limits in order to maintain a Normal State"

This is another typo, the cross reference is wrong, I have already pointed this out.

#### **Article 9 (2)**

"..... neighbouring TSOs shall define the voltage and/or reactive power flow limits on the Interconnections between their networks in order to use the reactive power resources in the most effective way and ensure adequate voltage control"

What happens if the TSOs 'define' the voltage and/or reactive power flow limits differently? What, if any, 'dispute resolution' provisions exist in this Network Code where neighbouring TSOs disagree?

#### **Article 9 (3) (first line)**

"Each TSO shall coordinate security analysis with neighbouring and all other affected"

Type, 'security analysis' should be 'Security Analysis' (and should be defined).

#### **Article 9 (3) (fourth line)**

"....shall perform Operational Security analysis based on..."

What is 'Operational Security analysis'? Should it be 'Operational Security Analysis' and be defined? Poorly worded, hopefully will read better in consultation version and as said earlier security analysis will be in lower case.

#### **Article 9 (5) (first line)**

"While complying with the provisions of the Article 9(3), Power Generating Facility Operators and Demand Facilities shall automatically disconnect..."

As I noted at the 2<sup>nd</sup> July meeting reading Article 9(3) there is no reference to either (i) Power Generating Facility Operators or (ii) Demand Facilities, therefore what, according to Article 9 (5), are they complying with?

#### **Article 9 (5) (fourth-sixth lines)**

“The terms and settings for automatic disconnection shall be defined in the contractual agreement of the Power Generating Facility Operators and / or Demand Facilities with the relevant TSO or DSO.”

The contractual agreement(s) should be subject to NRA approval. I suggest this (5) be amended along the following lines:-

“The terms and settings for automatic disconnection shall be defined in the contractual agreement of the Power Generating Facility Operators and / or Demand Facilities with the relevant TSO or DSO that have submitted to the NRA for approval in accordance with Article# [see above].”

#### **Article 9 (8)**

“Each TSO shall monitor the respect of operational voltage limits....”

Not sure what this means. Could perhaps benefit from a rewrite?

#### **Article 9 (10)**

“Each TSO shall coordinate Voltage Control actions with the Significant Grid Users, relevant DSOs and with neighbouring TSOs. TSOs and DSOs shall be entitled to direct their Grid Users in a coordinated way...”

Given the reference to ‘Significant Grid Users’ in the first sentence this should be reflected in the second sentence:-

“Each TSO shall coordinate Voltage Control actions with the Significant Grid Users, relevant DSOs and with neighbouring TSOs. TSOs and DSOs shall be entitled to direct their Significant Grid Users in a coordinated way...”

#### **Article 9 (11)**

“...the TSO may direct DSOs and Significant Grid Users to block automatic voltage/reactive power control of transformers and/or to follow other Voltage Control instructions.”

Should this be ‘Significant Grid Users’? I agree it needs to be I suspect most end consumer Grid Users do not have ‘automatic voltage/reactive power control of transformers’ or have the ability to ‘follow other Voltage Control instructions’.

#### **Article 10 (6)**

“The respect of the limits according to Article 10(1) is required at all steady state topologies.”

Two points to note.

First, what limited in Article 10 (1)? Second, should this sentence be redrafted to read better? There should be an opportunity for me and the chap from Ireland on the drafting team to improve the English in the final consultation version.  
Each piece of primary equipment has its own short circuit current carrying capability as set by the manufacturer, so the ‘Limit’ would be the lowest one of the components that make up that transmission circuit, so the actual ‘Operational Limits’ for short circuit wont appear in any Code, they are part of a circuit rating schedule held by the TSO per circuit. Same applies to the steady state thermal ratings, these are used to define an ‘Operational Limit’, they are specific to a particular circuit, so cannot be specified in a Code.

#### **Article 11 (2)**

See comments above under Article 9 (3) above with respect to ‘security analysis’ and ‘Operational Security analysis’.

#### **Article 11 (6)**

“If adjustments of the relevant market rules are required, these adjustments will be specified by the TSOs in charge and shall be done in cooperation with the responsible authorities, TSOs, DSOs and Grid Users.”

As I noted at the meeting on 2<sup>nd</sup> July, this is a substantial issue. Any changes to ‘the relevant market rules’ should not be ‘done in cooperation with’ per se, but rather be subject to full consultation with TSOs, DSOs, Grid Users and Market Participants and be subject to full NRA approval of any changes to ‘the relevant market rules’. I suggest this (6) be amended along the following lines:-

“If adjustments of the relevant market rules are required, these adjustments will be specified by the TSOs in charge, who shall be responsible for consulting all TSOs, DSOs, Grid Users and Market Participants. Any changes to the relevant market rules shall be submitted by the TSOs in charge; along with all consultation responses from TSOs, DSOs, Grid Users and Market Participants; to the National Regulatory Authorities for approval in accordance with Article# [see above].”

I agree,

#### **Article 11 (9)**

“Each TSO shall define Operational Security limits for power flows on each Transmission System element within its own Responsibility Area In accordance with Article 7(3).”

Should there be NRA oversight of the definition of Operational Security limits?

See earlier comments, Limits can be specific to a circuit. In GB SQSS we tend to use language like immediately after the fault there should be no unacceptable overloading on the system, so reflecting that each circuit has different ratings and different short term rating capability. Of course there is potential for system wide limits for voltage and frequency which we are used to having Ofgem approve by approving our GB SQSS.

#### **Article 11 (11)**

“In the (N-1)-Situation each TSO shall only allow system parameters outside the Operational Security Limits if the violations are within the Transitory Admissible Overloads and if Remedial Actions are available” This is poorly worded and I have asked for it to be changed, if after the fault a circuit is within its short term ratings e.g. 20 minute rating, and I can remove the overload before the time limit is reached, then I am not outside ‘Operational security Limits’

Given that ‘violations’ of the Operational Security Limits could lead to ‘Remedial Actions’ which could cost end consumers, it would seem reasonable that all such ‘violations’ are reported to the NRA (and possibly Grid Users?) as this will act as a ‘check & balance’ on the TSO(s) to minimise such ‘violations’.

Securing the system before and re-securing after a period of time following a fault for the potential next fault often does incur remedial actions that cost. These costs are incurred so that we don’t violate limits for a credible fault. In GB we have our annual C17 report to Ofgem where we would list all violations of our security standards, ideally there are none as severe violations would risk system shut-down or partial collapse.

#### **Article 12 (1) (first line)**

“Each TSO shall perform Contingency Analysis in its Responsibility Area”

What is ‘Contingency Analysis’? Where is it defined?

#### **Article 12 (1) (seventh-ninth line)**

“TSO can decide not to adopt and implement Remedial Actions if the Disturbances are local and they do not impact the Operational Security of the interconnected Transmission Systems”

I think it should as you suggest be clarified. I did not see it being relevant to us in GB as we have our detailed GB SQSS. I think they are trying to introduce the concept of cost benefit through these words, e.g. so that you don’t spend a ‘lot’ on balancing costs to secure the system against a local loss of that might lose say 300MW, whereas for a 3000MW group that might risk cascade

tripping or cross border impact you would spend much higher costs to secure the system.

I will propose some wording about 'TSO can decide not to implement remedial actions in accordance with local rules and procedures as approved by the NRA'

This could be a substantial distortion to the market. If the TSOs are to 'decide not to adopt and implement Remedial Actions' then (i) it should be in accordance with specified rules and procedures approved by the NRAs and (ii) each case should be report to the NRA (and Market Participants?).

#### **Article 12 (4)**

"Temporary non-compliance with the (N-1)-Criterion is allowed only in accordance with Article 11(5)."

As I mentioned at the 2<sup>nd</sup> July meeting, it is not clear if this reference to Article 11(5) is correct.

#### **Article 12 (11)**

"Each DSO and Grid User shall cooperate and deliver all information for Contingency Analysis as requested by the TSO, including forecast and real-time data."

This could be a substantial burden for Grid Users who may, depending on their size, have never had to provide any information to TSOs (or DSOs). There should be NRA oversight of this. I suggest (11) be amended along the following lines:-

"Each TSO will submit to the National Regulatory Authority for approval, in accordance with Article# [see above], the information they require each DSO and Grid User to provide to the TSO in order for the TSO to undertake the Contingency Analysis. Once approved by the National Regulatory Authority each DSO and Grid User shall cooperate and deliver all information for Contingency Analysis as requested by the TSO, including forecast and real-time data, in accordance with the timescales specified by the National Regulatory Authority."

#### **Article 12 (13)**

"Each Significant Grid User shall provide and update regularly the data required by their TSO for the CGM in accordance with Articles 17 to 29."

Two points to note.

First, given that a number of the relevant Articles do not relate to 'Significant Grid User' (such as Art. 17, Art. 18 and Art 19 etc., etc.) then this Article 12 (13) should either be amended to (i) list those Articles between 17 and 29 that only relate to 'Significant Grid User' or (ii) reflect that "Each **TSO, DSO or**



Significant Grid User shall provide and update regularly the data required by their TSO for the CGM in accordance with Articles 17 to 29.”

Second, this could be a significant burden on ‘Significant Grid Users’. As with my suggestion for Article 12 (11) there should be regulatory oversight of this information request with respect to what ‘Significant Grid Users’ have to provide.

#### **Article 12 (19)**

“Each Significant Grid User connected to the Distribution Network shall, after a desynchronisation, obtain the permission from its TSO and from its DSO prior to its resynchronisation.”

See earlier comment, I will hopefully get this re-drafted, I don't see it being necessary or practical other than in perhaps extreme conditions like islanded operations after multiple faults and then only for certain embedded large users would the TSO need to approve before they re-synchronised.

As I mentioned at the meeting on 2<sup>nd</sup> July; and expanded on further above under the definition of ‘Significant Grid User’; I’m not certain how, practically, it would be possible for 10s if not 100s of thousands of end consumers to seek permission (as would be required if this Art 12 (19) is not changed) for resynchronisation from their TSO. The TSO (and DSO(s)) would be overwhelmed. If ‘permission’ is in some way (as was suggested at the meeting) to be ‘assumed’ then I suggest (to avoid confusing end consumers) that this obligation should be deleted.

#### **Article 14 (4)**

“The methodology for determination of this minimum percentage shall be agreed upon and defined at the level of ENTSO-E for each Synchronous Area.”

Agree, NRA oversight and approval is likely and probably necessary as this could drive balancing costs up. I will propose some extra words as I said earlier I feel a few clauses will need the words ‘approved by NRA’ added in the final version, I would expect ACER will be asking for the same.

This is a key methodology with respect to Power Generating Facility Operators. The TSOs must (i) consult Power Generating Facility Operators on the methodology and (ii) obtain the approval of the NRAs / the Agency for the methodology. I suggest (4) be amended along the following lines:-

“The methodology for the determination of this minimum percentage shall be consulted on by each TSO with Power Generating Facility Operators in their Control Area and shall only be put into effect once the methodology has been approved by the National Regulatory Authority in accordance with Article# [see above]. Where the methodology applies to a Synchronous Area this shall be defined by ENTSO-E who will consult with Power Generating Facility Operators

in the Synchronous Area and shall submit the methodology to the relevant National Regulatory Authorities for approval in accordance with Article# [see above].”

### **Article 15 (1) / (6) / (7) / (11) / (12) / (13) / (16)**

As I noted at the 2<sup>nd</sup> July meeting this particular Article needs to be ‘sense checked’ in terms of the obligations it is placing on all Significant Grid Users, including all power stations from 1watt upwards and all end consumers. Is it, for example, practical for the TSO to receive (and, presumably, action) the test information from the 10s if not 100s of thousands of end consumers that they are required (by Article 15 (16)) to provide?

How will I (at my home or me) comply with the obligation (in Article 15 (1)) to continuously monitor my areas of responsibility, perform operational testing and participate in the investigation of events?

The obligation (in Article 15 (6)) does not appear to differentiate between Grid Users with and without generation. I have no generation at my home, yet I appear to be obliged to carry out tests and “complying with its declared availability and supply of Ancillary Services in accordance with RfG NC”. How do I comply with this?

[Note – ‘Ancillary Services’ is not defined in the 12<sup>th</sup> June 2012 version of the RfG NC.]

What steps will the TSO (and DSO?) take to provide me (as a Grid User) with information on (i) the ‘appropriate margin for emergencies’ and (ii) how I can ‘look at the impact on the system as a whole’ in order to establish a test plan (Article 15 (7))?

With respect to testing etc., there should be substantial NRA involvement in terms of oversight of the reasonableness / practicality of the obligations placed (by TSOs and DSOs) on Grid Users. I suggest this whole Article is redrafted in terms of linking the testing to the (RfG NC defined) Types of generators (by size band) and including proper NRA ‘checks & balances’ to ensure that what the TSOs and DSOs are seeking is appropriate.

### **Article 15 (12)**

“If a TSO or a Grid User is conducting a test influencing a neighbouring TSO and the System State of the affected Transmission System changes to Alert State or Emergency State, the TSO or Grid User conducting the test shall immediately cease all testing.”

Notwithstanding the above comments on Article 15; how will a Grid User (of whatever size) know (i) that their test may ‘influence a neighbouring TSO’ or (ii) what ‘the System State of the affected Transmission System’ is in terms of ‘changes to Alert State or Emergency State’?

## Chapter 4 – general

This chapter relates to the information flows between TSOs and (i) other TSOs (ii) DSOs (iii) Power Generating Facilities / Generators and (iv) Demand Facilities.

This is a substantial area in terms of needing to quickly (and very clearly) (i) define the exact information required (is it, for example, kW or MW? kWh or MWh? etc.) (ii) specify how that data is to be transferred (what data format to be used over which electronic route etc.) and (iii) at what time / date. In the absence of knowing these (and other) critical items it will be difficult for all parties concerned (including TSOs) to determine the (practical) implementation timescales for this Network Code. It was for this reason, and mindful of comments I've sent with respect to the CACM code (23<sup>rd</sup> March 2012 version), that I raises the issue, at the 2<sup>nd</sup> July meeting, of the implementation timescales set out in Article 33.

The data obligations are described at a high level only in this OS NC. I have taken the view that as long as they are not inconsistent with the detailed data flows set out in the GB GC and the B&SC then we probably don't want or need them to try and have too much detail in what is trying to be a high level principles document.

Furthermore, in my view there should be substantial NRA involvement in terms of oversight of the reasonableness / practicality of the obligations placed (by TSOs and DSOs) on Grid Users in terms of data exchange (see, for example, Article 27 (1) and (2)).

I do not propose to comment in detail on the articles in Chapter 4, as I have not had a chance to consult with colleagues on the detail of what is being asked for. However, I have a few passing comments, on Chapter 4, as follows:-

### Article 16

It would be helpful, for the avoidance of doubt, to remind all parties that the provisions of Article 5 apply to this chapter.

### Article 21 (4)

As I mentioned at the meeting on 2<sup>nd</sup> July, it seems 'strange' that in order to meet the cross border obligations associated with the Third Package that generators are required (by Art. 21 (1)) to provide TSOs with ten items of information whilst interconnectors only need to provide four items.

In this regard I'm mindful of the comments (on page 8) of the 'Supporting Paper for the Operational Security Network Code' (20<sup>th</sup> June 2012), namely:-

"The operation of HVDC links has to be ensured by TSOs. This requires a systematic approach to their reliability when connected to the continental

European AC grid and the consideration of the effects of connecting such large amounts of bi-directional power in-feed/out-feed to single points on the operation of the pan-European Transmission System. In addition, the operational impacts of HVDC also need to be accounted for, with their filter banks, zero fault level in-feed and very fast ramping rates.

The common features of devices such as PST (Phase-Shifting Transformers) or FACTS (Flexible Alternating Current Transmission Systems) are their controllability and the large impact they can have on cross-border power flows also alongside HVDC.”

In light of this statement from ENTSO-E, are the drafting team comfortable that the four data items in Article 21 (4) are sufficient for Operational Security purposes?

### **Article 27 (1) / (2)**

“Power Generating Facility Operators and DSOs shall provide to the TSO all the information described in Articles 24 to 26 if requested by the TSO.”

This seems like an unreasonable ‘catch all’ clause. Articles 24 to 26 link the obligation (to provide information) on the Power Generating Facility Operators to plant Type (i.e. B, C and D) as defined in the RfG. However, it would appear that Article 27 (1) does not have this ‘limitation’ and could, therefore, be read to mean that all Power Generating Facility Operators, irrespective of size / (RfG) type has to provide any information (set out in Articles 24-26) if requested by the TSO. This is reinforced by reading Article 27 (2).

This is too wide a clause and should, as a minimum, contain NRA oversight / approval of the TSOs actions.

### **Article 28 (1)**

As I mentioned at the meeting on 2<sup>nd</sup> July (and noted above under the definition of ‘Demand Facilities’) clarification is required on the issue on on-site demand for power stations. For the avoidance of doubt the RfG definition of ‘Demand Facilities’ should be used in this Network Code.

### **Article 29 (1)**

“Each Demand Facility connected to the Distribution Network which participates in curtailment shall communicate to its DSO and TSO the minimum and maximum active power which can be curtailed.”

Whilst I can appreciate where the TSOs and DSOs are coming from is this ‘practical’ in terms of asking each ‘Demand Facility’ to provide this information? It is highly unlikely that those that ‘participates in curtailment’ (not defined) will do so without recourse to another legal entity; i.e. their energy supplier or aggregator or DSO; via ‘smart’ technology. Would it not be more practical (and efficient) to place this obligation (via the DCC NC?) on

those companies / organisations who undertake this curtailment. Otherwise millions of end consumers will have to communicate with DSOs and TSOs (can the TSOs cope with the volume of these 'communications' – unspecified, they will need to be if end consumers are to comply with this obligation?).

## **Chapter 5 / Article 30**

The issue of training is important one and should not, in my view, be left to the TSOs alone to determine themselves. It would seem reasonable that the training plans etc., are subject to NRA approval to ensure all stakeholders can have confidence that they will ensure the TSO staff are trained to meet the Third Package obligations. I don't believe NRAs would want to or need to have that level of scrutiny over TSO staff training plans.

### **Article 31(1)**

"Each significant Grid User or DSO shall ensure that its facilities are compliant with the requirements from this Network Code, which are relevant for their connection and interaction with the Transmission System."

This seems a very heavy burden for all Grid Users (including all end consumers) especially as there will not, according, to Article 33, be a period for transition period for Grid Users to ensure that their 'facilities are compliant with the requirements from this Network Code'.

### **Article 31(2)**

"Planned modifications of the technical capabilities of the significant Grid Users facilities, with possible impact on its compliance to the requirements under this Network Code shall be notified to the relevant TSO or DSO by Grid User before initiating such modification."

Be careful what you ask for(!). How will I, as a Grid User, know that a 'planned modifications of the technical capabilities of the Grid Users facilities' (my home) such as putting in a new socket or adding a new light fitting will have a 'possible impact on its compliance to the requirements under this Network Code'? I won't....so the safest thing to do (legally) will be to notify the TSO and DSO 'before initiating such modification'. There is then a moral (if not legal?) obligation on the TSO and DSO, once I have notified them, to tell me if I should not proceed. Can the TSO and DSO handle the volume of notifications received?

### **Article 31 (3)**

"Any operational disturbance of a facility of the significant Grid User that have impact on its compliance to the requirements of this Network Code shall be notified to the relevant network operator by significant Grid User as soon as possible without any delay after the occurrence of such an incident."

As with Article 31 (2) above how will I, as a Grid User, know that an 'operational disturbance of a facility of the Grid User' (my home) has an 'impact on its compliance to the requirements of this Network Code'? I won't....so the safest thing to do (legally) will be to notify the TSO and DSO (as I'll not be sure who 'the relevant network operator' is) of, for example, all fuse trips.

#### **Article 31 (4)**

"Any foreseen test schedules and procedures to verify compliance of a facility of the significant Grid User with the requirements of this Network Code, shall be notified to the relevant TSO or DSO by Grid User in due time and prior to their launch and shall be approved by the relevant TSO or DSO."

Can the TSOs or DSOs handle the volume of approvals that they will receive (and have to be actioned by them) from each electrician visiting all domestic (as well as industrial and commercial) premises in their control area?

#### **Article 31 (5)**

"The relevant TSO or DSO shall be facilitated-able to participate in such tests"  
I think this is what it should be saying

What does 'facilitated' mean? Paid, by the Grid User, to attend the tests? If so then such costs imposed by the TSO or DSO on the Grid User should be subject to full NRA oversight and approval.

#### **Article 32 (2)**

"The relevant TSO or DSO shall regularly, at least once in 3 years assess the compliance of a significant Grid User's facility with the requirements under this Network Code, throughout the lifetime of the Grid Users' facility."

Seems over the top, I will ask for a change

Has the practicality / reasonableness of this proposal been considered? In GB we have a population of approximately 60 million and circa 24 million electrically connected properties - circa 40% of the population figure. The population of the EU 27 is in the order to 500 million which would appear to equate to circa 200 million properties (or 'Grid User's facilities') which implies some 65 million compliance tests per year across the 27 Member States. This seems like a substantial financial burden to be placed on all Grid Users. Where is the Cost Benefit Analysis which justifies this?

#### **Article 32 (4)**

How will I as a Grid User be expected to provide "details of the technical data of the Grid User facility with relevance for the system operation" (Art. 32 (4) (b)) or model "for steady-state and Dynamic Stability Analysis" (Art. 32 (4) (c)) or demonstrate "expected steady-state performance and Dynamic Stability Analysis outcome"?

#### **Article 32 (6)**

“The relevant TSO or DSO may partially or totally delegate the performance of its compliance monitoring to third parties.”

The involvement of third parties to undertake this compliance monitoring should, in my view, be subject to NRA oversight.

### **Article 33**

As I mentioned at the meeting on 2<sup>nd</sup> July (and as per my comments above) I think consideration should be given to a period of transition of this code in terms of the time the code enters into force to when it shall apply from.