

G5/5 Working group

Meeting Name: G5 Review Workgroup

Date: 12 January 2018

Time: 10:30 – 15:30

Location: ENA, London

Attendees:

Attendee		Affiliation
Xiaoyao Zhou (Chair)	XZ	National Grid
Roshan Bhattarai	RB	Northern Powergrid
Gary Cotter	GC	Dong Energy
Sarah Foster	SF	SONI
Forooz Ghassemi	FGh	National Grid
Alireza Mousavi	AM	ABB
Richard Newman	RN	UKPN
John Reilly	JR	EDF
Simon Scarbro	SS	WPD
Ahmed Shafiu	AS	Siemens
Nigel Shore	NS	ABB
Mike Thong	MT	Fairford
Davor Vujatovic	DV	VANDA Engineering
Sarath Wijesinghe	SW	RWE
Ben Gomersall (Joint Secretary)	BG	National Grid
David Crawley (Joint Secretary)	DC	ENA

Apologies:

Frank Griffith
David Lyon
Victoria Montag
Andrew Oliver
Patrick Osakue
Dr Abram Perdana
David Spillett
Wayne Turtill

The purpose of these notes is to capture the main actions and discussion topics rather than to provide a complete record of the meeting.

Agenda Item

1 Welcome

The Chairman welcomed members to the meeting. Train strikes meant it was unfortunately not possible for some members to attend on this occasion.

2 Draft Action Notes of Meeting held on 9 November

(a) Accuracy

Agreed as a correct record of the meeting

(b) Brief Review of Actions

All actions were up to date, except:

Agreed that XZ and DS will review the current ToR in the light of the change of governance arrangements.

Action: XZ and DS

3 Review of G5/5-draft 2018 document and Technical Editor Comments

This draft had been circulated on 4 January 2018. Comments had been sent back from members and where possible accommodated in a new draft. Some of the outstanding issues to be resolved were summarised in a slide presentation by FG (attached to these notes).

3.1 Issues with printing the draft

Apologies were received from the Technical Editor for printing/PDF conversion issues. A workaround will be adopted for future versions.

3.2 Terms for customer/connectee (inconsistent use in the document)

Proposal: use terms in red

- **Connectee** = customer = network user
- New user = new network user = **new connectee** = new customer
- This includes one Network Owner connecting to another Network Owner

Agreed.

Action: FG

3.3 Use of NOC –Network Operating Company.

Is this valid with future TO/TSO and DNO/DSO split?

- Proposed to use the term “Network Owner” in all instances
- Agreed to align if possible with terminology in the new EREC P28.

Action: FG to check with Gary Eastwood.

3.4 *Should we use the term background harmonics or pre-existing background harmonics?*

- Proposal to use background
- We should try to use the more precise term harmonic voltage, as other documents can refer to harmonic current.

Accepted and agreed to ensure the definition is accurate.

Action: FG

3.5 *Definition of resonant plant*

- NS pointed out that currently resonant plant is only defined as passive equipment. Should it refer to active equipment?
- Noted that the existing definition was probably acceptable for Stages 1 and 2. This section was designed for passive elements and it is a simplified methodology. The largest active equipment will be a lot smaller than passive equivalent.
- Proposal: to re-define, removing reference to passive equipment and adding further examples, eg inductances and active elements such as converters. Agreed.
- Agreed to look again at the wording in Stage 3.
- Agreed there should be only one resonant plant section and that the “stages” concept, eg Stage Res1, should be removed.

Action: NS/DV/FG/SS to amend definition and review Stage 3 wording.

3.6 *Role of accompanying ETR*

Agreed that a companion ETR was needed, because G5/5 would be unwieldy if it included the background material. ETR 122 should remain unchanged as ETRs are a snapshot in time. SS pointed out that there was already a considerable amount of material available for a new ETR.

Action: SS/FG to compile existing potential content.

(DC Note: There is a standard ENA MS Word Template for ETRs)

It was agreed to discuss outside the meeting whether the new ETR could be ready in time to be circulated with the consultation draft of G5/5 and to check the ToR with regards to the preparation of the ETR.

Action: XZ/FG/DS

3.7 *Final voltage limit table - tolerance of measurement*

- New text proposed
- If all limits are rounded to 0.1%, PL could be breached if there is a high gain.
- Conversely, any limit below 0.1% cannot be measured due to accuracy and noise susceptibility.
- Proposal to remove the word “telephone” in 8.5 (penultimate paragraph) when describing interference, so as to include all types of interference. Agreed.

Action: FG

3.8 *Direct Current*

- The current draft does not consider DC, but does not refer to anywhere else to look.
- A DC injection limit is given in EREC G59 section 9.6.8
- Proposal: EREC G59 to be cross referenced
- Alternate proposal: remove last sentence

Agreed to rewrite to remove last sentence and a half, but not to refer in EREC G5/5 to EREC G59 (or successor document). Also agreed to consider whether this could be moved to scope and whether or not it could be transferred to the accompanying ETR (in which case perhaps DG documents could be referred to for information purposes).

Action: FG

3.9 *Sub-harmonic or subharmonic?*

Agreed that the term subharmonics should be used, ie with no hyphen.

Action: FG

3.10 *Interharmonics*

- How do the bands adjacent to integer harmonics get limited?
- Noted that the current text is directly from IEC and that the adjacent bands are captured in the integer limit.

Agreed no change needed.

3.11 *Table 13 note 3*

- NS noted that there are in fact 2 adjacent integer harmonics.
- Agreed to update to refer to the lower of the 2 adjacent integer limits.

Action: FG

3.12 *Planning levels - missing voltages*

- It was noted that in previous meeting that the WG decided not to use grouped voltages as in IEC and instead use explicit voltages. However more voltages than the explicit ones currently stated are used.
- Should we include other voltages or use a range?
- Proposal: keep the 4 table and add voltages: 220 kV with 400 kV, 150 kV with 132 kV, 34 kV with 33 kV, 110 kV with 132 kV, 13 kV with 11 kV.
- Alternate proposal: Change to use voltage ranges (with gaps between). Agreed, and also agreed to add a note that any other voltage should assume the closest range.

Action: FG

3.13 *How is short duration of high harmonics covered? e.g. during switching*

- It is part of 10 min average or considered against burst limit
- Section 3.4 refers to ETR 122 - which says they can be treated as voltage regulators but reference to voltage regulators has been removed from Stages 1 and 2.

- Propose to use 6-pulse instead. Agreed – section to be re-drafted.

Action: SS/FG

3.14 *When should new standard apply? Should it be retrospective?*

- Projects in flight carry on (if limits have already been given to the connectee).
- New connections must use the new EREC.
- If a connectee wishes to obtain a new limit based on the new EREC they can, but this may affect their position in the queue.
- What about mod apps? Agreed outside of the scope of G5.

3.15 *EMC Regulations*

Agreed to check references are current and update if necessary.

Action: FG

3.16 *Apportionment below 132 kV. Section 4.3.1*

- SF asked how 50% apportionment was chosen for DNOs and why does it not change with size.
- Noted that in Northern Ireland 110 kV is a transmission voltage.

Agreed that an explanation of the apportionment method and background to be produced in ETRxxx.

Action: FG

3.17 *Acknowledgements*

DC noted that usually acknowledgements were not included in an EREC. He has sent FG a standard EREC template. Acknowledgements can be made in the Consultation pack and/or the ETR.

3.18 *The term POC is used but not defined. Used in section 3.2.*

Agreed this abbreviation should be removed.

Action: FG

3.19 *Introduction*

Noted that disturbance levels are steady state. Text to be reviewed.

Action: FG

3.20 *Section 2. Voltage distortion caused heating.*

Not strictly true. To be corrected.

Action: FG

3.21 *Stage 3b. Beta values.*

Agreed these were appropriate.

3.22 *Appendixes and data collection form*

The proposed data collection form drafted by SS has already been circulated to WG members for comment. (Note by DC: so far, no replies have been received.) The proposed Annexes A and B will be circulated to WG members for comment on a short timescale so they can be included in the next full draft.

Action: DC

4 **Harmonics above 50th, text and implementation of Planning Levels**

4.1 *Measurement*

- New text has been circulated to go after PL and CL.
- It was highlighted by one DNO that measurement at 11 kV above 50th harmonic will not be technically feasible on existing equipment due to VT and transducer technologies. At 33 kV, it was not feasible at the moment but could be in the future. At higher voltages it is feasible, but it will take to beyond 2031 to install the equipment.
- The sub working group report highlighted that these high frequency harmonics exist, but that most existing transducers do not have capability to measure them at some voltages.

The following proposal was made and agreed:

- Assessment is necessary and measurement is desirable.
- Assessment should be kept to 100th but use assumed background if measurement is not available.
- Background assumed shall be at the discretion of NO's.
- Some text should be added to incentivise investing in more transducers.
- Rewrite text beginning "It is prudent".

Action: SS/AS to amend text

4.2 *Modelling inaccuracies*

- Proposal: to remove text, as inaccuracies exist in all studies and is not specific to this study.
- Alternate Proposal: to move this to ETRxxx and expand.
- Alternate Proposal: to add reference to CIGRE design.

Agreed to update with an extra paragraph on modelling adequacy beginning "In addition..." with text that refers to CIGRE, IEC and/or IEEE.

Action: AS/FG to amend text

5 **Next steps**

Second week of February 2018

Public consultation legal text available. WG will have two weeks to comment.

End February 2018

EREC (and ETR?) signed off by WG
(DC Note: ENFG signoff is also needed at this point).

End March 2018

Review comments from public consultation and record responses.

End April 2018

Produce Report to Authority

Early May 2018

Publish G5/5

6 AOB

FG thanked everyone who contributed comments on the text.

RB gave an update concerning the NPL work.

DC will send FG an example of the DCRP Consultation Pack.

Action: DC

7 Date of future WG meeting

A provisional date was agreed for a further WG meeting if needed, depending on WG feedback. This is **Weds 28 February 2018** (DC note: Rooms 3 and 4 have now been reserved at ENA).

All members to note.