Draft Minutes of the Fifteenth Meeting of the ER P28 Joint GCRP and DCRP Working Group

26th January 2017

Held at the ENA, Dean Bradley House, 52 Horseferry Road, London, SW1P 2AF

1. Welcome, Introductions

GE welcomed everybody to the fifteenth meeting of the ER P28 Joint GCRP and DCRP Working Group (WG) to review the case and proposed scope of review of ENA Engineering Recommendation P28 Issue 1 Planning Limits for Voltage Fluctuations caused by Industrial, Commercial and Domestic Equipment in the UK (P28).

Attendance, apologies and absences were noted (see Appendix B for Attendance List including member initials).

2. Address by the Chair

GE thanked the WG members for their contributions and presented the agenda (see Appendix C for Agenda)

[Document reference: P28 WG_Paper_15_1_Agenda_P28 WG_Meeting 15_26.01.17_v0.1]
[Document reference: Presentation_P28 WG_Meeting 15_26.01.17_v1.0]
[Document reference: COMPETITION ACT COMPLIANCE.docx]

In addition to the standard agenda items the primary purpose of the meeting was to review comments/responses on Draft_v2 of P28 Issue 2 and to summarise the outstanding technical issues from the second draft of P28 Issue 2.

The WG members were respectfully reminded of ENA requirements to adhere to The Competition Act Compliance - ENA Meetings – Best Practice Guidelines document which was attached to the agenda for this meeting.

There were no comments.

3. Update/Actions from Last Meeting

It was agreed the draft minutes were a fair and accurate account of the previous meeting and could be published in the public area of the DCode website.

[Document Reference: P28 WG_Meeting Minutes and Actions_15.12.16_Draft v1.0]

ACTION 15.1: Publish the approved P28 minutes meeting no. 14 dated 15.12.16 on the DCode website (GE)

GE presented an update on the actions from the last meeting.

[Document Reference: P28 WG_Paper_15_3_Update_P28 WG Actions]

GE noted the actions marked ‘Complete’ in the ‘Due by’ column had been completed and, where applicable, the number of the Paper was referenced.

Action 14.2: It was agreed to use a threshold of 0.2% rate of rise of voltage for defining the end of a RVC event.

Action 14.4: The WG were not able to confirm whether the memory time technique was still valid. GE agreed to liaise with DV to reach a conclusion.

Action 14.5: Action complete – see Paper_15_9 concerning comparison of ramp voltage change - minimum time between changes. In summary, the minimum time between ramp voltage changes derived from Figure 5 in P28 Issue 1 is higher than that for Figure 3 in PD IEC/TR 61000-3-7. GE stated that moving to the new IEC Standard would permit more frequent ramp voltage changes of the characteristic per minute or hour than the current P28.

The WG agreed that P28 Issue 2 should only refer to Figure 3 in PD IEC/TR 61000-3-7 and that Figure 5 in P28 Issue 1 is obsolete.

[Document Reference: P28 WG_Paper_15_9_RAMP VOLTAGE CHANGES]

Action 14.6: GE stated that permission needs to be sought to replicate requirements or figures from International and/or British Standards. DC confirmed that this should not be a major issue; documenting a schedule of requirements and figures to be replicated and requesting permission from IEC/BSI Standards should be sufficient.

ACTION 15.2: Contact Geraldine Salt at BSI regarding permission to reproduce content from BS EN Standards (GE)

GE agreed to progress/complete outstanding actions from previous meetings.

ACTION 15.3: Review outstanding actions from previous meetings with a view to closing out (GE)

4. Review Comments/Responses on Draft_v2 of P28 Issue 2

GE thanked those members of the WG that had provided comments on the Draft_v2 of P28 Issue 2, which were a balance of general, technical and editorial. GE confirmed that the comments received to date had been collated in Paper_15_4.

[Document Reference: P28 WG_Paper_15_4_Comments_P28 Issue 2_2nd Draft_Collated_v0.2]

GE invited comments from AH and RB and stated it was not too late for those that had not yet submitted comments.

GE confirmed that discussion points for the WG had been distilled from the collated comments and were summarised in Paper_15_5. GE proceeded to summarise the collated comments that needed discussion by the WG as documented in slide 7-8 of the presentation.

[Document Reference: P28 WG_Paper_15_5_P28 WG Discussion Points]
[Document reference: Presentation_P28 WG_Meeting 15_26.01.17_v1.0 – slide 7-8]

A summary of discussions and agreements were documented in Paper_15_5 (see Appendix D). Notwithstanding, salient discussions points are summarised below.

GE highlighted that some comments related to the 'readability' of the document. GE confirmed that Draft_v2 of P28 had been kept deliberately concise and limited to requirements as opposed to background and justification. GE agreed that some additional wording may be required to improve readability. It was agreed to circulate Draft_v2 of P28 to selected persons outside the WG to obtain feedback on whether the document is comprehensible.

ACTION 15.4: Circulate Draft_v2 of P28 Issue 2 to selected colleagues that are not power quality experts, but who will be expected to understand and apply the document, regarding the 'readability' of the document including: graduate engineers, connections engineers etc.

In addition:

- **MH to circulate to Nick Gudgeon (Lightsource)**
- **GE to circulate to Sam Rossi-Ashton (ENA)**
  Making clear that the document is confidential and deadline for comments is 09.02.17

MB agreed to circulate Final_v1 to selected engineers at Ofgem to review.

AH commented that there should be a clear distinction between flicker, RVC and step voltage change – at the moment this is not reflected in the draft.

It was agreed to circulate Final_v1 of P28 Issue 2 to the ENA Low Carbon Technologies (LCT) Group once Section 8 'Applications' has been drafted.

ACTION 15.4a: Review and update P28_v2 in line with Paper 15.5 discussion from P28 WG Meeting No.15 and follow up outstanding comments on Draft_v2 (GE)

ACTION 15.5: Redraft para 2 on p.10 of Draft_v2 of P28 Issue 2 and consult with the GCRP and DCRP regarding whether the requirements of P28 Issue 2 should be adopted by System/Network Operators (GE)

There was a discussion concerning whether transfer coefficients equally apply to RVC as well as flicker. The WG believed they did. KL stated he had reviewed voltage fluctuation data following a 400 kV fault in the Carrington area and that he had found anomalies with respect to applying transfer coefficients.

ACTION 15.6: Review transfer coefficients in light of recent power quality data obtained following 400 kV fault in Carrington area (KL/FG/GE)

The WG considered what recommendations should apply to battery storage technology. AH pointed out that this was an interesting and fast developing area. The WG had no knowledge of any particular voltage fluctuation issues associated with this technology. However, it was noted that modelling voltage fluctuation for this technology was contentious as it can be done in different ways. It was noted that ENA may be establishing a new Energy Storage WG.

ACTION 15.7: Liaise with new ENA WG concerned with energy storage with a view to setting specific voltage fluctuation requirements in P28 Issue 2 (GE)

The WG confirmed they were happy to include recommendations in Section 8 'Applications' accepting that this would need to be reviewed in the next 2 years.

The WG agreed that examples in P28 Issue 2 would be helpful at points but should not replicate those within Standards, e.g. PD IEC/TR 61000-3-7.

The WG reviewed Table 4 'Planning levels for RVC' in P28 Issue 2. The WG agreed to carrying out some analysis to determine how the frequency of energisation and the minimum time between energisations affected P_{st} and P_{lt} values.

The merits of having a 'rule of thumb' type calculation for evaluating the RVC associated with energisation of distribution type transformers was discussed. The validity of the Paper by Turner & Smith relating to RVC and transformer energisation was discussed. MH stated that the calculation method in the Paper quotes a value of source impedance but that this may be too high. The WG agreed to carry out some modelling of energisation of distribution transformers using different software programs to assess the validity of the approach in the Paper by Turner & Smith; the objective being to develop a generic approach for Section 6.3.2 of P28 Issue 2.

ACTION 15.8: Compare test results from different software programs modelling distribution transformer magnetising inrush based on the same parameters and assumptions (FG - ATP; PTh - IPSA; MH – DigSILENT)

5. Review Outstanding Technical Issues

The WG agreed that Paper_15_5 would be updated in light of discussions in the meeting and any outstanding technical issues would be summarised for further discussion.

[Document Reference: P28 WG_Paper_15_5_P28 WG Discussion Points]

6. Terms of Reference (ToR)

[Document Reference: ER P28 WG_ToR_v2.2_Issued]

GE stated there had been no changes to the ToR. No comments were received from the WG.

7. Status of Phase 3 Revision

See Project Plan.

8. Project Plan

GE presented a revised Project Plan.

[Presentation_P28 WG_Meeting 15_26.01.17_v1.0 – slide 11]

In summary:

21.02.17	Submit final version to WG for approval
10.03.17	Issue Final_v1
17.03.17	Obtain approval from the P28 WG for ENFG Approval

GE stated that a meeting of the P28 WG in mid-march may be required. Although there may be no definite requirement for a meeting, the WG asked whether a placeholder could be sent given members' commitments.

ACTION 15.9: Send placeholder for potential P28 WG meetings in March and May 2017 (GE)

AH stated that Ofgem may wish to send the final version of P28 Issue 2 to an external consultant.

ACTION 15.10: Ofgem to clarify whether P28 Issue 2 will be sent to an external consultant for review/validation (MB/GE)

9. General Management/Administration

Arrangements for general management and administration had not changed since the previous meeting.

10. AOB

GE stated that JD had formally tendered his resignation as Deputy Chair but had agreed to remain a corresponding member of the WG. GE confirmed he had formally responded to JD to thank him, on behalf of the WG, for the good work he had done as Deputy Chair. DC kindly agreed to assist as Deputy Chair in the interim.

GE confirmed that he had spoken with NW regarding the WG's concerns that the Solar Trade Association had not been represented for a number of consecutive meetings. GE informed the WG that NW has confirmed the STA's commitment and would ensure that Draft_v2 of P28 would be circulated to relevant parties with a view to NW collating comments and sending them to the P28 WG.

11. Date and Venue for Future Meetings

There are no scheduled meetings of the P28 WG. It was agreed that any subsequent meetings of the P28 WG would be convened as required, noting sufficient notice would be provided to members.

Appendix A

ER P28 Joint GCRP & DCRP Working Group Meeting No.15

Summary of Actions from Current Meeting

Item	Action	Who	Due by
15.1	Publish the approved P28 minutes meeting no. 14 dated 15.12.16 on the DCode website	GE	02.02.17
15.2	Contact Geraldine Salt at BSI regarding permission to reproduce content from BS EN Standards	GE	27.02.17
15.3	Review outstanding actions from previous meetings with a view to closing out	GE	27.02.17
15.4	Circulate Draft_v2 of P28 Issue 2 to selected colleagues that are not power quality experts, but who will be expected to understand and apply the document, regarding the 'readability' of the document including: graduate engineers, connections engineers etc. In addition: • MH to circulate to Nick Gudgeon (Lightsource) • GE to circulate to Sam Rossi-Ashton (ENA) Making clear that the document is confidential and deadline for comments is 09.02.17	All MH GE	ASAP
15.4a	Review and update P28_v2 in line with Paper 15.5 discussion from P28 WG Meeting No.15 and follow up outstanding comments on Draft_v2	GE	20.02.17
15.5	Redraft para 2 on p.10 of Draft_v2 of P28 Issue 2 and consult with the GCRP and DCRP regarding whether the requirements of P28 Issue 2 should be adopted by System/Network Operators	GE	27.02.17
15.6	Review transfer coefficients in light of recent power quality data obtained following 400 kV fault in Carrington area	KL/FG/ GE	03.02.17
15.7	Liaise with new ENA WG concerned with energy storage with a view to setting specific voltage fluctuation requirements in P28 Issue 2	GE	03.02.17
15.8	Compare test results from different software programs modelling distribution transformer magnetising inrush based on the same parameters and assumptions	FG - ATP; PTh - IPSA; MH - DigSILENT	10.02.17
15.9	Send placeholder for potential P28 WG meetings in March and May 2017	GE	10.02.17
15.10	Ofgem to clarify whether P28 Issue 2 will be sent to an external consultant for review/validation	MB/GE	27.02.17

Summary of Outstanding Actions from Previous Meetings

Item	Action	Who	Due by
14.2a	Review Paper_14_5 concerning Normal Operating Conditions with specific reference to meeting security of supply requirements	JD	In progress
14.4	Consult with DV whether memory time technique is still valid	GE/DV	In progress
13.15	Compare what information DNOs currently provide compared to what P28 Issue 1 states should be provided	JD	In Progress
13.17	Comment on Paper P28 WG_Paper_13_15_flicker-FG1	All	In Progress
13.19	Comment on the website links in P28 WG_Paper_13_17 Effect of Flicker on Various Equipment (from MH)	All	In Progress
6.12	Find out the high level cost of Stage 3 Assessment	GE	In Progress
5.8	Ask ENA what the formal mechanism is for obtaining access to data that has been gathered	GE	In Progress
4.14	Ask person who responded to Briefing Paper 1 regarding possible relaxation of planning limits for 'weak' networks with "hydro connections" to provide clarification of technical issue and more detail on flicker/RVC caused by these connections	GE	In Progress

Summary of Completed Actions in Current Meeting

Item	Action	Who	Due by
14.1	Publish the approved P28 minutes meeting no. 13 dated 26.10.16 on the DCode website	GE	Complete
14.2	Provide r.m.s. voltage measurement data for LV networks to see whether 0.2% or 0.5% limit change is acceptable	KL	Complete WG agreed 0.2%
14.3	Investigate what assumptions, if any, need to be stated when carrying out flicker simulation in software	GE	Complete
14.5	Compare flicker severity results for ramp voltage changes assessed using Fig. 4 and Fig.5 in P28 Issue 1 with those in Annex E of PD IEC/TR 61000-3-7	GE/DV	Complete See Paper_15_9
14.6	Check copyright status of reproducing figures from IEC Standards in P28 Issue 2	GE	Complete See Action 15.2
14.7	Update P28 WG Membership for Mark Horrocks to reflect change in employment	GE	Complete

Appendix B

ER P28 Joint GCRP & DCRP Working Group Meeting No.15

Attendance List
26th January 2017 ENA Office, London

Attendees:

Name	Initials	Company
Adrian Ellis	AE	Scottish & Southern Electricity Networks
Mark Horrocks	MH	McLellan & Partners
Ken Lennon	KL	SP Energy Networks
Andrew Hood	AH	WPD
Roshan Bhattarai	RB	Northern Powergrid
Peter Johnston	PJ	NIE Networks
Peter Twomey	PT	ENW
Peter Thomas	PTh	Nordex
Matthew Ball	MB	Ofgem
Mark Kilcullen	MK	Department for Business, Energy and Industrial Strategy
Forooz Ghassemi	FG	National Grid
David Crawley	DC	ENA
Gary Eastwood	GE	Threepwood Consulting Ltd
Michelle Chambers	MJC	Threepwood Consulting Ltd

Apologies:

Davor Vujatovic	DV	VandA Engineering Services
Steve Mould	SM	UKPN
Richard Newman	RN	UKPN
John Parsons	JP	BEAMA
Sridhar Sahukari	SS	Energy UK
Nicola Waters	NW	Primrose Solar
Joe Duddy	JD	RES Group

Absences:

None

Appendix C

ER P28 Joint GCRP & DCRP Working Group

Meeting No.15

To be held at ENA, 6th Floor, Dean Bradley House, 52 Horseferry Road, London, SW1P 2AF

on Thursday, 26th January 2017, 10:30 – 15:30

Agenda

Fire Procedure

1.	Welcome, introductions, Competition Act Compliance	**GJE**	**10:30**
2.	Address by the Chair	**GJE**	
3.	Update/actions from last meeting	**GJE/ALL**	
4.	**Review Comments/Responses on Draft_v2 of P28 Issue 2**	**GJE/ALL**	
5.	**Summarise Outstanding Technical Issues**	**GJE/ALL**	
6.	Terms of Reference (ToR)	**GJE/ALL**	
7.	Status of Phase 3 Revision	**GJE/ALL**	
8.	Project plan	**GJE**	
9.	General management/administration • On-line repository requirements • Consultation process • Support requirements	**GJE**	
10.	AOB	**ALL**	
11.	Future meetings • Dates • Agenda items		**15:30**

Lunch will be provided at 12:30.

For location of venue and map visit:
http://www.energynetworks.org/info/find-us/map.html

Please advise any special access and/or dietary requirements as soon as possible to:
michelle.chambers@threepwoodconsulting.com

Appendix D

ER P28 Joint GCRP & DCRP Working Group Meeting No.15

Updated Paper 15_5 with WG Comments

<Insert file P28 WG_Meeting Minutes and Actions_26.01.17_Draft_v1_Appendix D>