

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

3rd March 2016

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

1. Welcome, Introductions

GE welcomed everybody to the eighth 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_8_1_Agenda_P28 WG_Meeting 8_03.03.16_v0.1]

[Document Reference: Presentation_P28 WG_Meeting 8_03.03.16_v2]

In addition to the standard agenda items the purpose of the meeting was threefold:

- Review status of the Phase 2 Review Report (section 5)
- Review sub-WG progress (section 6)
- Review Papers and Proposals from the WG (section 7)

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 without amendment.

[Document Reference: P28 WG_Paper_8_2_P28 Meeting Minutes and Actions_12.01.16_v1_Issued]

ACTION 8.1: Publish the approved minutes from P28 meeting no.7 12.01.16 on the DCode website. (GE)

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

[Document Reference: P28 WG_Paper_8_4_Update P28 Meeting Minutes and Actions]

GE noted the actions highlighted in green had been completed and those in amber required further discussion before marking them as complete as listed below:

Action	Who	Description	Outcome
7.3	All	Discussed how customer verifies source impedance is less than the reference test impedance used for tests in the relevant BS EN 61000 series of Standards.	<ul style="list-style-type: none">• P28 Issue 2 Stage 1 process will need to specify how source impedance is determined as part of a conditional connection process.• Agreement that Stage 1 should remain a simple assessment that does not

		WPD stated this was addressed in their design process given different source impedance values are used. Discussed extension of Stage 1 concept to voltage levels other than LV. Assessment under Stage 1 could be based on a simple ratio of demand/generation power to system fault level	require system/network operator intervention <ul style="list-style-type: none"> Agreement that Stage 1 could be extended to voltage levels other than LV subject to agreement on detailed proposal
7.9	GE	ToR for sub-WGs have been revised and circulated	Confirmed complete in meeting
7.14	PTh	Not possible to obtain wind turbine flicker data from contact at West Coast Energy	Agreed action complete and can be removed
7.15	GE/DV	Consider different technologies and how to treat them in the Phase 2 Report (e.g. equipment with different alpha values)	GE/DV to prepare a Paper for submission to the WG
ACTION 8.1a: Prepare a Paper on application of alpha values to new technologies (GE/DV)			
7.18	PTh	Obtain the latest developments on connections by EV manufacturers	Agreed any additional information on flicker from EVs would be beneficial and this area should be monitored. PTh to obtain information from Nick Yenkin at ENGIE
7.22	FG	Circulate IEC standard containing the definition of voltage in a steady state condition	<ul style="list-style-type: none"> Email with relevant definition received from FG GE to circulate to WG
7.23	RB	Define steady state characteristics for step voltage change for P28 WG to review	Agreed would be discussed under section 6 of the agenda
7.25	KL / FG / PTh	Circulate data referenced in the meeting to assist the Measurements & Specific Applications sub-WG	<ul style="list-style-type: none"> Flicker data for some 65 sites had been collated by KL [Document Reference: P28 WG_Paper_8_19_P28 review group flicker at sites without site names] PTh to upload data for recently commissioned wind farms
ACTION 8.2: Upload flicker data for various wind farm connections and provide analysis (PTh)			
7.28	All	Obtain information on the different allocation methodologies that other countries use and forward to DV/GE	<ul style="list-style-type: none"> Information obtained by GE included in P28 WG_Paper_8_9_P28 WG Justification for Allocation of Headroom_v1 DC agreed to follow up responses from Eurelectric colleagues

			<ul style="list-style-type: none"> • See Action 4.12 • Agreed action completed within meeting
7.29	PTh	Measurement & Specific Applications sub-WG to consider problem with defining flicker & harmonics when not in generating conditions	<ul style="list-style-type: none"> • Outstanding

4. **Terms of Reference (ToR)**

[Document Reference: P28 WG_Paper_8_3_ER P28 WG_ToR_v2.2_Issued]

GE and JD held a teleconference call with the Secretaries of the DCRP and GCRP on the 23rd February 2016 at which the questions/clarifications previously raised by the RVC sub-WG were tabled (see Item 4 of the P28 Meeting Minutes and Actions from the 12th January 2016).

The outcome from the teleconference call was as follows:

- GE to submit a Paper summarising the questions/clarifications being sought on behalf of the P28 WG for submission ahead of the next DCRP meeting on the 10th March 2016
- David Spillett (Secretary of the DCRP) to brief the Chair of the DCRP and ask whether he would present an update on the Paper and discussions from the DCRP at the next GCRP meeting
- Subject to the outcome from the GCRP meeting, GE to amend the Paper for submission to the GCRP

GE advised that, on behalf of the P28 Working Group, a draft Paper had been prepared and was submitted to the Secretary of the DCRP on the 24th February [Document Reference: P28 WG_Paper_8_13_DCRP Paper xx_P28 ToR_v0.1].

FG commented that National Grid would like recommendations for RVC being developed in P28 Issue 2 to be applicable to network operators. FG expressed National Grid's view that limits for voltage fluctuation in the network need to be specified and maintained by network operators and that users (customers and network operators) should be treated the same.

SSc expressed caution about applying any limits on network operators and that care must be taken to properly distinguish between limits used for planning networks and connections as opposed to limits for operation of networks. Network operators are governed by operational voltage characteristics expressed in BS EN 50160.

DV agreed that P28 should be a planning standard to govern connection of new disturbing loads/generation and that it would not be appropriate for recommendations to be collectively applied to network operators.

SSc tabled a number of comments on P28 WG_Paper_8_13, which are summarised below:

- References to limits applying to operation [of networks] should be removed; the scope of P28 is planning
- The Paper should reference ER P29 and ER G5, which are similar power quality standards that apply to customer connections
- The difference between Compatibility Levels and Planning Levels needs to be made and how these limits apply, or not, to network operators

ACTION 8.3: Forward comments on draft DCRP Paper (SSc)

ACTION 8.4: Address comments on draft DCRP and resubmit to David Spillett

GE provided an update on P28 WG membership matters [Document Reference: slide 9 in Presentation_P28 WG_Meeting 8_08.03.16_v2]. In summary:

- The DCRP & GCRP approved recent changes in membership of the P28 WG
- MH is happy to continue to cover solar (PV) aspects following his new employment
- Invitations for nominations of membership have been sent to the following:
 - Solar Trade Association
 - Celsa Steel UK
 - British Oxygen
 - Saint-Gobain PAM
 - Major Energy Users Council
- a planning connection document that only applies to new connections (Network Users)

5. Status of Phase 2 Review Report for ER P28 – Recommendations for Revision

GE advised that the Final_v3 version of the Phase 2 Review Report for ER P28 – Recommendations for Revision [Document Reference: P28 WG_Paper_8_11_ENA_EREC_P28_Ph2_Report_Issue 1_Final_v3_Issued_Clean] was submitted to the Secretaries of the DCRP and GCRP on the 9th February. No comments have been received to date.

The WG discussed the need to record the background and justifications for proposed changes in P28 Issue 2. It was agreed that a technical report containing the detailed background to the revision of P28 Issue 2 would be beneficial. In the meantime GE will ensure that changes and justifications are captured in a Phase 3 report, which could ultimately be adapted to become an ENA Technical Report.

ACTION 8.4a: Raise requirement for a technical report to support P28 Issue 2 with the Secretary of the DCRP (GE)

6. Reports from sub-WGs

6.1 Flicker Assessment & Limits sub-WG

DV presented an update on the progress made by the Flicker Assessment & Limits sub-WG [Document ref: slides 13 to 23 in Presentation_P28 WG_Meeting 8_03.03.16_v2]

The current thoughts of the sub-WG were as follows:

- Flicker compatibility levels

- Pst=1 remains the compatibility level and the planning level for LV systems (Plt=0.8)
- The planning level at higher voltages could be lower to allow for flicker transfer between voltage levels
- Existing limits
 - Greater understanding of the basis for setting limits for Plt is required

ACTION 8.5: Email DV notes on product standards referenced in previous SSc paper (SSc)

- The use of typical transfer coefficients between different voltage levels would facilitate permissible levels of flicker at all voltage levels
- For planning purposes the Pst limit should be strictly complied with but emissions could be assessed based on the 95th percentile of measurements; there is an option of using the 99th percentile but with Plt limits increased
- Measurements would be based on a minimum of 1 week but could be greater for specific circumstances - detail about interpretation of data is required
- Planning levels
 - Further work is required to understand the basis for setting Plt limits and why a Plt limit is not specified for the current Stage 2 assessment
 - Consultation with other sub-WGs and data/measurements to support the change will be required before recommending any changes to planning levels
- Assessment procedure
 - Stage 1 should be retained as a simplified assessment, which does not require the intervention of the system/network operator
 - Stage 1 could apply to MV equipment and installations based on the size of the installation and the fault level
 - Stage 2 would principally remain the same but that different emission limits would apply at different voltage levels - to be discussed further
 - Stage 3 is still open for discussion but that connections that fail Stage 1 and Stage 2 would be assessed under this stage based on specific evaluation of the flicker emission and the conditions in the network
- Exchange of information
 - Some guidance on exchange of information between the system/network operator and connectees should be included in P28 Issue 2
- Assessment methods
 - Detail assessment procedures shouldn't be included, unless necessary. Reference should be made to Standards for this detail, where appropriate
 - Allowance will need to take into account new software tools that offer flickermeter as a function
 - Impedances in Appendix D should be removed

With respect to questions posed from the sub-WG by DV the following discussion took place within the P28 WG.

- There is a difference between the flicker curve (Pst = 0.5) in P28 Issue 1 and BS EN 61000-3-7, particularly at lower frequencies of change. The reason for the difference needs to be understood before any change is made
- Clear justification to change flicker emission limits is required - is there any evidence why the current limits are not working?
- Members were encouraged to submit any information (change in Standards, change in legislation, difficulty in application, unfair access etc.) and/or evidence to the Flicker Assessment & Limits sub-WG regarding why existing limits are not adequate

- Information from system/network operators regarding any evidence of flicker complaints of difficult in connecting new customers because of existing limits
- The WG agreed to consider the differences between the flicker curves for Pst=0.5 in Figure 4 of P28 Issue 1 and IEC Standards. The IEC Standards do not cover a period between voltage changes of less than 1 s whereas Figure 4 of P28 Issue 1 does. The WG believed the lower period between voltage changes shown in Figure 4 of P28 was correct

ACTION 8.6: Provide Flicker sub-WG with original ENA ERs including ACE 7 referred to in P28 Issue 1 (GE)

ACTION 8.7: Advise what measurement data/analysis is required from Network Operators to support recommendations from Flicker sub-WG and email ENA PQ&EMC Group

ACTION 8.8: Provide DV with information on Flickermeter measurement flagging concept and recommendations for measurement probability and periods (FG)

ACTION 8.9: Provide copy of IEC 61000-4-15 to Measurements sub-WG (GE)

ACTION 8.10: PQ&EMC Group to advise what data/analysis can be provided by Network Operators in response to Item 8.7 (DC)

6.2 Voltage Step Change sub-WG

SM presented an update on the progress made by the Voltage Step Change sub-WG [Document ref: P28 WG_Paper_8_18 160226 - Voltage Step Change - for Discussion in M3 JPD20160229]

A summary of the issues raised by the sub-WG and discussion in the meeting were as follows.

- The relevance of voltage step change was discussed. Existing P28 does not clearly differentiate between voltage step change and RVC
- Introducing a separate steady state voltage limit may cause ambiguity and overlap with the characteristic and limits defined by the RVC sub-WG
- Two approaches to defining the steady state voltage characteristic are time based and rate of change. It is not clear whether the time based definition should consider a 2 s or 5 s period? Rate of change definition is more complex and will require more work
Are the P28 WG comfortable with a time dependent definition?
- What happens if $dv/dt > 0.5\%$ after 2 s - does the 2 s rule still apply?
- The sub-WG raised the query whether the Pst=1 value is absolute or represents a 95th percentile. DV understood this was an absolute value but 95th percentile would apply to measurements

FG agreed to check the definition of voltage in a steady state condition in IEC standard 61000-4-30 (note: it was thought to be 0.5% voltage change within 1 second (FG)).

ACTION 8.14: Circulate Paper and definition of steady state voltage to P28 WG provided by FG (GE)

It was agreed for the Chairs of the Voltage Step Change sub-WG and the RVC sub-WG to consider whether voltage step change and steady state voltage characteristic and limits will be defined in the RVC proposals.

6.3 Rapid Voltage Change sub-WG

MH presented a summary of progress to date:

[Document Reference: P28 WG_Paper_8_21_P28 RVC sub-WG]

- The reasons for introducing RVC limits in P28 and decoupling from flicker were outlined mainly being harmonisation with International/European Standards and the Grid Code
 - The P28 WG agreed with the reasons for decoupling RVC from flicker in the revised P28.
- Conditions and parameters for assessing infrequent switching events against RVC limits were outlined including minimum fault levels, pre-event voltages and remanence.
 - Minimum fault levels were intended to be compatible with the SQSS and ENA ER P2
 - There was agreement to consider the nominal voltages pre-energisation of transformers
 - It was noted that remanence of 0.5 as opposed to 0.8 has been chosen. PTh commented that he had data from commissioning a recent wind farm that supported this change
 - Customers should consider the worst case energisation condition (i.e. 90° out-of-phase) and the effects of sympathetic inrush
- The limits are intended to apply to switching during commissioning, maintenance and post fault
- The voltage and time envelope for an infrequent event (see slide 4 of the document reference) a regular infrequent event (see slide 6 of the document reference) and a frequent event (see slide 8 of the document reference) were tabled
 - MH confirmed that the envelopes were universal for all voltage levels
 - MH confirmed that for a regular infrequent event 4 dips within a 2 hour window were allowed
 - MH confirmed that the limits applied to the phase with the worst case voltage dip
 - The impact of distributed generation < 50 MW in voltage control mode on the maximum 12% voltage dip for 100 ms was discussed
 - A frequent event has been chosen to be one event every 10 minutes based on the Pst=0.5 curve
 - The decision as to whether the limits apply to line voltage or phase voltage should be consistent with relevant measurement standards

PTh discussed the applicability of the number of permitted occurrences for wind farm connections, where there are never more than 2 wind farm connections based on compliance with a Pst=0.5 limit. The proposed RVC envelopes and occurrences may require further consideration to ensure typical wind farm arrangements of transformers can be energised without too much difficulty.

ACTION 8.11: RVC sub-WG to consider limits for voltage swell (FG/MH)

ACTION 8.12: Amend proposals from RVC sub-WG to provide clarity on limits for 'energisation 4 times per month', whether voltages are line voltage or phase voltages etc. (MH)

6.4 Measurements & Specific Applications sub-WG

KL presented a summary of mean average Pst and Plt measurements (95% probability values) obtained from 60 sites, over a 1 week period in February 2016, covering Merseyside and North Wales and Scotland. The sites were grid (33 kV) and primary (11 kV) substations with a variety of background levels.

[Document Reference: P28 WG_Paper_8_19_P28 review group flicker at sites without site names and slide 25 in Presentation_P28 WG_Meeting 8_03.03.16_v2]

In summary:

- It would appear that solar farms increase flicker levels slightly (only 33 kV connected data available)
- Wind farms appear to cause very marginal (arguably insignificant) increases at 33 kV
- It is important to note that this is only a relatively small sample of flicker data
- Unfortunately, no fault level data was readily available
- Raw data is available, if required

The WG agreed that additional data from 11 kV sites would be useful in understanding typical flicker background levels.

ACTION 8.13: Provide SPEN flicker data for 11 kV sites (KL)

DV asked whether there was any data for 132 kV? FG has previously provided flicker values for 132 kV, 275 kV & 400 kV - grouped by geographical area – up to 100 sites

ACTION 8.13a: Circulate flicker values for 132 kV, 275 kV & 400 kV sites previously provided by National Grid (GE)

PTh stated his recent experience of observing slight increases in flicker emissions for wind turbines with asynchronous generators (measured over 1 week based on 95% probability values). PTh agreed to provide the P28 WG 'before' and 'after' measurements for comparison.

FG asked whether the Pst and Plt values at which complaints were triggered maximum values? KL confirmed the comments were based on empirical evidence.

MH commented that the results for 33 kV solar farms appeared to be higher than for windfarms, which is unexpected given that calculation of flicker emission for solar is based on those carried out for wind turbines. MH expressed concerns that this difference may be due to the unsuitability of applying wind turbine calculation methods for solar. It was agreed that further data and analysis in the area was required to draw firm conclusions.

6.5 Drafting sub-WG

GJE presented a summary of progress made by the Drafting sub-WG [Document Reference: slide 26 in Presentation_P28 WG_Meeting 8_03.03.16_v2]

- Good progress has been made with general non-technical aspects
 - Foreword and Introduction drafted
 - Scope and Normative References drafted
 - Section 3 Terms & Definitions outline developed
- Technical aspects
 - Section 4 'Basic EMC Concepts' drafted

- Section 5 'Compatibility & Planning Levels' – general requirements being developed
- Section 6 'Assessment' – general requirements being drafted; Stage 1 recommendations part drafted – based on LV product Standards
- No progress to date on Measurements or Specific Applications

In general, there was agreement that the principles of the Stage 1 assessment, not requiring assessment by the system/network operator, should be retained in P28 Issue 2.

DV asked the P28 WG whether they could provide any relevant references, papers and supporting information to support Flicker sub-WG work on flicker assessment and limits.

ACTION 8.15: Provide any relevant references, papers and supporting information to support Flicker sub-WG work (All)

7. Review Papers and Proposals from WG

Compatibility Levels

GE presented a summary of Paper 8_6 and summarised the current understanding with respect to specifying compatibility levels.

[Document reference: P28 WG_Paper_8_6_Compatibility Levels]

The anomaly that the compatibility level of Pst=1 at LV is the same as equipment immunity levels was discussed. It was agreed that it would be in appropriate to deviate from BS EN 61000 series concerning LV compatibility levels.

The fact that compatibility levels can be generally better defined for RVC than flicker was discussed.

There was no objection to including the concept of compatibility levels in the draft of P28 Issue 2.

Multiple Installations

GE presented a summary of Paper 8_8 and summarised the current understanding with respect to multiple installations.

[Document reference: P28 WG_Paper_8_8_Multiple Installations]

In summary:

- The term "multiple installation" is not specifically defined in IEC EMC Standards
- The term "fluctuating installation" is defined and means the customer's installation (fluctuating and non-fluctuating parts) connected to the network
- It can be inferred from IEC TR 61000-3-11 that "multiple installations" relate to the cumulative effects of similar high power electrical equipment but that are installed in different individual fluctuating installations

No other comments were noted.

Network Code Impacts

GE presented a summary of Paper 8_7 and summarised the voltage fluctuation aspects in Requirements for Grid Connection of Generators (RfG) and Requirements for Demand Connection Code (DCC).

[Document Reference: slides 30-32 in Presentation_P28 WG_Meeting 8_08.03.16_v2]

In summary:

- A review of the RfG suggests no references to voltage fluctuation, flicker, EMC, IEC 61000 or power quality requirements and no material impact on ER P28 has been identified
- The Final Draft of the DCC (16 October 2015) contains the main technical rules and requirements concerning connection of new demand and distribution networks
- Article 20 of the DCC governs power quality and:
 - directly applies to new transmission connections; not existing
 - does not directly impact distribution network connections (new or existing)
 - requirements apply to disturbance at the PCC not to exceed levels allocated by TSO; implies some allocation of emission?
 - states the need for co-ordination between TSOs
- Clause 3.6 of the DCC Implementation Guidelines addresses implementation of power quality aspects; the following aspects are relevant
 - Requires TSOs to define standard of power quality for demand facility of distribution network to meet at their connection point
 - References IEC 61000-3-6, 3-7 and 3-13
 - Also references ER G5/4 and ER P28
 - Requires future network characteristics to be accounted for over the life of the plant and equipment
 - Recognises impact of type of demand and equipment technology but does not recommend adjustment for variety of technologies
 - Requires co-ordination so emission levels are below standards set by networks and users

No other comments were noted.

Justification for Allocation of Headroom

GE presented a summary of Paper 8_9 and summarised the key conclusions.

[Document reference: P28 WG_Paper_8_9_P28 WG Justification for Allocation of Headroom_v1]

In summary:

- The following arguments would appear to justify a change from the current 'first come first served' policy in ER P28 Issue 1 to an allocation of emission limits using available headroom
 - The 'first come first served' policy is 'out-of-kilter' with the allocation approach advocated in IEC Standards on power quality
 - It is considerably less likely that flicker planning levels will be exceeded and associated voltage complaints will arise by adopting the allocation method. Fewer voltage complaints and investigations has a positive regulatory impact and commercial impact for network operators

- There is a risk (albeit small) that the current policy may not prevent planning levels being exceeded more often in the near future given increasing connection of new technology that can cause flicker and multiple installations of potentially disturbing loads. A key justification for moving to the allocation method will be if there is a realistic prospect that on-going connection of new technologies and multiple installations will result in background flicker levels increasing
- Similarly, retaining the current policy in ER P28 Issue 2 would be different to the allocation approach being advocated in the latest revision of ER G5/5 [3]. There are similarities and some justification for aligning the principles and approaches of both documents, so far as is possible
- Although the current policy in P28 sets emission limits these are not in proportion to the connectees size; there is no inbuilt incentive to minimise flicker emission
- The following arguments would appear to support a decision to retain the current policy of 'first come first served'.
 - There is no compelling evidence to date that shows there are significant issues with the current 'first come first served policy' in practice; the application of the allocation method would appear to be a solution looking for a problem that doesn't exist
 - Experience in other countries that have adopted the allocation method in PD IEC/TR 61000-3-7 [2] suggests there are complexities and problems with applying it in practice, particularly to existing networks, and that a modified approach based on measurement of flicker background levels and allocation based on available headroom is required to address the short comings
 - The allocation approach appears to have been taken up more in relation to transmission system operators than for distribution network operators, where there are a greater number of connections
 - There are fairness arguments for both methods and it would be incorrect to say that the current 'first come first served' method could be considered to be overwhelmingly unfair. There is not a compelling case to move to the allocation method on the grounds of fairness
 - A move to an allocation method will be more complex technically and marginally more expensive commercially given that it will require more information and consideration for network operators and connectees than at present
 - There is a risk that, given the changing capacity of distribution networks due to distributed/small scale embedded generation, some flicker emissions may be unfairly constrained given there is no guarantee that remaining flicker headroom will be used in future or that system capacity will not be increased in the future. Connectees, who exceed their flicker allocation, could be paying for flicker mitigation even though flicker levels may never actually be exceeded in future. I.E. Customers may be paying for mitigation that would not otherwise be required if we retained the 'first come first served' policy

A summary of comments received from JD on Paper 8_9 were presented by GE [Document Reference: slide 34 in Presentation_P28 WG_Meeting 8_08.03.16_v2]]

There was a comment that allocation of rights could be applicable to those instances where proposed connections at the same location are being assessed concurrently.

Due to time constraints there was insufficient time to finalise discussions on the key findings (see Action: 8.18).

Information on Stage 2 & 3 Assessments

GE briefly presented a summary of responses received from system/network operators in relation to voltage fluctuations and assessments under ENA P28 Issue 1

[Document Reference: slide 35 in Presentation_P28 WG_Meeting 8_08.03.16_v2]]

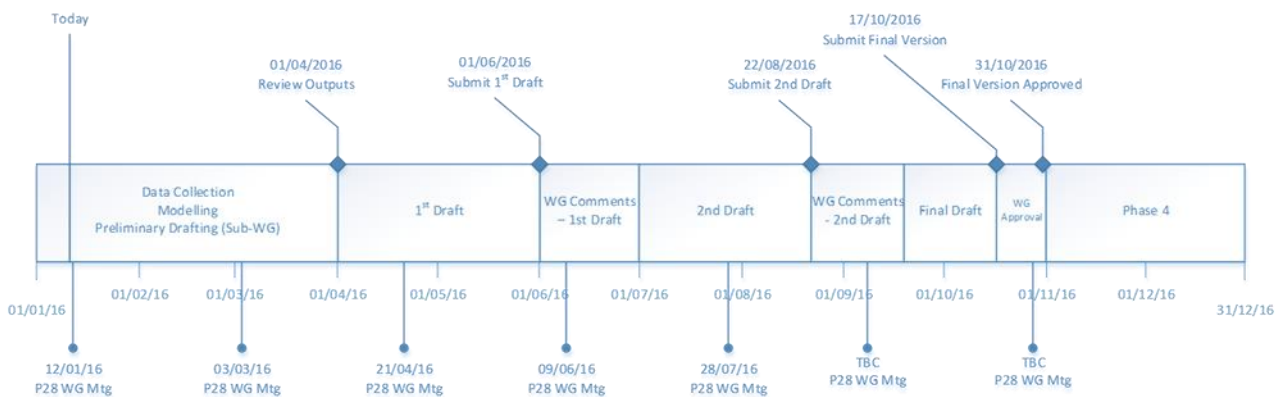
In summary data had been received from 2 network operators, which indicates zero Stage 3 assessments carried out over the last three years (2013 - 2015 inclusive). The data received to date suggests:

- A very low incidence of investigations related to flicker complaints
- No investigations carried out were attributable to planning levels being exceeded due to high flicker background levels (i.e. lack of headroom available)
- In each case only one investigation was attributable to planning levels being exceeded because of higher than permitted emissions from a single customer

8. Project Plan

[Document reference: P28 WG_Paper_7_6_ENA_EREC_P28_Ph3_Project Plan_v0.1]

GE presented the Phase 3 Revision Project Plan. No changes had been made since the last meeting. The P28 WG agreed Phase 3 was still running to plan.



- The deadline for the data collection, modelling and preliminary drafting of the sub-WG outputs is 1st April 2016
- The final version of the Phase 3 Revision document should be approved by P28 WG 31st October 2016
- The final Phase 4 Acceptance & Adoption is due to commence thereafter

9. General Management/Administration

Arrangements for general management and administration had not changed since the previous meeting. The secure access area on the ENA website is operational. GE had issued the link and login details.

9.1 On-line Repository Requirements

- Public access
 - Hosted by ENA on the DCRP website
 - Administered on behalf of the WG by the ENA Secretariat
 - Access to all approved outputs from WG (see <http://www.dcode.org.uk/areas-of-work/>)

- Working Group secure access
 - Hosted by ENA on their website
 - Click on ER P28 Working Group
 - Enter Username and Password supplied
 - If there are any problems accessing files let GE know

GE confirmed the ENA Secretariat had uploaded all WG papers to the new P28 area on the ENA website.

Due to time constraints the following two sections 9.2 and 9.3 were omitted from the meeting as nothing had changed since the last meeting.

9.2 Consultation Process

The following governance processes that need to be complied with are summarised below.

- Current References
 - DCRP Constitution and Rules - Standard Procedure 1
 - Electricity Networks and Futures Group (ENFG) Document Review/Approval Process (v3 Revision November 2013)
- Proposed Processes
 - Interfaces with Working Group now incorporated into revised ENFG Document Review/Approval Process
 - No initial public consultation proposed for development of ER P28 revision
 - Regulatory authorities, trade associations and IET will be given early opportunity to comment of draft P28 revision
 - Working Group will draft consultation paper for agreement by the GCRP and DCRP
 - Public consultation will only take place following acceptance of the modifications by the ENFG and joint agreement by the GCRP and DCRP

9.3 Support Requirements

The following support requirements are being provided:

- Provided by ENA Secretariat
 - Organisation and facilitation of WG meetings
 - Preparation of meeting agendas
 - Taking and distributing meeting minutes/actions
 - Preparation of briefing papers and documents
 - Preparation and distribution of WG reports and documentation
 - Collation of incoming data and responses
- Provided by Working Group Members
 - Preparation of papers
 - Response to papers
 - Specialist technical support
 - Incoming/field data

There were no other support requirements identified.

10. AOB

MH requested invitations to future P28 WG meetings be resent to him by email.

ACTION 8.16: Resend invitations for future P28 WG meetings to MH (MJC)

The WG agreed it would be helpful if GE circulated the latest draft of EREC P28 Issue 2 for information only.

ACTION 8.17: Circulate latest draft of EREC P28 Issue 2 (GE)

GE asked the WG to provide their comments on Paper 8_9 and to indicate whether they support:

- 1) retaining current 'first come first served' approach or
- 2) adopting an allocation method approach or
- 3) a hybrid approach

JD provided feedback on P28 WG_Paper_8_9 on 26/2/16 including several comments on the summary and the body of the report proposing potential improvements and areas for further investigation.

ACTION 8.18: Provide comments on P28 WG_Paper_8_9 and indicate whether you support: 1) retaining current 'first come first served' approach or 2) adopting an allocation method approach or 3) a hybrid approach (All)

11. Date and Venue for Future Meetings

The following dates have been proposed for future meetings:

- 3rd March 2016
- 21st April 2016
- 9th June 2016
- 28th July 2016
- **8th September 2016**
- **27th October 2016**

The WG did not express any objection to the dates proposed for the P28 WG meetings in September and October 2016.

The venue for P28 WG meetings in 2016 is:
Energy Networks Association, 6th Floor Dean Bradley House, 52 Horseferry Road,
London SW1P 2AF

Appendix A

ER P28 Joint GCRP & DCRP Working Group Meeting No.8

Summary of Actions from Current Meeting

Item	Action	Who	Due by
8.1	Publish the approved minutes P28 meeting no.7 12.01.16 on the DCode website	GE	
8.2	Upload flicker data for various wind farm connections and provide analysis	PTH	
8.3	Forward comments on draft DCRP Paper	SSc	
8.4	Address comments on draft DCRP and resubmit to David Spillett	GJE	
8.5	Email DV notes on product standards referenced in previous SSc paper	SSc	
8.6	Provide Flicker sub-WG with original ENA ERs including ACE 7 referred to in P28 Issue 1	GE	
8.7	Advise what measurement data/analysis is required from Network Operators to support recommendations from Flicker sub-WG and email ENA PQ&EMC Group	DV/ GJE	
8.8	Provide DV with information on Flickermeter measurement flagging concept and recommendations for measurement probability and periods	FG	
8.9	Provide copy of IEC 61000-4-15 to Measurements sub-WG	GE	
8.10	PQ&EMC Group to advise what data/analysis can be provided by Network Operators in response to Item 8.7	DC	
8.11	RVC sub-WG to consider limits for voltage swell	FG/MH	
8.12	Amend proposals from RVC sub-WG to provide clarity on limits for 'energisation 4 times per month', whether voltages are line voltage or phase voltages etc.	MH	
8.13	Provide SPEN flicker data for 11 kV sites	KL	
8.14	Circulate Paper and definition of steady state voltage to P28 WG provided by FG	GE	
8.15	Provide any relevant references, papers and supporting information to support Flicker sub-WG work	All	
8.16	Resend invitations for future P28 WG meetings to MH	MJC	
8.17	Circulate latest draft of EREC P28 Issue 2	GE	
8.18	Provide comments on P28 WG_Paper_8_9 and indicate whether you support: 1) retaining current 'first come first served' approach or 2) adopting an allocation method approach or 3) a hybrid approach	All	

Summary of Outstanding Actions from Previous Meetings

Item	Action	Who	Due by
7.3	WG members to advise justifications why existing Stage 1 Assessment is not acceptable	All	In Progress
7.15	Consider different technologies and how to treat them in the Phase 2 Report (e.g. equipment with different alpha values)	GE/DV	In Progress
7.18	Obtain the latest developments on connections by EV manufacturers	PTh	In Progress
7.28	Obtain information on the different allocation methodologies that other countries use and forward to DV/GE	All	In Progress
7.29	Measurement & Specific Applications sub-WG to consider problem with defining flicker & harmonics when not in generating conditions	PTh	In Progress
Item	Action	Who	Due by
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
7.1	Amend the meeting no.6 draft minutes: <ul style="list-style-type: none"> Page 3 PTh comment - reference fault level (FG) Page 6 penultimate bullet point change to "confirmed voltages were measured over one cycle refreshed at half cycle in accordance with BS EN 61000-4-30" (FG) 	GE	Complete
7.2	Subject to the agreed amendments publish the approved minutes P28 meeting no.6 04.11.15 on the DCode website Note: amend title from Draft to Approved	GE	Complete
7.4	Circulate the latest draft of 61000-3-11	DC	Complete
7.5	Circulate Flicker and New Lamps paper by Frank Deter, Miele	DC	Complete - Paper 8_10
7.6	Ask flicker specialist colleague about the status of Flickermeter and whether modern lighting has an impact	DV	Update from DV received. Check of IEC website shows no work in progress. Maintenance date is 2017
7.7	Circulate comments received on ToR v2.2 Issued	GE	See Paper_8_5

Item	Action	Who	Due by
7.8	Write to GCRP & DCRP identifying the issues raised in the revision of P28 along with WG proposals	GE	Complete - Email 08.02.16
7.9	Amend section 6 Communications & Meetings of sub-WG ToR and issue in line with amendment received from RB	GE	Complete
7.10	Write to the Solar Trade Association, Celsa Steel UK, British Oxygen, Saint-Gobain PAM, Major Energy Users Council regarding P28 membership opportunities	GE	Email sent to the REA and STA and MEUC and BOC and Celsa Steel
7.11	Circulate the comments received on the Phase 2 Review Report v2 from WPD, RES Group and NPG	GE	Complete
7.12	Consider whether compatibility levels should be defined <u>by</u> or <u>for</u> Networks Operators	GE	Complete - see Paper 8_6 by GJE
7.13	Review the latest Eurocode drafts for RfG & DCC and assess the impact on P28	GE	Complete - see Paper 8_7 by GJE
7.16	Clarify what is meant by multiple installations	GE	Complete - see Paper 8_8
7.17	Document impact of making changes to the Allocation of Rights including the technical, commercial and regulatory impact	GE/DV	Complete - see Paper 8_9
7.19	Liaise with Low Carbon Technology WG on EV developments	GE	Complete - see reponse from Jamie McWilliam
7.20	Accept existing changes to draft P28 report v2. Issue final draft v3 with tracked changes incorporating the latest comments received (see actions 7.12 – 7.19) for final comment, ahead of GCRP & DCRP approval	GE	Complete - see Paper 8_11
7.21	Review and comment on amendments only shown as track changes in final draft Phase 2 Review Report for ER P28 v3, within two weeks of report being issued Note: it was agreed no comments received will be taken as approved	All	Complete - Issued to the DCRP & GCRP on 09.02.16
7.22	Circulate IEC standard containing the definition of voltage in a steady state condition	FG	Complete
7.23	Define steady state characteristics for step voltage change for P28 WG to review	RB	Complete
7.24	Send P28 WG the Dropbox link for collecting data to assist the Measurements & Specific Applications sub-WG	GE	Complete

Item	Action	Who	Due by
7.25	Circulate data referenced in the meeting to assist the Measurements & Specific Applications sub-WG	KL / FG PTw	Complete
7.26	Update sub-WG membership list and transfer Flicker Headroom Allocation method to Flicker Assessment & Limits sub-WG	GE	Complete
7.27	Write to the Network Operators requesting data on the no. of Stage 3 Assessments carried out in the last 3 years and the levels of flicker before and after	GE	Complete - sent on the 19 th February
7.30	Give feedback on appropriate no. of occurrences considered for RVC	All	Complete
7.31	Advise P28 meeting dates for September and October 2016	GE	Propose 8th September and 27th October
4.12	Ask Eurelectric PQ WG about their knowledge of how other countries allocate rights	DC	Complete

Appendix B

ER P28 Joint GCRP & DCRP Working Group Meeting No.8

Attendance List

3rd March 2016 ENA Office, London

Attendees:

Name	Initials	Company
Roshan Bhattarai	RB	Northern Powergrid
Adrian Ellis	AE	SSE
Forooz Ghassemi	FG	National Grid
Mark Horrocks	MH	HVMS
Peter Johnston	PJ	NIE
Ken Lennon	KL	SP Energy Networks
Steve Mould	SM	UKPN
Simon Scarbro	SSc	WPD
Peter Thomas	PTH	Nordex
Peter Twomey	PTw	ENW
Davor Vujatovic	DV	VandA Engineering Services
Gary Eastwood	GE	Threepwood Consulting Ltd

Apologies:

Matthew Ball	MB	OFGEM
Joe Duddy	JD	RES Group
Gareth Evans	GE	OFGEM
Tony Headley	THe	BEAMA
Andrew Hood	AH	WPD
Mark Kilcullen	MK	Department of Energy & Climate Change
Sridhar Sahukari	SS	Energy UK
Kieran Coughlan	KC	ENA
David Crawley	DC	ENA
Michelle Chambers	MJC	Threepwood Consulting Ltd

Absences:

None		
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Appendix C

ER P28 Joint GCRP & DCRP Working Group Meeting No.8 Thursday 3rd March 2016, 10:30 – 15:30

Agenda

1.	Welcome, introductions	GJE	10:30
2.	Address by the Chair	GJE	
3.	Update/actions from last meeting	GJE/ALL	
4.	Terms of Reference (ToR)	GJE/ALL	
5.	Status on Phase 2 Review Report for ER P28 - Recommendations for Revision	GJE/ALL	
6.	Reports from sub-WGs <ul style="list-style-type: none">• Progress• Issues for discussion with Main WG	GJE/ALL	
7.	Review Papers and Proposals from WG	ALL	
8.	Project plan	GJE	
9.	General management/administration <ul style="list-style-type: none">• On-line repository requirements• Consultation process• Support requirements	GJE	
10.	AOB <ul style="list-style-type: none">• Update on membership	ALL	
11.	Future meetings <ul style="list-style-type: none">• Dates• Agenda items		15:30