

Summary of Meeting and Actions

Meeting Name	E3C Small Embedded Generation Frequency Obligations Working Group
Meeting No.	5
Date of Meeting	Thursday 9 th July 2009
Time	10:00am – 2:00pm
Venue	Conference Room 5, National Grid House, Warwick

This note outlines the key issues and actions from the fifth meeting of the E3C Small Embedded Generation Frequency Obligations Working Group.

1) Apologies for Absence

Apologies were received from Ham Hamzah (RWE), Barbara Vest (AEP) and Raj Nagarajan (National Grid– System Operator)

2) Previous Meetings

The minutes for meeting 4, held on the 4th June 2009, were discussed and amended as agreed. The updated version was circulated within the Working Group.

3) Overview of Key Issues

During Meeting 5, WH gave a presentation to the group covering a number of topics:

- Feedback on Technical Meeting with generating plant manufacturers
- Report on results of High Frequency Risk Survey with DNOs
- Review implications from the low frequency incident on existing plant
- Clarity of proposed Distribution Code and G59/2 Requirements

4) Outcome of Technical meeting

The objective of the technical meeting was to share NGET's system security concerns with the manufacturing industry regarding uncertainties of frequency operating range capability of generating plant in the Small Power Station category. The meeting was well represented by expertise on the subject (GE, Siemens, RR, Convertteam (was GEC Electrical Machines at Rugby), Cummins, ERA Cobham Technical Services, DEIF and Technical Committee member of AMPS (Association of Manufacturers of Power generating Systems)). The presentation by NGET, DNO and manufactures at the meeting were circulated to the WG members for information.

During the technical meeting, there were useful and constructive discussions on the subject and the outcome is summarised below:

- The industry has a better understanding of the System need for more robust performance of small embedded plant
- This impact of small embedded generation on Transmission System performance is becoming more significant and this problem is not restricted to GB but EU wide as reported by manufacturers and recent ERGEG consultation paper and drafting of the CENELEC document
- There was a general consensus from the manufacturers and consultants at the meeting that small generating plant should not have any major technical problems of meeting the frequency operating range as proposed in the Distribution Code
- For record, manufacturers were invited to complete a feedback form to indicate the frequency operating range capability of their plant with existing and future design and return to NGET

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The post meeting confirmation by manufacturers' feedback forms indicated that they have no major issues of meeting the proposed requirements. These were presented at the meeting and some members requested NGET to confirm with the manufacturers if some of the interpretations are correct.

Action: WH

The Working Group agreed there was a differentiation between the proposed protection settings that were included in the draft revision to the Distribution Code and the potential future requirements on small generator performance in the Distribution Code.

In summary, the representatives from the industry support and do not see any major technical issues on the proposed Distribution Code changes and appreciate the need for more resilient small embedded plant to mitigate risk on system security.

5) Unacceptable Risk posed by Existing Plant on High Frequency Excursions

The current setting of 50.5 Hz as specified by the G59/1 is considerably lower than the 52Hz required in the Grid Code for larger generating plant. The survey result confirmed over 6GW of embedded plant is expected to have high frequency protection setting at 50.5 Hz.

The impact of system security on disconnection of large volume of embedded generation at this frequency could drive the system frequency to below 48.8 Hz leading to unnecessary automatic demand disconnection. Depending on the volume disconnected, the system frequency could be further driven to lower frequency levels leading to major blackout or even total system collapse

Given the system security implications, the high frequency setting of 50.5 Hz on over 6 GW of plant is unacceptable. Rather than affecting all the stations, NGET accepts the risk posed by below 5 MW plant could be manageable, but settings on larger stations (aggregated volume of 4.5GW) are required to be raised to 52 Hz or at least 51.5 Hz.

6) Uncertainties posed by Existing Plant during Low Frequency Incidents

Despite the G59/1 setting recommendations of 47 Hz, the recent incident confirmed that there could be significant volumes of small embedded plant having more sensitive settings. Some of these were found to be at 49.5 or 49.0 Hz. These uncertainties make it difficult for NGET to manage the system in particular at the times of unexpected cascaded generation or infeed losses.

As the feedback from manufacturers confirmed that there should not be any major technical plant problems in meeting the 47.5 Hz or possibly the 47 Hz requirements, NGET suggested DNO companies to clarify the low frequency settings of stations connected to their networks are in line with either that of G59/5 or those being proposed in the Distribution Code.

7) Agreed Actions to Mitigate System Security Risk on Existing Embedded Plant

To reduce the system risk to manageable level, NGET requested DNOs as an urgency to contact their customers with plant at or above 5MW to

- Confirm their low and high frequency settings
- Request settings to be changed, if required to ensure their plant will not be disconnected from the network unless the system frequency is outside the range of 47.5 to 51.5 Hz or preferably 47 to 52 Hz.

Prior to DNOs contacting their affected customers, some members suggested NGET to report on the cost implications if the above risk is to be managed by operational means. This cost information will help to compare with the industry cost in changing the frequency settings on those affected stations.

Action: NGET

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NGET will also draft a generic letter for DNOs to send to their affected customers. This letter will be circulated to the WG members for comments.

Action: NGET

CM commented that before generators are asked to perform such changes an assessment should be made of the likely future frequency excursions and their probability in order to determine whether it is the efficient way forward. NGET to confirm the probability of such frequency excursions.

Action: NGET

8) Clarity on Distribution Code to meet NGET and DNOs requirements

The protection settings set out in the proposed Distribution Code is to safeguard the distribution network to avoid undetected islanding operation of embedded generation on safety and QoS reasons. For network protection, the plant must be disconnected from the network at those specified settings and should not remain connected if the system frequency moves outside this range..

However, given the significant impact of small embedded generation on system security, NGET's position is that this category of generation is required to remain connected with the network unless the frequency is outside the settings specified. This require plant to have the minimum capability of maintaining operation unless the frequency is beyond the settings recommended.

The above requirements from NGET and DNOs appear to be in conflict but WH indicated that there was a possible common ground. If all small embedded stations adhere to and ensure that protection operates at the settings set out in the proposed Distribution Code, both objectives will be meet.

This was agreed to be a way forward but there is a minor concern that when two or more sets of G59 frequency protection relays are adopted (e.g. one at the upstream DNO infeed and the other downstream to the local generation site), grading of these settings for protection discrimination purposes may be required. This could be an issue but can be resolved with appropriate wordings in the drafting of the Distribution Code and the associated G59/2 document and / or by adopting performance requirements that are slightly different than for those for the protection setting.

Some Working Group members would like to see the legal text drafting proposed for the Distribution Code. Since this is associated with the Distribution Code, NGET felt that it may be more appropriate to invite Working Group members to kick off the first draft. As there was no volunteer, NGET agreed to prepare the first draft and circulate it for comments.

Action: NGET

9) Next Meeting

It was agreed that the next meeting of the Working Group would be provisionally scheduled for 3rd September 2009.

The provisional dates for the future Working Group meetings are:

- 3rd September 2009
- 19th October 2009

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Appendix 1 – Working Group Attendance

Members Present:

Mark Perry	MP	Working Group Chairperson
William Hung	WH	National Grid
Kabir Ali	KA	National Grid
Alan Creighton	AC	CE Electric UK
Hamish Dallachy	HD	Scottish Power
Dan Randles	DR	Electricity North West
Paul Newton	PN	E.ON
Andy Hood	AH	Western Power Networks
Keith Hodson	HH	Central Networks
Claire Maxim	CM	E.ON UK
Tom Ireland	TI	Observer (National Grid)
Bridget Morgan	BM	Ofgem
Apologies:		
Ham Hamzah	KH	RWE
Raj Nagarajan	RN	National Grid (System Operator)
Barbara Vest	BV	AEP