

Grid Code Generic Provisions Working Group

Notes of 4th meeting held at Brandon Hall, Coventry
21 February 2003

Attendance

Present

<u>Name</u>		<u>Company</u>
David Payne	(DP)	National Grid (Chairman)
Nasser Tleis	(NT)	National Grid
Steve Mortimer	(SM)	National Grid
Mark Horley	(MH)	National Grid
Mike Thorne	(MT)	National Grid
Peter Lang	(PL)	Seeboard
Ham Hamza	(HH)	Innogy
Dave Ward	(DW)	Magnox
John France	(JF)	Powergen
Paul Newton	(PN)	PowerTech
John Morris	(JM)	British Energy
Charlie Zhang	(CZ)	London Power Company
James Glennie	(JG)	BWEA
Hamish Dallachy	(HD)	Scottish Power
Elaine Grieg	(EG)	AMEC
Bridget Morgan	(BM)	Ofgem (Observer)

Apologies for Absence

John Norbury	(JN)	Innogy
Francois Boulet	(FB)	RTE

Minutes Of Last Meeting

1. BM pointed out that paragraph 12 should state that Guy Nicholson had offered to collate view. With this small correction the minutes of the last meeting were agreed as correct.

Actions From Last Meeting

2. Action 3/1. A revised draft of Connection Condition requirements had been circulated for discussion at this meeting.
3. Action 3/2. MH reported that National Grid had reviewed their calculations of equivalent HV power factors and had revised their proposals accordingly. Because the data used was supplied by Users to National Grid under the Grid Code and site specific the information was not circulated. JF commented that actual HV reactive capabilities are quoted in the Seven Year Statement.
4. Action 3/3. A link to the Reactive Power Working Group Report had been circulated.

5. Action 3/4. Comments on the proposed Definitions and Connection Conditions had been received from four members of the Generic Provisions Working Group.
6. Action 3/5. Views on other areas of the Grid Code requiring modification had been received from one member of the Generic Provisions Working Group.
7. HH and JG both commented that the circulation of documents from National Grid had been too late to allow proper consideration prior to the meeting. DP apologised on behalf of National Grid.
8. CZ asked about licence exemption in relation to the Grid Code conditions. NT replied that licence exempted generation did not have to meet the Grid Code requirements but, following the recent DTI meeting, would be subject to a separate “bilateral” agreement between the generator and National Grid as a temporary arrangement until the Distribution Code is modified by DNO’s via the DCRP. After that, no bilateral agreement with National Grid would be required. JG disagreed with NT on technical requirements being in a “bilateral” agreement however BM supported NT’s understanding of the DTI position.
9. DW asked about potential difference in treatment between embedded and directly connected generation. NT responded that National Grid wished to avoid undue discrimination by treating both similarly.
10. JG and HH believed that some of the requirements could not be met with the technology currently being offered commercially. HH suggested that some of the requirements might need to have a staged introduction. NT suggested that discussions should focus on the specific issues raised by the proposed connection conditions to identify current capability shortfalls. NT agreed that if current technology could not provide the service then staged introduction might be appropriate. NT asked that GPWG members suggest clause introduction dates where appropriate.

Action 4/1- All

11. JG suggested the use of an independent engineer, agreeable to both National Grid and BWEA, who could independently assess the need for the requirements as proposed. NT responded that considerable effort had already been made in meeting manufacturers so repeating the process would not be an efficient use of resources.
12. JG asked National Grid to supply a list of names of those who National Grid had been in discussion with at the various manufacturers. NT pointed out that JG could contact the manufacturers directly in order to discover the content of discussions with National Grid since National Grid was bound by confidentiality agreements with manufacturers. After discussing the confidentiality that National Grid had agreed with the manufacturers to protect their product design, National Grid agreed to contact the manufacturers to request permission to release the names to British Wind Energy Association.

Action 4/2 - NT

Changed Proposed Connection Conditions And Definitions

13. DP thanked all the Generic Provisions Working Group members who had provided comments on the Connection Conditions and Definitions. National Grid had responded to each point raised and had made some amendments to the proposals.

14. MH took the meeting through the revised Connection Conditions and Definitions proposals. A lively discussion ensued and all GPWG members were asked to respond to National Grid with their considered views by **7 March 2003**.

Action 4/3 - All

15. During the discussion the following points were noted.

Definitions

16. The use of “Intermittent” in Intermittent Power Source was probably not the most appropriate phrase.
17. The concept of a **Power Park Module** was generally accepted however some changes to the definition were suggested along the lines of:

*A number of small generating devices joined together by a **System** having a single electrical point of connection to the **NGC Transmission System** (or **User System** if **Embedded**).*

Reactive Capability

18. Existing requirements for synchronous machines had been retained following comments received from proposals tabled at last meeting.
19. Of the three suggestions discussed for Non-synchronous generation the third option generated the most debate. Some group members were more comfortable with option 2 as it specified a range albeit the range may need further development. EG expressed concern that option 2 was not site specific and there was the possibility that capability would be designed in and never used in some instances. DW remarked that from his experience the reactive power despatched from a power station could change considerably as the generation background altered. CZ expressed support for Option 3 stating that he felt it was a reasonable development from current practice for non-synchronous units and may be practically achievable for most technologies subject to realistic and fair determination of the envelope.
20. DW noted that developers would need to know the minimum fault levels in order to design for voltage step changes. DW noted that in practice there was a certain amount of latitude in Mvars dispatched at the HV and in fact a synchronous machine could not operate at all points across the range due to the discrete nature of tap-changers.
21. Following questions from DW and PN, NT drew attention to the “At all times” requirement. This implies transient conditions as well as steady state. NT requested suggestions for appropriate transient capabilities, possibly to be added to the fault ride through requirements.

Action 4/4 - All

CC633

22. JG stated that wind turbines could not meet the “constant” output requirements of CC633. NT outlined his understanding of the output variation of stall turbines i.e. output rose slightly as frequency fell and output fell slightly as frequency rose. MH explained that in practice National Grid interpreted this clause as

meaning active power output should not fall as frequency fell below 50 Hz and should not rise as frequency rose above 50 Hz. Therefore National Grid believed that this requirement could be met.

Governor Systems

23. PN believed this capability was under development at present so should be a staged introduction to the Grid Code.

Excitation Systems

24. DW commented that voltage control might not be appropriate depending on the requirements on reactive power capability.
25. HD reported that Scottish Power study work had shown significant reactive power demands occurred on remaining synchronous generators during fault conditions if wind farms were unable to provide voltage support. HD said that Vestas could provide reactive support for 2 seconds. EG said that Vestas could change modes in 500ms. HD said that response was required within one second. NT postulated that the response should be faster than a synchronous machine as it was simply a response of very fast power electronics converter through an overall low inductance system. NT again requested suggestions for appropriate transient capabilities.
26. In response to a question SM commented that HVDC would provide excess VARs on to the system to aid recovery post fault.
27. EG suggested that if the voltage dip was defined this would define the reactive recovery requirement. NT postulated that this would be site specific and asked GPWG for views in this area.

Action 4/5 - All

Negative Phase Sequence Loading

28. PN and EG agreed that this needed checking with manufacturers. NT indicated that he understood that machine capability should be well in excess of the requirement and this was a protection setting issue.

Frequency Range

29. There was a short discussion on frequency range. EG believes that wind turbines may not be capable of operation above 51 Hz. However this may be a protection co-ordination issue.

Fault Ride Through

30. The meeting noted that the drafting should use the SI symbol for milli-second.
31. National Grid tabled a slide to indicate the propagation of voltage dips across the transmission system in the event of a fault. NT noted that in the example the fault was not on a heavily meshed part of the system and was therefore not a "worst case" scenario.
32. NT explained that the system was operated with frequency response capable of managing the loss of 1320MW in line with the security standards. A

transmission fault on a generator site could lose 1320MW through fault clearance plus all the locally connected wind farms if no fault ride through capability was provided. The consequence would be disconnection of customer demand.

33. There was some discussion of the proposed drafting limiting the fault considered to one on the Transmission System. DW felt the wording was not necessarily clear that the intention was 400/275kV faults rather than 132kV. MH agreed to consider drafting to clarify that 132kV faults in England and Wales were not included. NT pointed out that there could be no additional voltage support within a Distribution Network which was purely passive.

Action 4/6 – MH

34. EG felt the fault ride through requirement should be phased in. NT commented that the information from some manufacturers was that sensitive DFIG wind turbines could withstand 15% volts at the generator-transformer HV terminals for 250ms whereas other information suggests 15% volts at generator terminals. HD and EG thought that Doubly Fed Induction Generators would trip in 5ms due to rotor current overload. HD also commented that this could be overcome by appropriate choice of transient rotor current rating and co-ordination with rotor protection settings.

Other Areas Of The Grid Code For Change

35. DW suggested that wind farms might not have on site manned control points.

Review Of Workplan

36. DP reviewed progress against programme and noted that the work was slightly behind planned schedule but the report to the May Grid Code Review Panel was still achievable.

Any Other Business

37. HH asked about the DTI licence exemption process. NT explained that the DTI would require that a bilateral agreement between National Grid and the generator would be required as part of the licence exemption process. This was seen as a temporary arrangement until the Distribution Code was revised. JG stated that the DTI expressed the view that the conditions that NGT are currently seeking to impose through the Licence Exemptions would be best handled through the Distribution Code and the DCRP BM agreed to ask the DTI to clarify the situation.

Action 4/7 - BM

Date of Next Meeting

38. JG requested a change of date for the next meeting from the Tuesday to Monday to avoid clashing with the BWEA conference. Therefore the next meeting will be on **24th March 2003** at Brandon Hall, Coventry starting at 10.30.
39. A further meeting has been arranged for the **28th April 2003**.

Summary of Actions

No.	Name	Action
4/1	All	Suggest Connection Condition clause introduction dates where appropriate.
4/2	NT	Contact manufacturers to request permission to release names to British Wind Energy Association
4/3	All	Respond to National Grid Connection Conditions and Definitions proposals with their considered views by 7 March 2003 .
4/4	All	Suggestions for appropriate transient capabilities, possibly to be added to the fault ride through requirements.
4/5	All	Views on reactive recovery requirements.
4/6	MH	Fault Ride Through - Consider drafting to clarify that 132kV faults in England and Wales are not included.
4/7	BM	Clarify with DTI situation with respect to Bilateral agreements and inclusion of interim requirements.