

THE NATIONAL GRID COMPANY plc

GRID CODE REVIEW PANEL

**GRID CODE - CLARIFICATION OF CONNECTION CONDITION
PERCENTAGE TERMS**

INTRODUCTION

1. During the discussions of the OC5 Paper GCRP 02/09 at the Grid Code Review Panel meeting on 23 May 2002, a Panel member suggested that the Grid Code Operating Code OC.5.5.3 quoted a percentage for Phase Unbalance without clearly identifying the base quantity referenced.
2. National Grid has carried out a review to ascertain where such percentages are quoted throughout the Grid Code. This paper identifies a solution applicable to all occurrences within the Grid Code clauses.

BACKGROUND

3. The paper GCRP 02/09 proposed a number of modifications to Grid Code OC5 to including full references to Generator and User network Connection Conditions for compliance and ongoing lifetime testing. During discussion of the paper and proposed amendments a question was raised as to the base quantity of the percentage negative phase sequence voltage quoted in the Operating Code referred to.
4. At the meeting National Grid agreed to review the clause in the Operating Codes and Connection Conditions to ensure the base quantity for the percentage was clearly and consistently identified and report back to the September Grid Code Review Panel Meeting.

PROPOSAL

5. The Grid Code makes reference to Phase Unbalance in Connection Conditions CC.6.1.5(b) & CC.6.1.6 as well as Operating Code OC.5.5.3. The current wording of these sections assumes that the reader knows the definition of phase unbalance and industry practice in calculation.
6. National Grid proposes that the definition for Phase Unbalance set out in the Electricity Association Engineering Recommendation P29 "Planning Limits for Voltage Unbalance in the UK for 132kV and Below" should be added to the Grid Code Glossary. The proposed definition would be as follows:

Phase (Voltage) Unbalance

The ratio (in percent) between the rms values of the negative sequence component and the positive sequence component of the voltage.

7. The wording of CC.6.1.5 and CC.6.1.6 should then be subject to the following minor revisions:

CC.6.1.5

(b) Phase Unbalance

Under **Planned Outage** conditions, the maximum ~~negative phase sequence component of the phase voltage~~ **Phase (Voltage) Unbalance** on the **NGC Transmission System** should remain below 1% unless abnormal conditions prevail.

CC.6.1.6 Under the **Planned Outage** conditions stated in CC.6.1.5(b) infrequent short duration peaks with a maximum value of 2% are permitted for **Phase (Voltage) Unbalance**, subject to the prior agreement of NGC under the Bilateral Agreement. NGC will only agree following a specific assessment of the impact of these levels on NGC and other Users Apparatus with which it is satisfied.

8. Further, for completeness, the text of OC.5.5.3, which is currently the subject of a Report to the Authority as a result of Consultation paper D/00, would also require the following minor modifications should the proposed changes to OC5 be approved:

OC5.5.3 Test and Monitoring Assessment

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Phase Unbalance	CC6.1.5 (b)	The measured maximum negative phase sequence component of the phase voltage <u>Phase (Voltage) Unbalance</u> on the NGC Transmission System should remain below 1%.
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9. In the event that the Authority decides not to approve the OC5 changes as proposed in Consultation paper D/02, it is proposed that the changes to the Glossary and Definitions and the Connection Conditions identified above should be pursued.

RECOMENDATIONS

10. The Grid Code Review Panel is invited to consider and approve the proposed clarification.
11. Subject to any comments received from Panel Members at the GCRP meeting on 5th September 2002, National Grid would intend to issue a consultation paper shortly after that date.

The National Grid Company PLC

Date: 22 August 2002