

## **Transient over-voltages**

**A paper to the May 2010 Grid Code Review Panel – pp\_10/16**

**From**

**‘The Transients Workshop’**

### **Introduction**

At the Grid Code Review Panel in November 2009 it was agreed to convene a workshop of interested parties to discuss the issue of transient overvoltages. The first workshop was held in January 2010, and a verbal report was made to the February 2010 GCRP which agreed that a further workshop be held. This second workshop took place in April 2010, and the purpose of this paper is to report back to the GCRP on the overall findings and recommendations of the two workshops.

A list of attendees of the two workshops is shown in Appendix A.

### **Workshop #1**

The first workshop focussed on gaining an increased level of understanding of the overall issue of transients. It also discussed a specific incident where the switching of an offshore AC cable and the subsequent transient voltage generated, resulted in the operation of some protection relays at a nearby nuclear power station.

### **Workshop #2**

The second workshop continued the discussions by considering what specific provisions currently exist within the framework of codes and bilateral agreements. The main points of agreement/points to note from the workshop can be summarised as follows:

- Point on wave switching may help to mitigate some switching transients that can occur. However there is an incremental cost associated with this– both in terms of the initial capital cost (anecdotal evidence suggested this may be up to 30%) and the ongoing operational costs. Point on wave switching does not improve operation during a fault. Therefore careful consideration would need to be given to the overall benefit before mandating the use of point on wave switching even if it was possible to develop network criteria where transients were more likely to be an issue for Users – it should not be seen as a panacea.
- There may be benefits to the User in terms of reducing the stresses on their equipment (e.g. AC cables) by employing point on wave switching;
- It is not considered appropriate to include transient thresholds within the Grid Code at the present time for the following reasons:
  - There is no international precedent for doing this
  - There are no relevant standards available.

- The Grid Code (PC.A.6.2.1) provides a discretionary mechanism for National Grid to request information from a User to allow National Grid to undertake transient overvoltage assessments. However there are no clear criteria as to when this mechanism would be triggered. The Code gives two examples: capacitor switching transients and switchgear transient recovery voltages. The workshop agreed that it would be useful for these two examples to be expanded to include energisation of long AC cables;
- The workshop felt that the main gap in the process at present was a transparent and agreed mechanism to allow information to be shared so that all potentially affected parties are aware of new connections and the corresponding potential for transients. It was felt that there may be existing processes (possibly within the CUSC) that could be used and/or enhanced. Further work will be undertaken by National Grid to investigate this;
- If the focus is on the prevention of transients specifically affecting nuclear sites, it may be possible to use the Nuclear Site Licensing Provisions (NSLPA) to request information about local connections; and
- The workshop noted that a CIGRE working group was underway entitled 'Power system technical performance issues related to defining the system studies that should be carried out when designing networks containing long HVAC cables' which was of direct relevance to its deliberations. This group is due to conclude in 2012, and it is felt that its output may provide useful guidance to the GCRP in terms of enduring arrangements.
- It was not obvious to the workshop, had the suggested improvements been made to Grid Code and processes (i.e. that modelling had been undertaken), that the particular incident would not have occurred. I.e. there was nothing extra-ordinary in the transients created by the switching to suggest that it would have any adverse impacts on other users.

## **Recommendations**

The GCRP is invited to:

- Note the deliberations of the transients workshop as outlined within this paper;
- Agree that no specific provisions relating to transient levels should be included in the Grid Code at this stage;
- Note that arrangements should be investigated (perhaps outside of the governance of the Grid Code) to allow more formalised sharing of information so that transient studies can be carried out and the results shared between interested Users and network operators;
- Agree that a specific clarification to PC.A.6.2.1 would be useful, and that this should be progressed in the most convenient manner; and
- Note the CIGRE working group and consider its outcome in 2012.
- Provide guidance as to the need to further investigative work before 2012 given the likely increase in use of long ac cables to provide network connection.

## **Appendix A**

### **Attendees at the workshops**

<b>Name</b>	<b>Company</b>	<b>Workshop #1 21 January 2010</b>	<b>Workshop #2 29 April 2010</b>
John Greasley	NGET	✓	✓
Zia Emin	NGET	✓	✓
Dave Ward	Magnox	✓	
Bob Dalglish	Magnox	✓	
Peter Twomey	United Utilities	✓	✓
John Morris	EdF	✓	✓
David Mitchell	EdF	✓	✓
Alan Creighton	CE Electric	✓	✓
Mick Chowns	RWE	✓	✓
Tomasz Sulawa	RWE	✓	
David Scott	EdF	✓	
Guy Nicholson	Senergy		✓
Jim McHugh	NGET		✓