

Grid Code Review Panel

**Annual Summary Report for ROCOF tripping incidents
(1 August 2000 to 31 July 2001)
by Barry Crowley, National Grid**

1 Introduction

- 1.1 This report, for the period 1 August 2000 to 31 July 2001, fulfils the requirement to provide the annual summary of the ROCOF information, as endorsed by GCRP 00/16 (September 2000). The notified ROCOF events for the period are reviewed, and consideration given to the need for continued reporting.
- 1.2 Generation trips of 1000 MW or more are reported for the above period.
- 1.2 Attached is the record of notified ROCOF tripping incidents for the 12 month period.

2 Background

- 2.1 The present ROCOF reporting procedure OS123 (Reporting of instantaneous active power losses to RECs and ILEX) has been in place since May 1998 and was agreed by Panel representatives.
- 2.2 The origin of the procedure follows National Grids concern that non centrally despatched embedded generation protected by Rate of Change of Frequency (ROCOF) protection could trip following a large generation loss. The effect of such ROCOF trips could aggravate the resulting frequency change following the loss and have an adverse effect on normal frequency recovery.
- 2.3 In order to increase the knowledge of the behaviour of this ROCOF protected plant and the risk it may present to the system :

National Grid agreed to notify RECs and ILEX (representing a number of independent power producers), when an incident occurred likely to lead to ROCOF operation.

Following notification both RECs and ILEX inform National Grid of any generation tripping.
- 2.4 Originally the procedure was triggered for generation losses of 550 MW or more, however this was changed to 1000 MW, and above following the initial review period of May 1998 – July 1999.
- 2.5 The last update to RECs and ILEX was sent out in early February 2001 for the period 1 August 2000 – 31 January 2001. A verbal report was also made to the Panel in February.

3 Summary of notified events during the period of review

- 3.1 Participants have provided the necessary information, in accordance with OS123, to National Grid following notification, including nil returns.

- 3.2 The appendix provides details of each notified incident where a generation trip of 1000 MW or more occurred, together with a summary of any reported embedded generation trips subsequently reported to National Grid.
- 3.3 During the period there have been six large generation losses, meeting the agreed reporting criteria, and ranging from 1100 to 1260 MW. Only one of these has resulted in a report of ROCOF trip of only 2 MW.
- 3.4 For any single event the rate of change of frequency, calculated over a two second period, for these particular incidents has varied from 0.04 to 0.075 Hz/second.
- 3.5 Two other events, on 13 and 29 June 2001, were incorrectly notified by National Grid as the system loss was below the 1000 MW trigger value. No embedded trips were reported following these notifications.

4 Conclusions from the period reported

- 4.1 From the events notified there have been less reported ROCOF trippings than previous periods even where high rates of change (0.075 Hz/second) have been experienced. This last twelve months have in general been consistent with previous experience.
- 4.2 The evidence from this years review period supports the conclusion of last year, that ROCOF operation is not significant for the rates of change of frequency experienced during normal operations and represents little risk to the system.

However, few events have given rise to high rates of change. As reported last year, the effects of higher rates of change remain an unknown.

- 4.3 The effects of the new electricity market (since March 2001) has not noticeably changed the pattern of large generation losses or ROCOF operation.

5 Recommendations

- 5.1 Members of the Grid Code Review Panel are invited to :-
 - i) provide comments on the contents of this report.
 - ii) note the summary of incidents of possible ROCOF (appendix 1) was sent to all RECs and ILEX on 5 August 2001.
 - iii) agree that OS123 requirements be discontinued, as currently there is no evidence of ROCOF operation having adverse effect.
 - iv) endorse that in future National Grid may request via the Panel that reporting be resumed, if greater volumes of embedded / renewable generation connected should cause concern with ROCOF operation.
 - v) note that National Grid will continue to take interest in any ROCOF operation, which is notified, from time to time via normal operational liaison.

Barry Crowley
August 2001

INCIDENTS OF POSSIBLE RoCoF TRIPPINGS during the period 1 August 2000 - 31 July 2001

Notified incidents where there are generation losses of 1000MW, or more, which are likely to lead to the tripping of embedded generation

NOTIFICATIONS RECEIVED FROM RECs/Ilex AND MW LOST WHERE APPROPRIATE																Loss (MW)	Ref
Date	Time	EE	EME	LE	MEB	SSE	YE	Manweb	Northern	Norweb	SEE	WPD	WPD Wales	Ilex	RoCoF		
06/12/00	13:44	None	None	None	None	None	None	None	None	None	None	None	None	None	0.0725	1260	
05/01/01	08:26	None	none	None	None	None	None	None	None	None	None	None	None	None	0.0475	1150	
10/01/01	05:09	None	None	None	None	None	None	None	None	None	None	None	None	None	0.0755	1260	
16/01/01	02:29	None	None	None	None	None	None	None	None	None	None	None	None	None	0.06	1170	
12/03/01	05:36	None	None	None	None	None	None	None	None	None	None	None	None	None	0.0195	1100	
30/04/01	11:56	None	None	None	None	None	None	None	None	2	None	None	None	None	0.04	1140	2

Notes:-

- 1) RoCoF is calculated by taking the frequency at the time of disturbance, then two seconds later and dividing the difference by two
- 2) NORWEB report that 2MW of embedded generation tripped at Heysham with no associated demand loss
- 3) EME report that an embedded generator at Derby tripped on the 1st April.
There were no frequency incidents likely to have caused this at the time.
- 4) EME report that an embedded generators at Ratcliffe (8MW) and Willington (40MW) tripped on the 28th April.
There were no frequency incidents likely to have caused this at the time.