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Frequency Changes during Large Disturbances WG Meeting N0 3

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National Grid

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Meeting Objectives

- The overall aim of the WG is to provide leadership to the industry to resolve the RoCoF risk imposed on the system security in a most effective way

- The key objectives of this meeting are:
  - Finalise notes for early engagement with Industry on proposed RoCoF changes
  - Agree measures to mitigate RoCoF risk to manageable level
  - Agree questions to be sent to affected stations

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Initial Thoughts on Minimising System Risks

- New plant connecting in and beyond Apr 2014
  - must not have LoM protection sensitive to RoCoF; or
  - the RoCoF setting must be at or above 1Hz/s and with a minimum timer setting of 0.5 s
- New plant connecting after Apr 2013 but before Apr 2014
  - must not have LoM protection sensitive to RoCoF; or
  - the RoCoF setting must be at or above 0.5Hz/s with a minimum timer setting of 0.5 s with a provision of changing to 1 Hz by Apr 2014
- Existing plant
  - If LoM protection is sensitive to RoCoF, its setting is required to be changed to 0.5Hz/s or above and with a minimum timer setting of 0.5s as soon as practically possible
  - Provision should be made to change to 1 Hz by Apr 2014

In addition, a frequency deadband setting of 49.5 to 50.5 Hz could be adopted when possible to minimise risk on system security

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Suggested List of Questions for affected stations

- 1) Do you have a LoM protection? If yes, please proceed on the following questions:
- 2) What is the relay type and model (including manufacturers and approx year of installation)?
- 3) What are the relay settings (eg df/dt, timer, frequency dead band if any, voltage angle)?
- 4) Does the protection trip operation on the associated generator circuit breaker or the site supply interface connection circuit breaker?
- 5) Have you experienced nuisance operation of LoM protection (ie when it operate under system conditions which is not related to the loss of electricity supply from your local network connections)? If so, how often has this been happened?

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Some useful feedback from ALSTOM Grid

- Their MiCOM relays are easy to set and change with df/dt and timer settings and some models include frequency deadband option
- There is no performance issue on 1 Hz/s and 0.5 sec recommended.
- The default settings for timer and deadband are 0.5 s (which is in line with our proposal) and 49.5 and 50.5 Hz respectively. His view is that these should be adopted in G59 ASAP to avoid nuisance tripping (eg these would have avoided tripping on the 28 and 30 Sept incidents). NGET's view is that these are useful features which should be introduced as soon as practically possible for new plant and incorporate on existing plant during the resetting process.
- 4) The relay has been around since 1999 and their market share at the time was ~ 30%. Relays from other manufacturers would have similar design then. This implies that any plants which were built since then would have easily adjustable settings.
- 5) ALSTOM is in collaboration with Strathclyde on development of a new algorithms for LoM protection