

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 84/MP/2015

Sub: Endangering the secured grid operation of All India electricity grid through inadequate/non-performance of Free Governor Mode Operation (FGMO) with Manual Intervention by the generators and non-compliance of Regulation 5.2 (f), (g), (h), (i) of Indian Electricity Grid Code read with Regulations 24 and 111 of Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999.

Date of hearing : 5.5.2014

Coram : Shri Gireesh B. Pradhan, Chairperson
Shri A.K. Singhal, Member
Shri A.S.Bakshi, Member

Petitioner : National Load Despatch Centre

Respondents : SLDC, Delhi and others

Parties present : Shri S.R.Narashimhan, NLDC
Ms. Abiha Zaidi, NLDC
Shri V.Suresh, NLDC
Shri L.P.Joshi, THDC
Shri Anil Raghuwanshi, THDC
Shri Rahul Srivastava, Advocate, UPSLDC
Shri Zahir Ahmad, UPSLDC
Shri M.K.Gupta, UPSLDC
Shri Jagtar Singh, SLDC, Punjab
Shri Naresh Bansal, NHPC
Shri Jitendra Kr. Jha, NHPC
Shri Prashant Chaturvedi, APCPL
Shri Krishna Pal Singh, NPCIL
Shri A.K.Arya, RRVPNL
Shri A.K.Bohra, RRVPNL
Shri V.K.Gupta, RRVPNL
Shri Swapna Seshadri, KPTCL and KSK Mahanadi
Shri A.Suresh, CEA
Shri S.N.Kayal, CEA
Shri Somesh Bandyopadhyay, NTPC
Shri Uday Shankar, NTPC
Shri Rajiv Agarwal
Shri Romesh Kapoor

Record of Proceedings

The representative of the petitioner submitted as under:

(a) The average system frequency has improved considerably over the years due to various initiatives taken by the Commission through amendments in the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (Grid Code) and introduction of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014. The system frequency is remaining within the 49.9-50.05 Hz for 60-70% of the time. Every time the frequency crossed this band, it was returning within the band in 3-4 minutes. However, during contingencies i.e. sudden load rejection, generation tripping, wide variations in frequency deviation have been observed. These events pose a threat to grid security and indicate vulnerability of the system. However, Frequency Response Characteristics (FRC) of the Indian grid is still very much less than the expected/ideal response and operation of large grid without adequate primary response makes the system vulnerable in case of large contingencies in the grid, particularly, if there is part separation of any part of the grid.

(b) On 14.1.2015 at 1920 hours, one unit at Kudankulam nuclear power station tripped and the frequency fell to 49.87 Hz from 50.04 Hz. The Frequency Response Characteristics (FRC) of control areas as well as generators was calculated by NLDC/RLDCs as per the procedure approved by the Commission.

(c) The overall Frequency Response Characteristics (FRC) on an all India basis for this event which occurred during the evening peak hours is of the order of 6000 MW/Hz. During this period, the number of generating units on bar is maximum and they should have provided a much higher frequency response (assuming 5% governor droop).

(d) While such an ideal response is rarely available, it has been observed that few constituents responded in a manner which aggravated the deviation of frequency.

2. The representative of the petitioner submitted during the earthquake in Nepal on 25.4.2015 at around 11:43 hrs, there was demand reduction of approx. 3500 MW within 3-4 minutes due to trippings/manual load shedding especially in Northern Region and Eastern Region. The frequency went up to 50.50 Hz from 49.95 Hz i.e. variation of 0.55 Hz in matter of few minutes was observed. In this event, adequate frequency response was missing in many control areas, particularly in the NEW Grid which led to high voltages in system and large angular variation among nodes in grid, etc. He further submitted that the most alarming outcome of the event was sudden flow change in 765 kV Sholapur-Raichur D/C (AC lines between NEW Grid and SR Grid) by approx.1000 MW due to better frequency response from Southern Region generating units leading to generation reduction in the region. The impact was also observed on 400 kV Wardha-Parli D/C line on which loading increased to such high levels that triggering of System Protection Scheme

(SPS) missed by a narrow margin. The representative of the petitioner further submitted that SPS action of load shedding associated with the line would have again caused frequency to rise to a higher value. Frequency rise to 50.50 Hz and above was also dangerous considering the likely increase in Distributed Generation resources such as solar PV. The representative of the petitioner submitted that CEA Grid Standards Regulations prescribe disconnection of Solar PV at 50.50 Hz and above (or lower depending on agreement with the licensee). The representative of the petitioner requested to allow the petitioner to file detailed additional submission on the above incident.

3. The representative of the petitioner further submitted that the performance of FGMO/ RGMO is far below expected level. SLDCs are yet to take-up seriously at appropriate management level/SERC for ensuring effective Governor performance.

4. The representative of THDC submitted that THDC is unable to implement the FGMO as it is a multi-purpose project.

5. Learned counsel for SLDC, UP submitted that it has already submitted the details of response of UP generators before the Commission.

6. Learned counsels and the representatives of the respondents submitted that they have not received copy of the petition.

7. After hearing the parties, the Commission directed the petitioner to upload the copy of the petition immediately in its website and RLDC's websites. The respondents were directed to download the copy of the petition from the websites of the petitioner and RLDCs and file their replies by 12.6.2015. The petitioner was directed to file its rejoinder, if any, by 24.6.2015.

8. The Commission directed the petitioner to file the following details/clarification on affidavit by 12.6.2015 after serving copies on the respondents:

(a) FRC report for the earthquake in Nepal on 25.4.2015.

(b) The ISGSs, who have given poor response or no response need to explain reasons and justification for poor response or negative response with reference to Grid Code during both frequency excursions.

9. The Commission directed SLDCs to file the following details/clarification on affidavit by 12.6.2015 with an advance copy to the petitioner:

(a) FRC report of their respective control areas including reasons for poor/negative response from their control areas clearly bringing out the generator wise response in MWs, in percentage of ideal response and scheduled MW during both the frequency excursions for all the generators of the state.

(b) Seek the reasons from the generators who have shown poor or no response as per their respective grid code /Grid Code or negative response to

the frequency excursions.

10. The Commission observed that while reporting the Frequency Response of Demand Areas, it would be required to know "Net system demand met after the event". The petitioner and SLDCs shall submit the same for both events.

11. The Commission further observed that ideal response has been calculated based on governor droop of 5% which requires generation to be increased by 40% for a frequency fall of 1 Hz. Accordingly, frequency dip of 0.17 Hz in the case of tripping of one unit (1000MW) at Kudankulam Nuclear Power Station on 14.1.2015 at 1920 hours as indicated by the petitioner, requires generation increase of 6.8%. However, as per the provisions of Grid Code, the maximum increase has been limited to 5% considering limited thermal reserve available in thermal units. The Commission directed the petitioner to indicate whether the FRC procedure requires to be modified to take into account the above aspect.

12. The petition shall be listed for hearing on 14.7.2015.

**By order of the Commission
Sd/-**

**(T. Rout)
Chief (Law)**