CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 009/SM/2014

Sub: Investigation of load crash in Northern Region on 30.5.2014.

Respondents : Power Grid Corporation of India Limited
Power System Operation Corporation Limited

Petition No. 10/SM/2015

Sub: Investigation of line outage due to Tower Collapse in Northern Region on during April 2015 to June 2015 (1st quarter of 2015-16).

Respondents : Power Grid Corporation of India Limited
Power System Operation Corporation Limited
Central Electricity Authority

Date of hearing : 3.12.2015

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

Parties present : Shri J. Mazumder, PGCIL
Shri Gopal Ji, PGCIL
Shri Shashi Bhushan, PGCIL
Shri Vivek Sundaiyal, PGCIL
Ms. Supriya Singh, Advocate, NRLDC
Ms. Abilia Zaidi, NRLDC
Shri Rajiv Powal, NRLDC
Shri N. Nallarasan, NRLDC
Shri Shimpy, TPDDL
Shri Umesh Ambali, NTPC
Shri Nishant, NTPC

Record of Proceedings

The representative of Power Grid Corporation of India Limited (PGCIL) submitted that in case of tower failure during 1st quarter 2015-16, out of total 21 tower failure cases, one tower failed due to sinking of land, in another case main member was found broken, and other cases on account of high wind velocity/cyclone. He further submitted

that the tower designs were as per the prevailing norms and CEA guidelines. All the cases are investigated in association with CEA and the report would be discussed in the meeting of Standing Committee on Tower Collapse on 8.12.2015.

2. The Commission, on the basis of the data available from the report of POSOCO, expressed its concern over the increase in number of tower collapse and observed that it needs in depth examination and consideration. The Commission further observed that PGCIL should be more concerned and should take a holistic view of the situation instead of focusing on individual cases of tower failure. The Commission further observed that a comprehensive report explaining the reasons for tower failure and the remedial measures required to handle the situation is yet to be submitted by PGCIL.

3. In response, the representative of PGCIL submitted that (a) there is a change in wind speed pattern and wind zone given by Structure Engineering Research Centre (SERC), Chennai, wherein it was suggested that there is change in some parts of Delhi, where wind zone is becoming high. However, the same has not been considered in the recently published IS 875 code and IS 802 code for wind zone report given by SERC, and (b) PGCIL is using design manuals of Central Board of Irrigation and Power (CBIP) and in the latest published CBIP manual, the revised wind zone map has been considered, wherein the wind zone-IV has been suggested as wind zone-V.

4. The Commission observed that the towers are designed to withstand certain range of wind speed and enquired whether testing of tower is done according to latest IS codes and wind zone. In response, the representative of PGCIL submitted that PGCIL has designed towers with the maximum wind speed of the zone. The representative of PGCIL further submitted that the testing facilities are available at CPRI, SERC Chennai, KEC ltd, Jyoti ltd, L & T, Kalpatru, etc.

5. In response to the Commission's query as to whether the tower collapses are in particular area(s) only, the representative of PGCIL submitted that the present petition has been initiated only for the Northern Region. The representative of PGCIL further submitted that the tower design code has been revised. Earlier it was 'A' type tower (Suspension) where wind condition was not taken for the broken wire cases. PGCIL introduces 75% wind condition in the broken wire condition and is doing more than what is given in the code and same has been accepted and included by SERC.

6. The Commission expressed its concern over tower collapses in many parts of the country and enquired as to whether any international studies are available or referred to. The Commission observed that PGCIL having a moto "ONE-NATION ONE-GRID" should look comprehensively and it has to be convinced that there is no further change in terms of tower design criteria, with respect to higher wind, higher seismicity and landslide, etc. The Commission also emphasized that tower collapse is a serious issue as the wind regime has changed and PGCIL needs to take a comprehensive view, in

terms of tower design and its testing on all India basis. The Commission further observed that apart from examination of the design, PGCIL needs to check whether proper erection including soil investigation and proper maintenance of towers is being carried out. In response, the representative of PGCIL submitted that point load coming on the top of the tower (between conductor and earth-wire) is calculated and simulated.

7. The representative of CEA submitted that there are two Standing Committees, one on tower failure and another on sub-station equipment failure. All utilities/ transmission licensees are required to report failure of towers of 220 kV and above. However, number of State transmission utilities and PGCIL are not reporting all failures of towers/sub- station equipments to CEA. In regard to tower collapse during the 1st quarter of 2015, out of 21 cases of tower collapse, only 03(three) preliminary reports of tower failure have been received by them. CEA has written to PGCIL, UPPTCL, RRVPNL and WBSETCL to submit preliminary report of tower failure.

8. In response to the Commission's query as to the intimation given by PGCIL on tower failure, the representative of CEA replied in negative. The representative of CEA further submitted that PGCIL has not been intimating failure of sub-station equipment as required under Section 73(1) of the Act.

9. The representative of CEA further submitted that as per the Commission's direction, in the case of 765 kV Gaya-Fatehpur transmission line, two meetings were convened with the experts from SERC and CPRI for detailed investigation of tower failure. In the said meetings, it was decided that the originally the 765 kV line is designed with Right of Way of 85 mtrs with horizontal configuration which has been revised with 64 meter delta configuration. Later, the configuration was found to be complicated due to difficulties in the erection work. In response, the representative of PGCIL submitted that PGCIL has decided to go for horizontal configuration with all the three conductors on horizontal portion with pushing up the middle conductor upward so that ROW reduce from 85 meters to 64 meters. Therefore, PGCIL has decided in case of ROW issue, it would use the delta configuration of 64 meters and in other cases, horizontal configuration would be used.

10. The representative of CEA submitted that all the failed towers were of 'A' type. In the Gaya-Fatehpur transmission line out of 15 nos. of tower collapse, in one section, there are 11 towers and 4 towers in one section and other two sections respectively and one tower was collapsed due to high wind velocity. In this regard, two meetings were held in CEA. Inputs on the design and drawings of the tower have been received from CPRI Bangalore and PGCIL which would be further discussed in the Standing Committee meeting to be held on 8.12.2015.

11. The representative of CEA submitted that the following decisions were taken in the Standing Committee meetings held on 19.6.2014 and 12.9.2014:

(i) Committee decided to write to BIS for revision of IS 875 for review of wind map-based studies made by SERC in 2009; and
(ii) To install Anemometer in all sub-stations of PGCIL and DTL duly computerized, to get output of every one hour wind data.

12. The representative of PGCIL submitted that the earlier wind map was for 43 locations. SERC has been given consultancy for reviewing the number of instruments required and deciding the technical specification as per revised wind map for identifying the installation of Anemometer. The representative of PGCIL submitted that PGCIL's officials revisited the sites and found that for the new towers, re-strengthening has been done by fixing secondary member but for the existing tower it was not possible due to requirement of shut down of the line.

13. The representative of CEA submitted that since number of towers have failed from the waist level, CEA has decided to review the design. He further submitted that CPRI has also stated that design needs to be revised, Meanwhile, PGCIL has been asked to re-strengthen the members.

14. After hearing the representative of the respondents and CEA, the Commission directed PGCIL to investigate by 5.1.2016 the incidences of collapse of transmission towers and tripping of transmission lines in 1st quarter of 2015-16 and submit report after Board's approval by 22.1.2016.

15. The Commission directed CEA to intimate by 5.1.2016 total number of cases where tower failures have not been intimated by PGCIL to CEA and submit the detailed report on the failure of tower as on 31.5.2014. The Commission directed PGCIL to confirm by 5.1.2016 whether the issue of tower failure was discussed in the Standing Committee meeting scheduled on 8.12.2015 including the decision taken in the meeting. The Commission directed that due date of filing the information and report should be strictly complied with. No extension shall be granted on that account.

16. The petitions shall be listed for hearing on 28.1.2015.

By order of the Commission
Sd/-
(T. Rout)
Chief (Law)