

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 5/MP/2013**

**Coram:**

**Shri V.S. Verma, Member**

**Shri M. Deena Dayalan, Member**

**Date of Hearing: 21.5.2013**

**Date of Order : 18.9.2013**

**In the matter of:**

Providing protection systems having reliability, selectivity, speed and sensitivity and keeping them functional in terms of Regulation 5.2 (I) of the CERC (Indian Electricity Grid Code) (First Amendment), Regulations 2012 read along with Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2010 for ensuring security of the Northern Regional Grid as well as the interconnected Indian Grid

**And**

**in the matter of:**

Northern Regional Load Despatch Centre, New Delhi

**....Petitioner**

Vs

1. Uttar Pradesh Power Transmission Corporation Ltd, Lucknow

2. State Load Despatch Centre, Lucknow, Uttar Pradesh

**Respondents**

**And**

**in the matter of**

1. Member-Secretary, Northern Regional Power Committee, New Delhi

2. Executive Director (NR-1), Power Grid Corporation of India Limited, New Delhi

3. Executive Director (NR-1), Power Grid Corporation of India Limited, New Delhi

4. Punjab State Electricity Board, Patiala

5. Haryana Power Purchase Centre, Panchkula

6. Rajasthan Rajya Vidyut Prasaran Nigam Limited, Jaipur

7. Delhi Transco Limited, Delhi



8. Himachal Pradesh State Electricity Board, Shimla
9. Power Transmission Corporation of Uttarakhand Limited, Dehradun
10. Power Development Deptt., Govt. of Jammu and Kashmir, Srinagar
11. Electricity Department, Union Territory of Chandigarh, Chandigarh
12. State Load Despatch Centre, Ablowal, Patiala
13. State Load Despatch Centre, Panchkula, Haryana
14. State Load Despatch Centre, Heerapur, Jaipur
15. State Load Despatch Centre, Delhi
16. State Load Despatch Centre, Rishikesh, Uttarakhand
17. State Load Despatch Centre, Totu, Shimla
18. State Load Despatch Centre, Gladini, Jammu and Kashmir

**Proforma Respondents**

**Parties Present:**

1. Shri Rahul Srivastava, Advocate, SLDC, UP
2. Shri M.K.Gupta, SLDC,UP
3. Shri Vivek Dikshit, UPPTCL
4. Shri Rajiv Porwal, NRLDC
5. Shri A.Man, NLDC
6. Shri Rajiv Porwal, NRLDC
7. Shri D.K.Jain, NRLDC
8. Shri Darshan Singh, SLDC, Delhi
9. Shri B.L.Gujar, DTL
10. Shri Mukesh Kumar, RVPNL

**ORDER**

The petitioner, Northern Regional Load Despatch Centre has filed present petition with following prayers to:

- (a) Suitable actions may be initiated against the respondent for its failure to comply with the
  - (i) Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2010;
  - (ii) Regulation 5.1, 5.2 (e), 5.2(l) and 5.2 (r) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (First Amendment) Regulations, 2012



(b) UPPTCL may be directed to ensure adequacy and healthiness of protection system in compliance with Regulation 3 (e) of the CEA (Grid Standards) in terms of IEGC Regulation 5.2 (e).

(c) UPPTCL may be directed to carry out a thorough audit of the protection system at all its sub-stations and take corrective measures.

(d) Pass such orders as deemed fit."

2. The petitioner has submitted that on 23.12.2012 at 1:53 hrs there was an incident involving simultaneous forced outage of multiple transmission lines emanating from 400/220 kV Panki and 765/400/220 kV Unnao sub-stations in Northern Region. The tripping along with the other forced and planned outages resulted in threat to integrated operation of the Northern Regional Power System due to depleted transmission system. The petitioner has enumerated instances of the forced outage as under:

S.No.	Name of the Element	Type	Voltage level	Owner	Outage		Revival	
					Date	Time	Date	Time
1	Obra-Panki	Line	400 kV	UPPTCL	23.12.2012	01.38	23.12.2012	17.20
2	Kanpur (PG)-Panki (UP) 1	Line	400 kV	PGCIL	23.12.2012	01.53	23.12.2012	03.07
3	Kanpur (PG)-Panki (UP) 2	Line	400 kV	PGCIL	23.12.2012	01.53	23.12.2012	03.10
4	Muradnagar-Panki	Line	400 kV	UPPTCL	23.12.2012	01.53	23.12.2012	03.15
5	Panki-Unnao	Line	400 kV	UPPTCL	23.12.2012	01.53	23.12.2012	03.25
6	Panki 240 MVA ICT 1	ICT	400/220 kV	UPPTCL	23.12.2012	01.38	23.12.2012	03.30
7	Panki 240 MVA ICT 2	ICT	400/220 kV	UPPTCL	23.12.2012	01.38	23.12.2012	03.29
8	Bareilly-Unnao 1	Line	400 kV	UPPTCL	23.12.2012	01.53	23.12.2012	18.02
9	Bareilly-Unnao 2	Line	400 kV	UPPTCL	23.12.2012	01.53	23.12.2012	15.38
10	Lucknow (PG)-Unnao (UP)2	Line	400 kV	PGCIL	23.12.2012	01.53	23.12.2012	02.58
11	Unnao 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	23.12.2012	01.53	23.12.2012	03.11
12	Unnao C	ICT	765/400	UPPTCL	23.12.2012	01.53	23.12.2012	21.55

	1000 MVA ICT 1		kV					
13	Singrauli-Fatehpur	Line	400 kV	PGCIL	23.12.2012	01.53	23.12.2012	03.04
14	Fatehpur-Kanpur-1	Line	400 kV	PGCIL		01.38	23.12.2012	02.10

3. The petitioner has submitted that the voltage profile (phase to neutral) at Kanpur (adjacent to Panki) recorded in the Phasor Measurement Unit shows a severe dip (touching almost zero) in Y-phase voltage at 01:53:03.560. The timing of the voltage dip matches with the tripping time of multiple elements. Thus, PMU data corroborates Y phase fault at Panki at this time. The final voltage recovery was initiated at 01:53:04:520 and fault was finally cleared after 960 milliseconds.

4. The petitioner has submitted that the Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2012 (CEA Grid Standards Regulations) provides for standards for protection system provided by all entities. The petitioner has submitted that fault at Panki was cleared in 960 milliseconds against 100 milliseconds. The delay in fault clearance resulted in tripping of transmission elements instead of single element had the protective system performed as per the mandated standards.

5. The petitioner has submitted that the tripping occurred due to inadequacy of protection system at 400/220 kV Panki and 765/400/220 kV Unnao sub-stations in Uttar Pradesh which are under the jurisdiction of Uttar Pradesh Power Transmission Corporation Limited (UPPTCL). The analysis report of the event is still awaited from UPPTCL or SLDC, UP. The Regulation 12 of the CEA Grid

Standards Regulations and Regulation 5.2 (r) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (Grid Code) amended from time to time provides that the relevant information required for analysis of any grid event should be sent to RLDC within 24 hours. The analysis report supported by relay indications in respect of tripping on 23.12.2012 is awaited (on 10.1.2013) from UPPTCL. Thus, UPPTCL has failed to comply with Regulation 5.2 (r) of the Grid Code.

6. The petitioner has submitted that similarly, there was a fault on 25.12.2012 tripping of multiple elements occurred at 400/220 kV Sultanpur sub-station of UPPTCL and the fault was cleared after 400 milliseconds. The detailed analysis report supported by relay flags, disturbance records/event log are still awaited from UPPTCL. The Regulation 5.1 of the Grid Code provides that the participant utilities shall adopt Good Utility Practice at all times for satisfactory operation of the Regional Grid. As per Regulation 5.2 (e) of the Grid Code, the maintenance of respective power system elements is required to be carried out in accordance with the provisions of CEA Grid Standards Regulations. Also, in terms of the Regulation 5.2 (l) of Grid Code, the provision of protections and relay settings are required to be coordinated periodically throughout the Regional Grid, as per a plan to be separately finalized by the Protection sub-Committee of the RPC.

7. The petitioner has submitted that a group constituted by Northern Regional Power Committee (NRPC) visited 400 kV Panki and Sultanpur sub-stations of UPPTCL and analyzed possible causes and suggest remedial measures to avoid

reoccurrence of such tripping in future and report submitted by the group on 2.1.2013 is enclosed. In its report, the group has highlighted several inadequacies in respect of the protection system and operational practices at these sub-stations of UPPTCL. Thus, UPPTCL has failed to comply with the Regulation 5.2 (l) of the Grid Code which provides that provision of protections and relay settings shall be coordinated periodically by the respective utilities as per the recommendations of the protection sub-committee of the NRPC.

8. It has been stated that PGCIL had carried out an audit of protection system at sub-stations in Northern Region with the help of CPRI and found defects/ discrepancies at almost all the stations of UPPCL including Agra, Muradnagar, Muzzafarnagar, etc. The petitioner has submitted that UPPTCL has failed to comply with Regulation 3 (e) of the Central Electricity Authority (Grid Standards), Regulations, 2010 and Regulations 5.1, 5.2 (e), 5.2 (l) and 5.2 (r) of the Grid Code.

9. Reply to the petition has been filed by the UPPTCL and SLDC, UP.

10. UPPTCL in its reply dated 29.4.2013 has submitted as under:

(a) On 24.1.2013, the fault analysis reports were sent to NRLDC in terms of Regulation 5.2 (r) of the Grid Code and analysis of tripping has been done both by UPPTCL and NRPC for corrective actions.

(b) UPPTCL owns a huge network of sub-stations and transmission lines consisting of 1 no. 765 kV, 14 No's 400 kV, 69 No's 220 kV and 271 No's 132 kV sub-stations along with around 23,500 km of associated transmission lines. Further, many of these sub-stations and transmission lines owned by UPPTCL are quite old and require large scale renovation and modernization. The initiative of Central Government, as per the directions of NRPC, third party Protection Audit of 1 no 765 kV, all 14 No's 400 kV as well as 3 No's 220 kV sub-station of UPPTCL has already been carried out by CPRI under the overall supervisions of Power Grid. As per recommendations/ observations of CPRI, UPPTCL has initiated the process of replacement of static/electro-magnetic relays with the state-of-art numerical protection relays. UPPTCL has already initiated the process of procurement of 34 nos. numeric distance protection relays for 400 kV sub-stations and 200 nos. for 220 kV sub-stations.

(c) As regard third party protection audit of the remaining sub-stations, as per minutes of 89th meeting of Operation Co-ordination Committee (OCC) "Recommendation No 9.11", two officers have been nominated to co-ordinate and conduct the third party protection audit on behalf of UPPTCL as one of the constituents of the Northern Region for which a specific petition (Petition No. 220/MP/2012) has already been filed before this Hon'ble Commission by Power Grid, in which proceedings have already been initiated by the Commission. Accordingly, the present petition should be clubbed with the Petition No. 220/MP/2012, as main prayers of the both petitions are same.

(d) UPPTCL is making its best efforts to set right its transmission system within its own constraints. With regard to specific observations of tripping analysis committee constituted by NRPC, UPPTCL has submitted point wise replies with time line of rectification of discrepancies.

11. SLDC, UP in its reply dated 30.4.2013 has submitted that on 28.12.2012 and 18.1.2013 required tripping reports regarding incident of total power failure at 400 kV sub-station Panki and failure of 400 kV Bus at 765 kV sub-station Unnao at about 1:53 hours of 23.12.2012 and total failure at 400 kV S/S Sultanpur at 16:24 Hrs. of 25.12.2012, based on information gathered from concerned sub-station and generating stations, respectively were sent to NRLDC.

12. The petitioner in its rejoinder dated 13.5.2013, has submitted that there are serious inadequacies in the protective system and utility practices in the sub-stations of UPPTCL, namely 400/220 kV Parichha, 400/132 kV Mau, 765/400/220 kV Unnao, 400/220 kV Muradnagar, 400/220 kV Sarojininagar (Lucknow), 220 kV Sambhal, 220 kV Moradabad, 220 kV Simbhaul, 220 kV Etah, 220 kV Khurja and 220 kV Harduaganj. Several events/incidents of multiple element tripping have been indicated by the petitioner in its submission. The first clearance time is also high in the above mentioned incidences. The petitioner has also submitted that analysis report pertaining to sub-station DR/EL print outs for the events enumerated in the petition is awaited from UPPTCL. Further, UPPTCL has



failed to comply with provisions of CEA Grid Standards Regulations and Grid Code.

13. During the course of hearing on 21.5.2013, the representative of the petitioner submitted that in the past four and a half months, 14 rare contingencies as per Transmission Planning Criteria 1994 have occurred averaging to 3.5 rare contingencies per month, which is very high and can jeopardize the whole system. The representative of UPPTCL submitted that all matters have been discussed at RPC forum and it has attended to all major contingencies. However, the overall implementation in whole system would take 6 to 9 months.

14. We have heard the petitioner and the respondents and perused the documents on record. We proceed to deal with the extent of non-compliance by the respondents with the provisions of Grid Code and CEA Grid Standards Regulations.

15. From the written pleadings and oral submissions of the petitioner and the respondents, it has emerged that there are number of inadequacies in respect of protection system and operational practices as well as discrepancies in the substations of UPPTCL, which make the transmission system of UPPTCL vulnerable. The defects were also pointed by protection audit undertaken after the Grid disturbances of July 2012. The petitioner has submitted that fault in Panki was cleared in 960 milliseconds against 100 milliseconds mandated in CEA Grid

Standards Regulations which resulted in tripping of transmission of elements instead of tripping of single elements. The Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2012 provides as under:

*"3. Standards for Operation and Maintenance of Transmission Lines. - (1) All Entities, Appropriate Load Despatch Centres and Regional Power Committees, for the purpose of maintaining the Grid Standards for operation and maintenance of transmission lines, shall,-*

*...*

*(e) Provide standard protection systems having the reliability, selectivity, speed and sensitivity to isolate the faulty equipment and protect all components from any type of faults, within the specified fault clearance time and shall provide protection coordination as specified by the Regional Power Committee.*

*Explanation: For the purpose of this regulation "fault clearance time" means the maximum fault clearance time are as specified in Table 4 below,-*

<i>S. No.</i>	<i>Nominal System Voltage (kV rms)</i>	<i>Maximum Time (in milliseconds)</i>
<i>1</i>	<i>765 and 400</i>	<i>100</i>
<i>2</i>	<i>220 and 132</i>	<i>160</i>

*Provided that in the event of fault by a circuit breaker within the time limit specified in Table 4, the breaker fail protection shall initiate tripping of all the breakers in the concerned bus section to clear the fault in the next 200 milliseconds."*

16. As the fault in UPPTCL sub-stations did not get cleared within prescribed time limit, this imposes a threat to secure operation of inter-State grid. Since UP`s power system is incidental to WR-NR and ER-NR corridor, any fault in UP`s power system would weaken the safety and security of the N-E-W grid.

17. The petitioner has submitted that UPPTCL had not submitted the analysis report supported by relay indications in respect of tripping on 23/25.12.2012. As

per Regulation 5.2 (r) of the Grid Code, all the users, STU/SLDC and CTU are required to send information/data to RLDC within one week for the purpose of analysis of any grid disturbance/event. The relevant portion of Regulations 5.2 (r) of the Grid Code is extracted as under:

*“(r) All the Users, STU/SLDC and CTU shall send information/data including disturbance recorder/sequential event recorder output to RLDC within one week for purpose of analysis of any grid disturbance/event. No user, SLDC / STU or CTU shall block any data/information required by the RLDC and RPC for maintaining reliability and security of the grid and for analysis of an event”*

18. Under the Electricity Act, 2003, SLDC is responsible for ensuring integrated operation of the grid and carrying out real time operation for grid control within the State. In this regard, section 32 of the Act is extracted as under:

“32. (1) The State Load Despatch Centre shall be the apex body to ensure integrated operation of the power system in a State.

(2) The State Load Despatch Centre shall -

(a) be responsible for optimum scheduling and despatch of electricity within a State, in accordance with the contracts entered into with the licensees or the generating companies operating in that State;

(b) monitor grid operations;

(c) keep accounts of the quantity of electricity transmitted through the State grid;

(d) exercise supervision and control over the intra-state transmission system; and

(e) be responsible for carrying out real time operations for grid control and despatch of electricity within the State through secure and economic operation of the State grid in accordance with the Grid Standards and the State Grid Code.”

Hence, in accordance with the provisions of Electricity Act, 2003, SLDC is the apex body for carrying out real time operations for grid control and despatch of electricity within the State through secure and economic operation of the State grid in accordance

with the Grid Standards and the State Grid Code. In our view, SLDC is sufficiently empowered under the Act to control the grid. Even if the SLDC is functioning under the supervision and control of the State Transmission Utility, it is responsibility of STU to ensure that the statutory provisions of the Act with regard to the functions of SLDC are complied with.

19. From the above, we have come to the conclusion that respondents have not complied with the provisions of CEA Grid Standards Regulations and Grid Code and the actions enumerated by the SLDC, UP are not adequate. Though UPPTCL has submitted that it is making efforts to set right its transmission system within its own constraints, but no concrete step has been taken for compliance with provisions of CEA Grid Standards Regulations and Grid Code.

20. In view of the above, UPPTCL is directed to submit action plan to set right the discrepancies/inadequacies in their protection system to NRPC within 6 months from the date of issue of this order. NRPC Secretariat is directed to monitor rectification of discrepancies/inadequacies by UPPTCL and submit quarterly progress report to the Commission. If the discrepancies/inadequacies are not rectified by UPPTCL within 6 months, appropriate proceedings for the non-compliance with the Commission's direction shall be initiated against the CMD, UPPTCL in accordance with law.

21. We direct the Officer in-charge of SLDC, UP to ensure compliance in accordance with Regulation 3(e) of CEA Grid Standards, failing which action shall be initiated against him in accordance with law.



22. NRLDC is directed to submit the status report in respect of protection system of UPPTCL after 6 months to indicate the status of rectification of defects.

23. The petition is disposed of with the above directions.

Sd/-

**(M. Deena Dayalan)**  
**Member**

sd/-

**(V.S.Verma)**  
**Member**

