

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 59/MP/2014

Coram:

Shri Gireesh B. Pradhan, Chairperson

Shri A.K Singhal, Member

Shri A.S. Bakshi, Member

Date of Order : 6.8.2015

In the matter of

Providing protection systems having reliability, selectivity, speed and sensitivity and keeping them functional in terms of Regulation 5.2 (l) of the Central Electricity Regulatory Commission (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 Eastern Regional grid as well as the inter-connected Indian grid.

And

In the matter of

Eastern Regional Load Despatch Centre
18-A, Qutub Institutional Area,
Katwaria Sarai, New Delhi- 110016

....Petitioner

Vs

1. Chairman cum Managing Director
Odisha Power Transmission Corporation Limited
Janpath, Bhubaneswar- 751022

2. Senior General Manager (Power System)
Odisha Power Transmission Corporation Limited
SLDC, Building, GRIDCO Colony,
P.O. Mancheswar Railway Colony,
Bhubaneswar- 751017, Odisha

....Respondents

3. Member Secretary
Eastern Regional Power Committee
14 Golf Club Road, Tollygunge,
Kolkata- 700091

4. Executive Director ERTS-II
Power Grid Corporation of India Limited
5th & 6th floors, Alankar Palace, Boring Road,
Patna- 800001
5. Chairman,
Bihar State Power Holding Company Limited
Vidyut Bhavan, Bailey Road,
Patna- 800021
6. Chairman,
Damodar Valley Corporation
DVC Headquarters,
DVC Towers, VIP road
Kolkata- 700054
7. Chairman,
Jharkhand Urja Vikas Nigam Limited
Engineering Building, HEC, Dhurva,
Ranchi- 834004
8. Chairman,
West Bengal State Electricity Company Limited
Vidyut Bhavan, Bidhannagar,
Block-DJ, Sector-II,
Kolkata- 700091
9. Principal Chief Engineer-cum Secretary,
Energy and Power Department, Govt. of Sikkim,
Kazi road, Gangtok- 737101

....Proforma Respondents

Following were present:

Ms. Jayantika Singh, SRLDC/POSOCO
Shri R.B. Sharma, Advocate, OPTCL

ORDER

The petitioner, Eastern Regional Load Despatch Centre (ERLDC), has filed the present petition seeking direction to Odisha Power Transmission Corporation Limited (OPTCL) to carry out audit of the protection system at its sub-stations so that corrective

measures can be taken in Odisha transmission system. The petitioner has made the following prayers:

- “(a) Appropriate direction/advice may be issued to the respondent for its failure to comply with:
- 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) OPTCL may be directed to ensure adequacy and healthiness of protection system in compliance with the Regulation 3 (e) of the CEA (Grid Standards) in terms of IEGC Regulation 5.2 (e); and
- (c) OPTCL may be directed to carry out a thorough audit of the protection system at all its substations and take corrective measures.
- (d) May pass such other orders as deemed fit, in the circumstances of the case.”

2. The petitioner has submitted that 400 kV Meramundali sub-station is one of the important gateways for import of power by Odisha as well as export of power to Southern Region through HVDC back-to-back at Gajuwaka. This sub-station also functions as a pooling point for the generating stations at Talcher STPP, IPPs at GMR and JITPL and a number of CPPs in the State of Odisha.

3. The petitioner has submitted that operational constraints at Meramundali sub-station have been in existence since 2009, and have disrupted power supply in OPTCL's transmission system a number of times. The incidents of multiple trippings from Meramundali sub-station were discussed during 82nd, 83rd and 86th OCC meetings held on 18.2.2013, 25.3.2013 and 21.6.2013 respectively, Special Protection Sub-Committee meeting held on 5.6.2013, 17th Protection Sub-Committee meeting held on

21.8.2013, 89th and 94th OCC meetings held on 10.9.2013 and 21.2.2014 respectively
In the said meetings, OPTCL was requested to take necessary corrective action to prevent multiple element outages from Meramundali sub-station. However, the desired improvement did not happen.

4. The petitioner has submitted that the outage at Meramundali sub-station reduces ATC of Eastern Region –Southern Region and the reliability of supply to both OPTCL and Southern Region. The forced outage/trippings of multiple transmission elements at 400 kV Meramundali sub-station and 220 kV sub-station at Jeynagar and Theruvali on numerous occasions resulted in temporary removal of complete sub-station from service. These events were a rare contingency as per transmission planning criteria. Such contingency always causes unforeseen variation in line flows and deterioration of grid parameters such as frequency and voltage, necessitating generation re-dispatch and/or unplanned load regulation.

5. The petitioner has submitted that the list of tripping demonstrates the inadequacy of protection system at 220 kV Jeynagar and Theruvali sub-stations and 400 kV Meramundali sub-station which are under the jurisdiction of OPTCL. Despite deliberations at RPC Forum, OPTCL is not maintaining the system as per the provisions of Regulations 5.1, 5.2 (e), 5.2 (l) and 5.2 (r) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (Grid Code) which is adversely affecting the grid operation. As per Regulation 12 of the Central Electricity Authority (Grid Standards) Regulations, 2010 (CEA Grid Standards Regulations) and

Regulation 5.2 (r) of the Grid Code, users, STU/SLDC and CTU are required to submit information to RLDC for analysis of any grid disturbance. In accordance with Regulation 5.2 (e) of the Grid Code, STU/SLDC and CTU are required to carry out maintenance of their respective power system elements as per the provisions of CEA Grid Standards Regulations.

6. The petitioner has submitted that inadequacies/failures in the protective system at 400 kV Meramundali sub-station and 220 kV sub-stations at Jeynagar and Theruvali of OPTCL are effecting the security, economy and efficiency of the grid.

7. The matter was heard on 24.4.2014. The Commission directed the parties to complete the pleadings.

8. During the course of hearing on 5.6.2014, the representative of the petitioner highlighted multiple tripping incidences in the State of Odisha as under:

(a) On 30.5.2014, there was complete blackout of Budhipadar sub-station due to fault in the 220 kV circuits of Tarkera-Budhipadar transmission line which led to loss of generation in various power stations in Odisha.

(b) On 30.5.2014, there was fault in Meramundali sub-station and bus 2 of sub-station became dead.

(c) On 7.4.2014, there was complete black out of Dubri sub-station in Odisha.

(d) Power supply within Odisha and transfer of power to Southern Region is dependent on the reliability of transmission system of OPTCL.

(e) The petitioner requested the Commission to direct OPTCL to correct the inadequacies in the system in a time bound manner and to carry out audit of its transmission system in accordance with report of the Task Force on Power System Analysis under contingency.

(f) The audit carried out is not as per the checklist specified by report of Task Force on Power System Analysis under Contingency. In response, the representative of OPTCL submitted that only two recommendations of report are pending for implementation and the rest of the recommendations have been attended/implemented.

9. The Commission directed OPTCL to submit a compliance report of earlier audit carried out by ERPC. The Commission further directed ERPC to submit status of implementation of recommendations of protection audit by OPTCL in respect of audit/inspection already done by the team constituted in ERPC. The Commission directed OPTCL to engage an independent third party, preferably CPRI to undertake afresh a complete audit of OPTCL transmission system as per checklist specified by report of Task Force on Power System Analysis under Contingency, which is available on CEA's website and submit a report in this regard.

10. OPTCL, vide affidavit dated 17.7.2014, has submitted status of implementation of recommendations of protection audit by OPTCL in respect of audit/inspection already carried out by the team constituted in ERPC. OPTCL has submitted the status of Meramundali 400 kV sub-station, Mendhasal 400 kV sub-station, Theruvali 220 kV sub-

station, Jayanagar 220 kV sub-station, Tarkera 220 kV sub-station, Joda 220 kV sub-station and Budhipadar 220 kV sub-station.

11. Meanwhile, the petitioner filed an I.A. No. 50/2014 seeking direction to OPTCL to comply with the provisions of the Grid Code and CEA Grid Standards Regulations. The petitioner in the IA has submitted as under:

(a) As per the Commission's direction, OPTCL engaged CPRI to undertake complete audit of OPTCL transmission system as per checklist specified by report of Task Force on Power System Analysis under contingency. He further submitted that OPTCL is in the process of discussion with CPRI for carrying out an independent audit of its transmission system. However, no response has been received from CPRI till date.

(b) The issue of frequent disturbances at Budhipadar, Theruvali, Jaynagar and Meramundali sub-stations including other issues such as replacement of faulty circuit breaker and old electromechanical relays by numerical relays were discussed in the 20th, 21st and 22nd Protection Coordination Sub-committee (PCC) meetings of ERPC in which PCC members expressed serious concern at the un-coordinated tripping in OPTCL system.

(c) Number of disturbances have occurred in OPTCL system in the months of June, July and August since 5.6.2014. The fault clearing time as estimated from PMU data for many of the disturbances run in seconds.

(d) In spite of repeated persuasion, no tangible result is forthcoming and trippings are continuing unabatedly in OPTCL system. The inadequacies/failures of the protective system in OPTCL are affecting the security, economy and efficiency of the State and the Eastern Region.

12. During the hearing on 28.10.2014, the representative of the petitioner submitted that as per the Commission's direction, OPTCL is in the process of discussion with CPRI for carrying out an independent audit of its transmission system. However, no response has been received from CPRI till date. The representative of the petitioner further submitted that in the PCSC meetings of ERPC, the uncoordinated tripping which led to blackout of 220/400 kV sub-station was noticed. The delayed fault clearing threatens the security not only of OPTCL sub-stations but also jeopardize the security of national grid as a whole. The representative of the petitioner submitted that OPTCL has not filed the details required for analysis of incidents, as per format circulated in ERPC forum. The Commission directed CTU to examine whether audit of the protection system of OPTCL's sub-stations could be undertaken by CTU and submit its response in this regard.

13. OPTCL, in its reply dated 13.11.2014, has submitted as under:

(a) CPRI has expressed its consent to undertake complete audit of protection system of OPTCL as per checklist specified by 'Task Force on Power System Analysis under Contingency' available on CEA's website.

(b) OPTCL is in the process of strengthening its protection system and especially the bus bar protection system in respect of 12, 220 kV sub-stations.

The work at Cuttak (Bidanasi) 220 kV sub-station has been completed and work at Bhubaneswar (Chandaka) 220 kV sub-station is expected to be completed shortly. For remaining 10 sub-stations, works are being carried out by M/s Siemens, India which is expected to be completed by December, 2014.

(c) OPTCL has replaced/overhauled circuit breakers, relays and other equipment in 220 kV Theruvali, Jaynagar and Budhipadar sub-stations and 400 kV Meramundali sub-station during last one year.

(d) All sub-stations have been provided with GPS system for time synchronization. All 220 kV transmission lines are provided with numerical Distance Protection (DP) relays and replacement of electromagnetic relays (for Over current and Earth fault) with numerical relays is being done in a phased manner. Event Loggers for 12 nos. of 220 kV sub-stations have been procured and the panel erection work is in progress.

(e) On 23.7.2014, the tripping of 400 kV GMR- Meramundali line occurred at GMR end, due to instantaneous time setting for Zone-2 of DP relays. GMR has revised the above setting to 300ms. Similarly, the 400 kV GMR-TSTPP line tripping on earth fault occurred due to time setting of earth fault being kept at 60ms. The same has been revised to 1.5 second.

(f) OPTCL has requested to direct the petitioner to co-ordinate all such issues in the PCC of ERPC and in the event of non-satisfaction, petitioner can raise the issue in TCC and ERPC forum.

14. OPTCL and GRIDCO in their joint affidavit dated 6.1.2015 have submitted the details regarding replacement of faulty circuits breakers, old relays etc. in the context of frequent disturbances in certain grid sub-station of OPTCL as under:

(a) Bus-bar protection installation work in Jayanagar, Theruvali and Budhipadar sub-stations has been completed. However, due to defect of some relays, the commissioning could not be completed. M/s Siemens has started work for replacing the relays and completion of commissioning of the bus bar protection in above grid sub-stations.

(b) With regard to Meramundali grid sub-station, testing work has been completed and the commissioning work is in final stage and is expected to be completed in a week's time.

(c) Replacement of electromagnetic relays with numerical relays has been completed at 220 kV system at Meramundali and Budipadhar sub-stations. However, at Jayanagar sub-station, replacement of electromagnetic relays with numerical relays would be completed by 2.1.2015.

(d) Replacement of Circuit Breakers at Meramundali sub-station would be completed by 30.1.2015.

15. During the hearing on 15.1.2015, the representatives of ERPC and ERLDC, submitted that on 11.1.2015, 5 nos. of 400 kV transmission lines, namely 400 kV D/C Meramundali-Angul, 400 kV D/C Meramundali-IBTPS and 400 kV D/C Meramundali-Duburi-2 tripped on overvoltage at Meramundali sub-station. They further submitted that

all the above 400 kV transmission lines had tripped on 2.1.2015 due to overvoltage at Meramundali sub-station. The representatives of ERPC and ERLDC further submitted that OPTCL is not providing any Event Log (EL) and Disturbance Record (DR). There have been repeated failures of lightning arresters on 400 kV transmission lines at 1401 hrs and 1905 hrs on 5.12.2014, at 1748 hrs on 6.12.2014 and at 1643 hrs on 17.12.2014 which shows poor operation and maintenance of the transmission lines. In response, learned counsel for OPTCL submitted that the petitioner should have called OCC meeting to discuss the above mentioned disturbances. The persistent overvoltage is due to inherent planning problem. Learned counsel further submitted that LOA has been placed on CPRI for independent third party audit for major 400 kV and four 220 kV sub-station in OPTCL system. Since, ERPC has identified only four areas and OPTCL has placed orders for third party audit only in these four areas, OPTCL can further order if the committee wants further audit. Learned counsel submitted that all distance protection relays have been procured and are to be installed. The major disturbances in OPTCL system are being deliberated on monthly basis in PCC meetings of ERPC. The representative of ERLDC submitted that as per tripping report submitted by OPTCL in respect of tripping on 11.1.2015, only two dias out of total eight dias seems to be completed and there was very poor coupling between buses as most of the dias were not completed.

16. OPTCL in its affidavit dated 16.2.2015 has further submitted as under:

- (a) Work order has been placed on CPRI to carry out the third party protection audit. CPRI is yet to take up the assigned audit.

(b) The alleged multiple tripping in the month of December 2014 and January 2015, were not part of the original petition or the Interlocutory Application filed by the petitioner. Since the remedial action on this issue falls within the jurisdiction of ERLDC, OPTCL has been requesting the ERLDC to regulate voltage at Meramundali area.

(c) Non-submission of EL and DR is not factually correct. OPTCL is furnishing the annunciation and DR recorded by numerical relays in PCC meetings as per the requirement.

17. ERLDC in compliance of Commission's directions dated 29.1.2015 to examine the LOA placed on CPRI by OPTCL for adequacy, vide its affidavit dated 2.4.2015, has submitted as under:

(a) LOA of OPTCL did not explicitly cover the requirements as specified in the report of the "Task Force on Power System Analysis under Contingencies". The same was informed to OPTCL.

(b) On 18.2.2015, OPTCL informed ERLDC that an amended LOA to CPRI in respect of time of completion of audit, has been issued. OPTCL is in the process of compiling inputs to be given to CPRI, for carrying out protection audit in the identified sub-stations. OPTCL further informed that the requirement of compliance with the recommendations of the "Task Force on Power System Analysis under Contingencies" would be intimated to CPRI during submission of the inputs required for the audit.

(c) CPRI is yet to take up auditing of the Protection system of the four identified sub-stations in OPTCL.

Analysis and Decision:

18. We have considered the submissions of the petitioner and OPTCL. The present petition has been filed seeking direction to OPTCL to carry out audit of the protection system at its sub-stations so that corrective measures can be taken in Odisha transmission system. According to the petitioner, 400 KV Meramundali sub-station of OPTCL is one of the important gateways for import of power by Odisha as well as export of power to Southern Region through HVDC back-to-back at Gajuwaka. The 400 KV Meramundali sub-station functions as a pooling point for the generating stations at Talcher STPP, IPPs of GMR and JITPL and a number of CPPs in the State of Odisha and a significant part of Odisha's load is catered from Meramundali sub-station. Therefore, tripping of multiple elements at Meramundali sub-station has impact on the security of not only Odisha system but also of Eastern and Southern Regions.

19. The petitioner has alleged that operational constraints at Meramundali sub-station have been existing since 2009, and have disrupted power supply in OPTCL's transmission system a number of times. The petitioner has also alleged that repeated trippings in South Odisha system are leading to frequent black out of Jeynagar, Theruvali, Balimela and Upper Kolab sub-stations.

20. Despite our specific directions to OPTCL on 5.6.2014 to undertake complete audit of OPTCL transmission system afresh preferably by CPRI and submit its report within three months, OPTCL did not engage CPRI within the specified time frame. However, OPTCL submitted the report of earlier audit carried out by ERPC. The compliance report indicates that most of the observations are yet to be complied with by OPTCL.

21. ERLDC has stated that OPTCL system is in a vulnerable condition and frequent disturbances are being observed at Budhipadar, Theruvali, Jeynagar and Meramundali sub-stations. On perusal of the minutes of 20th PCC meetings held on 19.6.2014, it is noted that disturbances are due to shortcomings in OPTCL`s system.

22. OPTCL awarded the contract for carrying out protection audit to CPRI on 27.11.2014 i.e. after 5 months of the Commission`s direction, without any time frame for completion of audit. As per RLDC`s status report dated 19.2.2015, all requirements under “Task Force on Power System Analysis under Contingencies” have not been taken into consideration. This kind of a casual conduct towards grid security is not acceptable. Any fault in OPTCL system affects grid security of the entire grid. It is the responsibility of STU to ensure healthiness of its system as a grid connected utility. OPTCL should give utmost importance to make its system compliant with Grid Code and CEA Grid Standard Regulations so that it does not endanger grid security.

23. We have perused the minutes of meeting of OCC dated 28.5.2015 available on ERPC website. It is noticed that even for the third party protection audit conducted after

grid disturbance of 2012, only 20% of protection audit remarks have been complied with by OPTCL. As per Section 39 of the Electricity Act, 2003, STU is required to ensure development of an efficient, co-ordinated and economical system of intra-State transmission lines for smooth flow of electricity. The relevant portion of Section 39 (2) (c) of the Act is extracted as under:

"To ensure development of an efficient, co-ordinated and economical system of intra-State transmission lines for smooth flow of electricity from a generating station to the load centers;"

OPTCL needs to expeditiously complete the work identified in the third party Protection Audit so that frequent trippings in its system are eliminated and the grid security is not endangered.

24. OPTCL vide its letter dated 30.1.2015 has stated that protection audit afresh by CPRI is under process and shall be completed within 120 days from receipt of data or completion of site visit, whichever is later. We direct OPTCL to ensure that all the findings of protection audit by CPRI are addressed and rectifications are completed as expeditiously as possible. OPTCL is further directed to submit the progress of implementation of works and report on frequency of tripping at Meramundali sub-station as on 30.9.2015 and 30.11.2015 within 15 days, thereafter to ERPC. We also direct ERPC to monitor the progress of corrective measures in regard to problems identified in Protection Audit and file compliance report along with report on frequency of trippings at Meramundali sub-station as on 30.9.2015 and 30.11.2015.

25. It is noted that OPTCL was given a number of opportunities to improve its protection system and to comply with the provisions of Grid Code and CEA Grid

Standards Regulations. However, OPTCL did not improve its protection systems, particularly at Meramundali sub-station. Non-compliance of the Grid Code and the direction of the Commission by OPTCL shall attract initiation of action under Section 142 of the Electricity Act, 2003 against the CEO of OPTCL.

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

Sd/-
(A.S. Bakshi)
Member

sd/-
(A. K. Singhal)
Member

sd/-
(Gireesh B. Pradhan)
Chairperson