CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

Petition No. 130/MP/2013

Coram:
Shri Gireesh B. Pradhan, Chairperson
Shri M. Deena Dayalan, Member
Shri A.K. Singhal, Member

Date of Hearing: 24.04.2014
Date of Order : 07.10.2014

In the matter of

Petition for compliance of Section 39 of the Electricity Act, 2003 read with Regulation 2.8.1 (c) of Central Electricity Regulatory Commission (Indian Electricity Grid Code) (First amendment) Regulations, 2012 to ensure development of an efficient, co-ordinate and economical system of intra-State transmission lines for smooth flow of electricity from a generating station to the load centers and for providing protection systems having reliability, selectivity, speed and sensitivity and keeping them functional in terms of Regulation 5.2 (I) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (First amendment) 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-110 016 **Petitioner**

Vs

1. Chairman, Jharkhand State Electricity Board,
Engineering Building,
HEC, Dhurva, Ranchi-834 004

2. Chief Engineer (Trs and O & M),
Jharkhand State Electricity Board,
Engineering Building, HEC, Dhurva, Ranchi-834 004 **Respondents**

3. Member Secretary
Eastern Regional Power Committee

14, Golf Club Road,
Tollygunge, Kolkata-700 003

4. Executive Director (ER-1)
Power Grid Corporation of India Limited
J-1-15,Sector-V, Salt Lake, Kolkata-700 091

5. Executive Director (ER-2)
Power Grid Corporation of India Limited
5th and 6th Floors, Alankar Palace, Boring Road,
Patna-800 001

6. Bihar State Power Holding Company Limited
Vidyut Bhawan, Bailey Road, Patna-800 021

7. Damodar Valley Corporation
DVC Headquarters, DVC Towers,
VIP Road, Kolkata-700 054

8. Odisha Power Transmission Corporation Limited
P.O. Mancheswar Railway Colony, Bhubaneswar-751 017

9. West Bengal State Electricity Company Limited
Vidyut Bhawan, Bidhannagar,
Block-DJ,Sector-II, Kolkata-700 091

10. Energy and Power Department
Govt of Sikkim, Kazi Road, Gangtok-737 101 …**Proforma Respondents**

Following were present:

For the petitioner:

1. Shri Surajit Banerjee, ERLDC
2. Ms. Jyoti Prasad, NLDC

For the respondent:

Shri R.B. Sharma, Advocate, JSEB

ORDER

The petitioner, Eastern Regional Load Despatch Centre (ERLDC) has filed the present petition seeking following reliefs:

> "(a) Appropriate directions/advice may be issued to the respondent for its failure to comply with the:
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> (i) Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2010;
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> (ii) Regulations 5.1, 5.2(e), 5.2(i) and 5.2 (r) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) (First Amendment) Regulations, 2012.
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> (b) JSEB 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) at the earliest;.
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> (c) JSEB may be directed 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 in compliance with Section 39 of the Electricity Act, 2003 and Regulation 2.8.1 (C) of IEGC;and
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> (d) May pass such other orders as deemed fit, in the circumstances of the case."

2. The petitioner has submitted that the protection system of Jharkhand State Electricity Board (JSEB) is in an appalling condition since long, resulting in frequent power supply interruptions in the State.

3. The petitioner has highlighted multiple tripping incidences at various sub-station due to lack of co-ordination of relay at Hatia sub-station as under:

(a) A number of tripping and disturbances had occurred in and around Hatia sub-station of JSEB. On most of the occasions, it was observed that a single fault led to tripping of multiple elements and the fault was cleared by tripping from

remote end. The disturbances *inter-alia* caused tripping of the running units at Patratu TPS and Tenughat TPS of JSEB also.

(b) 220 kV Tenughat-Biharshariff S/C is under breakdown from 12.5.2013 due to tower collapse. This outage has imposed constraints in evacuation of power from Tenughat as well as Patratu TPS which are now dependent on the transmission system connected to Hatia sub-station for evacuation of their generation. Further, any fault in 220 kV Patratu-Tenughat S/C line is leading to immediate isolation of Tenughat TPS. However, despite existence of alternative evacuation route for Patratu TPS, such fault is causing loss of generation of this station too.

(c) On 13.5.2015 at 16:18 hrs, due to fault in 220 kV Tenughat-Patratu S/C line, which could not be cleared in time by local main protection leading to tripping of 220 kV Patratu-Hatia D/C, 220/132 kV 2x150 MVA ICT at Hatia along with two running units at Tenughat (U#1 and 2, generation was 317 MW) and Patratu (U#4 and 10, generation was 110 MW).

(d) On 3.6.2013 at 15:39 hrs, 220 kV Ranchi-Hatia line tripped on distance protection, R-ph to ground fault, Fault Current (F.C)-5.14 kA, 21.8 km from Ranchi end. The fault could not to be cleared from Hatia end in time which caused simultaneous tripping of 220 kV Patratu-Hatia D/C, 132 kV Patratu-Hatia-D/C, 132 kV Chandil-Hatia and 220 kV Tenughat-Patratu lines. As a result, the running units of Patratu U#4 and 6 (68 MW) and Tenughat U#1 (142 MW)

tripped due to loss of evacuation path. The traction load at Hatia, Namkum and Kamdara sub-stations also got affected.

(e) The incidents were taken up in the Special PCC (Protection Coordination Committee) held on 5.6.2013 at ERPC Kolkata, wherein members took serious note of non-compliance with the provisions of Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (Grid Code) by JSEB. However, in the said meeting, JSEB could not furnish satisfactory reasons for the tripping. It was also noted that adequate information for analyzing the incidents such as DR (Disturbance Records) and EL (Event Logger) are not being furnished. The time-frame for furnishing preliminary report as specified in the Grid Code is often not being adhered to. Disturbances in JSEB were further discussed in the Special PCC meeting of ERPC held on 14.6.2013.

(f) Commitments given by JSEB in the earlier RPC meetings for rectifying/renovating its protection deficiencies have not yet materialized, and disturbances in JSEB are continuing unabated.

4. The petitioner has submitted that the need for improving the protection system of JSEB is being deliberated in various fora of Eastern Regional Power Committee (ERPC) for the last two years, with achievement of no significant progress in this direction, which amply illustrate the lack of seriousness on the part of JSEB. Moreover, JSEB frequently refrained from attending several successive meetings due to which deliberation pertaining to its system had to be abandoned. Under the circumstances, not

only the consumers of the State are suffering badly, but also the security of the entire Eastern Regional grid is at stake.

5. The petitioner has further submitted that inadequacies/failures in the protective system at Hatia sub-station of JSEB are affecting the security, economy and efficiency of the State. For most of the incidents that have occurred so far, detailed report and analysis have not been made available to ERLDC in contravention to Regulation 5.2(r) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 as amended from time to time (Grid Code) and Regulation 15 of the Central Electricity Authority (Grid Standards) Regulations 2010 (CEA Grid Standards Regulations).

6. Reply to the petition has been filed by the respondents. The respondents in their joint reply dated 18.2.2014 have submitted as under:

(a) The actions to improve protection system of transmission network in JSEB have been taken in line with the direction of ERPC/ERLDC and regular updates on improvement are being discussed regularly in the meetings of Protection Co-ordination Committee. Meetings of PCC are also held regularly with all the constituents of the region to co-ordinate and monitor the entire aspects of the relay co-ordination to ensure the security of the Eastern Regional Grid as well as the inter-connected Indian Grid. There have been clear and distinct improvements on the issue which was recognized by the petitioner in the special meeting of PCC held on 28.1.2014.

(b) JSEB is intended to complete the work in a time bound manner and in this regard it has directed all its concerned officials for compliance of issues related to protection in GSS as per direction of ERPC/ERLDC.

(c) 220 kV Tenughat-Biharshariff S/C line which was under breakdown has been restored on 12.11.2014 and therefore, the transmission constraints in evacuation of power from 220 kV Tenughat-Biharsharif S/C as well as Patratu TPS have been removed.

(d) There have been uncoordinated tripping at Hatia-I, Hatia-II, Ramchandrapur and Chandil GSS and the settings of relays on all the four GSS were checked, reviewed and coordinated in consultation with the Engineers of PGCIL during 23-27. 6.2013.

(e) The transmission line emanating from Patratu TPS have Micom relays which have been tested and caliberated. The relays settings have been configured with the help of M/s Areva in the month of October 2013.

(f) JSEB is guided by the views of Protection Coordination Committee (PCC) of ERPC in which the petitioner is also one of the members. JSEB has no issue on this point and if the petitioner has any point, the same can be discussed in the meeting of PCC for implementation.

(g) JSEB has requested to direct the petitioner to co-ordinate all such issues in the ERPC forum.

7. The respondents in their joint reply dated 17.4.2014 have further submitted that there was recently a tripping at Hatia-II and Chandil GSS causing total power failure at these grids. This tripping was not due to protection failure but on account of operation of LBB protection in the course of CT/PT testing at Hatia-II which is attributable to human errors. Similarly, a tripping at Chandil GSS also occurred during the retrofitting of new LBB relay. The respondents have further submitted that JSEB is taking due care to avoid such mishappening in future.

8. During the hearings on 25.2.2014 and 24.4.2014, the representative of the petitioner requested the Commission to direct JSEB to comply with the provisions of Grid Code and CEA Grid Standards. He further submitted as under:

(a) There is no tangible progress in rectification/implementation of protection system;

(b) JSEB has not submitted details of measures taken for implementation of protection system;

(c) The Commission vide its order dated 17.9.2013 in Petition No.72/MP/2013 had directed JSEB to attend the discrepancies of the protection system by December 2013. However, a number of tripping and disturbances had occurred in

and around Chandil and Hatia sub-stations of JSEB. ERPC convened a Special Protection Committee meeting on 28.1.2014 at Kolkata for ascertaining the latest status on implementation of recommendations of various ERPC teams as well as on zone settings towards full co-ordination of protection system of JSEB. Out of 28 remedial measures suggested by the Committee, JSEB has implemented only 14 measures so far;

(d) The respondent has not submitted the reports on routine tests on CTs and PTs to ERPC; and

(e) Even after the corrective measures taken by JSEB, on 22.4.2014 at 11.09 hrs, for single line to ground fault at Ranchi-Chandil line, LBB Protection operated at Chandil and all 220 kV and 132 kV elements connected to Chandil tripped and there was total failure of supply at Chandil area.

9. The Commission after hearing the parties on 24.4.2014 directed the petitioner and ERPC to convene a specific meeting of Special Protection Committee to discuss the issues pertaining to the present petition and file a report with compliance status by 10.6.2014.

10. ERPC vide letter dated 6.6.2014 has submitted that Special PCC meeting was convened on 9.5.2014 at ERPC, Kolkata for smoothening out protection related problems of JSEB. ERPC summed up the discussion held on 9.5.2014 as under:

(a) The status on implementation of recommendations of various ERPC teams for rectification of protection deficiencies in JSEB system was reviewed. The latest status on compliance is attached at **Annexure-I**;

(b) JSEB was advised to submit the report on routine tests of CT/PTs. JSEB is yet to submit the report;

(c) JSEB was advised to submit the detailed report on the status of PLCC link and Auto-reclosure scheme. The latest status on restoration of PLCC link and Auto-reclosure scheme for all 220 kV lines is attached at **Annexure-II**;

(d) The tripping incidences of 220 kV Chandil sub-station due to mal-operation of LBB protection system on 28.3.2014, 29.3.2014 and 22.4.2014 were deliberated in Special PCC meeting as well as in 19th PCC meeting held on 16.5.2014. JSEB ascertained that the LBB protection scheme has already been installed at Chandil sub-station on 30.3.2014. However, the LBB was mal-operating due to other factors. In 27th TCC/ERPC meeting held on 30/31.5.2014, JSEB confirmed that decision on LBB has already been complied with but it did not operate on one occasion due to delay in breaker operation at 220 kV Chandil sub-station. JSEB informed that the breaker problem has already taken care of in consultation with M/s Areva;

(e) In the Special PCC as well as in 19th PCC meetings held on 9.5.2014 and 16.5.2014 respectively, JSEB was advised to follow all safety/operating procedure strictly before undertaking any testing and

commissioning/maintenance work to avoid any type of mal-operation. JSEB was also advised to attend the following three main deficiencies at the earliest and prepare a report and submit the same to ERPC Secretariat:

(i) Measuring the operating time of all CBs at Chandil and rectifying/replacing the faulty CBs;

(ii) Checking the protection CT connection polarities of all lines emanating from Chandil sub-station and taking necessary corrective actions;

(iii) Thorough checking of all LBB protection system recently installed at Chandil for satisfactory performance.

11. ERPC, vide its submission dated 6.6.2014, has submitted that JSEB has complied with most of the recommendations of various ERPC teams which visited Chandil sub-station, Hatia sub-station (New), 132 kV Hatia sub-station, Tenughat TPS (2*210 MW) and Patratu TPS (2*50 + 1*100 MW) on 11/12/13.6.2013 and 132 kV Ramchandrapur, 132 kV Adityapur and Chandil sub-stations from 18.9.2013 to 20.9.2013 in JSEB control area. However, the following recommendations have not been complied with by JSEB:

(a) Recommendation of ERPC team which visited 220 kV Hatia sub-station (New), 132 kV Hatia sub-station, Tenughat TPS (2*210 MW) and Patratu TPS (2*50+1*100) MW on 11th, 12th and 13th June, 2013 in line with decision taken in

the Special Protection Committee meeting held on 5.6.2013 and latest status as under:

Recommendations	Latest Status
The PLCC link on 220 kV Tenughat- Patratu S/C, 220 kV Patratu- Hatia D/C and 220 kV Tenughat-Biharshariff S/C should be established immediately	As informed by TTPS, 220 kV Tenughat-Biharshariff 220 kV PLCC is not looked after by JSEB. As informed by TTPS, 220 kV Tenughat-Biharshariff line is under up gradation from 220 kV to 400 kV by PGCIL in which the same will be taken care.
The Auto-reclose feature should also be enabled on all the above 220 kV lines immediately.	A/R feature will be enabled immediately after restoration of PLCC link.

(b) Recommendation of ERPC team which visited 220 kV Ramchandrapur, Chandil, 132 kV Adityapur and 220 kV WBPDCL Santaldih sub-stations from 18.9.2013 to 20.6.2013 to ascertain the reasons behind disturbances occurring repeatedly in JSEB system (Ramchandrapur sub-station) is as under:

Observations	Recommendation	Latest Status
Relays are not time synchronized, therefore it is not possible to determine the sequence of events in case of multiple outage	JSEB should install the GPS system and time synchronize all its numerical relays with GPS clock	Material arrived. expected to be completed by 31.5.2014.

(c) Recommendations of various sub-committees and latest status are as under:

Recommendations	Latest Status
17th PCC meeting held on 11.9.2013	
Various Zone-settings of all transmission lines of JSEB were discussed and finalized and advised to implement the same by 31.12.2013	Complied (Except tie lines with NTPC and UP where some additional data were required for Z-3 settings).
JSEB was advised to place Restricted Earth Fault (REF) protection for all transformer with	All new transformer panels of capacity greater than 50 MVA are with REF. For three old 100 MVA, 220 kV transformers

rating >50 MVA.	discussion is on with M/s Areva for providing REF relays.

12. With regard to status of PLCC system of JSEB sub-stations, ERPC has submitted that PLCC is not available at number of sub-stations as under:

(a) For 220 kV Hatia II-PGCIL and 220 kV Chandil-PGCIL (Ranchi), responsibility for PLCC installation is with PGCIL. However, PLCC has not been commissioned yet. Power Grid has already purchased PLCC panels and switchyard equipments relating to PLCC and protection coupler.

(b) For 220 kV Hatia II-PTPS ckt-I and ckt-II, PLCC is not available at PTPS end for both circuits.

(c) For 220 kV PTPS-Tenughat and 220 kV Chandil- Ramchandrapur, PLCC link is available under ULDC project for speech and data communication only.

(d) For 220 kV Chandil-STPS line, PLCC link is not available at both end i.e. Chandil end and STPS end.

(e) Auto-reclosure feature is available which will be enabled after commissioning of PLCC.

13. We have considered the submissions of the representative of the petitioner and learned counsel for the respondents. The respondents have admitted that the protection system needs to be set right. It is noted that the issue for improving the protection system of JSEB was discussed in special PCC meetings held on 5.6.2013, 14.6.2013,

28.1.2014 and 9.5.2014. The Commission, vide order dated 17.9.2013 in Petition No.72/MP/2013, had directed JSEB to attend the discrepancies of the protection system by December 2013. However, a number of tripping and disturbances had occurred in and around Chandil and Hatia sub-stations of JSEB even during the year 2014. The incidences of grid disturbance are still happening in JSEB system and JSEB is not submitting reports of such disturbances to ERLDC in time. Further, JSEB has not fully complied with the recommendations of various ERPC teams which visited sub-stations in JSEB systems.

14. From the pleadings of the parties, we observe that implementation of protection system is a serious matter. We agree to the contentions of petitioner and emphasize that Grid Security is of utmost importance and of priority and the petitioner has done nothing wrong by bringing the issue before this Commission especially in view of the fact that the matter has already been discussed at various RPC forums without any tangible progress.

15. Further to take stock of the prevailing situation of JSEB System, on perusing the minutes of 22nd and 100th PCC/OCC meetings of ERPC held on 21.8.2014 and 22.8.2014 respectively, following has been observed:

(a) On 8.7.2014 at 13:53 hrs, there were two incidences, R-ph to ground fault occurred in 220 kV Chandil sub-station and total power at Chandil sub-station was interrupted due to busting of 33 kV side Y-phase LA of 132/33 kV transformer-IV at Adityapur sub-station which caused a load loss of 111 MW.

This was GD-1 type of disturbance. The tripping incidence could not be explained properly by the representative of JSEB. PCC advised JSEB to collect the details and send the detailed tripping incidence report in standard format within 7 days and also check the Zone setting of distance relay of 220 kV Chandil- Ramchandrapur line at Ramchandrapur end and Zone settings of all the distance relays at 220 kV Chandil sub-station. During the 22nd PCC held on 21.8.2014, JSEB informed that, Zone 3 settings at Chandil end of 220 kV Chandil-Ranchi (PG) and Zone 1 setting of 220 kV Chandil- Ramchandrapur was found incorrect and the same has been rectified. It was further informed that M/s Areva is testing all the relays at 220kV Chandil sub-station.

(b) On 21.7.2014 at 13:09 hrs, there were disturbances at Patratu and Hatia sub-stations and Tenughat which caused a load loss of 220 MW and generation loss of 30 MW. During the 22nd PCC held on 21.8.2014, the representative of JUSNL informed that the tripping details at Patratu end are available with newly constituted Jharkhand Urja Utpadan Nigam Ltd (JUUNL). He further informed that testing of protective relays by M/s Areva is in progress at all sub-stations in around 220 kV Chandil sub-station. The relay settings, if necessary, would be changed. PCC advised JUSNL to submit the detailed report after collection of tripping information from Patratu TPS and Hatia sub-station at the earliest.

(c) On 3.5.2014 and 31.5.2014, there were disturbances at Tenughat/Patratu/Hatia sub-stations. As per preliminary report, due to inclement

weather conditions the 220 kV Tenughat-Patratu, 220 kV Patratu- Hatia and 132 kV Patratu-Hatia were tripped along with Tenughat and PTPS units. In 20th PCC meeting, the issue could not be discussed in detail as the representative of JSEB was not present in the meeting. In 21st PCC meeting , it was observed that on both occasions i.e. on 3.5.2014 and 31.5.2014, TVNL maintained around 380 MW generation when 220 kV TVNL-Biharshariff line was under outage. It was an operational problem, which led to cascade tripping of various transmission lines connected to 220/132 kV PTPS. In the 22nd PCC meeting, JUSNL informed that relay testing of protection relays by M/s Areva is in progress at all sub-stations in and around Chandil sub-station.

(d) As per 99th OCC meeting held on 8.7.2014, CTU has restored the OPGW link on 3.7.2014 and JSEB has to restore its PLCC. The updated status of telemetry of JSEB sub-stations under ULDC project as deliberated in the 100th OCC meeting held on 22.8.2014 is as under:

S. No.	Name of the RTU	Latest Status
1	Chandil	Reporting
2	Lalmatia	Reporting
3	Hatia	Reporting
4	Ramchandrapur	Reporting is interrupted because of problem in PLCC link between Chandil and Ramchandrapur. CVT brusted at Ramchandrapur bay and requires replacement. Arrangement in being done for its replacement

5	Jamtara	Jamtara RTU has been shifted in new control room. POWERGRID has been requested to reintegrate the feeders in RTU as integration of additional feeder (new element) in the existing RTU. Work order for re-integration of Jamtara feeders to be placed on Powergrid is under process of vetting.
6	Deoghar	Both LMU and LMDU rusted at Jamtara. Arrangement in being done for its replacement. Deoghar-Jamtara-Maithon link is interrupted also because of snatching of patching cable at Maithon (G) and Maithon (SLDC). This was found during survey of sites with M/s PUNCOM which will be corrected by the agency under AMC. AMC by PUNCOM has been started.
7	Garawah	Garawah RTU will be restored when it will be connected from Ranchi end through Hatia-Loherdaga-Latehar-Daltonganj –Garwah Transmission line.
8	Sikidri	AMC by PUNCOM has been started. PUNCOM engineers are attending the sites for rectification of fault in PLCC causing non reporting of RTUs
9	Patratu	
10	Tenughat	
11	Rajkharsawan	Reporting is interrupted because of shifting of Chandil bay at Rajkharsawan. PLCC outdoor equipment has been shifted recently to new location of Chandil bay at RKSN. Some work like termination of co-axial cable will be done soon.
12	Kendposi	
13	Goilkera	
14	Jadugoda	Co-axial cable faulty at Golmuri (Chandil bay)

16. The Commission vide order dated 21.2.2014 in Petition No. 220/MP/2012 had directed as under:

"27. Since the protection system is a vital requirement for the safe and secure operation of the grid, we have decided that in order to implement the recommendations of the Protection Audit, a compliance mechanism with definite time line needs to be put in place as under:

(a) Each STU and CTU shall submit its action plan against each deficiency within one month from issue of this order clearly stating the deficiencies which can be corrected without any procurement (Category-A) and deficiencies involving procurement of equipment (Category-B). However, action plan for deficiencies dealt in Petition No. 146/MP/2013 shall be submitted therein;

(b) The remaining deficiencies, if any, in Category-A shall be rectified by the concerned STU and CTU within 2 months of issue of the order and compliance report in this regard shall be submitted to respective RPC.

(c) As protection is a matter of critical importance, a time period of one year, as informed by various agencies in RPC for rectifying the deficiencies, which involve procurement, cannot be allowed. All deficiencies of Category-B shall be rectified within 6 months of issue of the order. In this regard, reasons of non-availability of fund or delay in procurement process shall not be accepted. The procurement and implementation is to be completed by each STU using their own fund which can be reimbursed through a common request of funding through PSDF forwarded through RPCs as per procedure recently approved by Government of India.

(d) Each SLDC shall be responsible to monitor the action taken by STU. If any deficiency in the STU system in regard to the Category-A deficiencies is not corrected after 3 months of issue of this order, the concerned SLDC may approach the respective State Commission for appropriate action against defaulting State entity in accordance with State Grid Code. The Office-in-Charge of the concerned SLDC shall be responsible for monitoring and ensuring compliance of the action plan and filing of the petition as directed herein.

(e) RPCs at the end of each quarter shall prepare a report on the protection deficiencies and their rectification which shall be sent to this Commission with a copy to CTU not later than 45 days of expiry of the quarter. The report shall inter-alia identify deviations from time lines as well as the State sub-stations which have interface with ISTS system. CTU shall take necessary action and issue a show cause notice for disconnection to sub-station of STU for not complying with the Standards for Protection and Control as per Central Electricity Authority (Technical Standards for Construction of Electric Plants and Electric Lines) Regulations, 2010 and Central Electricity Authority (Grid Standards) Regulations, 2010.

28. Accordingly, we direct CTU, STUs and Generating Companies /Stations of all the regions to ensure rectification of defects in the protection system as pointed out in the protection audit within the time frame specified in paragraph 27 herein and submit the latest status of corrective actions to Member Secretary of the respective Regional Power Committee within one month of issue of this order. All RPCs are directed to furnish consolidated report with their observations/recommendations to the Commission within 2 months of issue of this order. Thereafter, CTU and SLDCs shall submit quarterly report to the respective RPC latest by 15th day of the first month of next quarter and RPCs shall submit the report to the Commission latest by 15th day of the second month of next quarter."

17. Regulation 5.1 of the Grid Code provides that the participant utilities shall adopt good utility practice at all the times for satisfactory operation of the regional grid. Relevant portion is extracted as under:

> "5.1 Operating philosophy
> (a) The primary objective of integrated operation of the National/Regional grids is to enhance the overall operational reliability and economy of the entire electric power network spread over the geographical area of the interconnected system. Participant utilities shall cooperate with each other and adopt Good Utility Practice at all times for satisfactory and beneficial operation of the National/Regional grid."

18. Further, Regulation 5.2 (e) of the Grid Code provides that the maintenance of respective power system elements shall be carried out in accordance with the provisions in CEA Grid Standards Regulations. Regulation 5.2 (l) of the Grid Code further provides that the provisions of protections and relay settings shall be coordinated periodically throughout the Regional Grid, as per the plan to be separately finalized by the Protection sub-Committee of RPC. Relevant portion is extracted as under:

> "5.2 System Security Aspects
>
> * * * * * * * * * * * * * * *
>
> (e) Maintenance of their respective power system elements shall be carried out by users, STUs and CTU in accordance with the provisions in Central Electricity Authority (Grid Standards) Regulations, 2010. Any prolonged outage of power system elements of any User/CTU/STU, which is causing or likely to cause danger to the grid or sub-optimal operation of the grid shall regularly be monitored by RLDC. RLDC shall report such outages to RPC. RPC shall finalise action plan and give instructions to restore such elements in a specified time period.
>
> * * * * * * * * * * * * * * *
>
> (l) Provision of protections and relay settings shall be coordinated periodically throughout the Regional grid, as per a plan to be separately finalized by the Protection sub-Committee of the RPC. RPC shall also prepare islanding schemes and ensure its

implementation in accordance with Central Electricity Authority (Grid Standards) Regulations, 2010. All users and SEBs shall ensure that installation and operation of protection system shall comply with the provisions of Central Electricity Authority (Grid Standards) Regulations, 2010."

19. The petitioner has submitted that despite continued efforts, JSEB is violating the provisions of Regulations 5.1, 5.2 (e), 5.2 (l) and 5.2 (r) of the Grid Code. The respondents have failed to comply with the provisions of Grid Code and Regulation 3 (1) (e) of the CEA Grid Standards Regulations as given below:

"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 times are as specified in Table 1 below:

S.No.	Nominal System Voltage (kV rms)	Maximum Time (In milliseconds)
1.	765 and 400	100
2.	220 and 132	160

Provided that in the event of non clearance of the 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."

20. The petitioner has also submitted that inadequacies/failures in the protective system at Chandil sub-station of JSEB are affecting the security, economy and

efficiency of the State. For most of the incidents that have occurred so far, detailed report and analysis have not been made available to ERLDC in contravention of Regulation 5.2 (r) of the Grid Code and Regulation 15 of the CEA Grid Standards Regulations as given below:

> "5.2 (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 the 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".

Regulation 15 of the CEA Grid Standards Regulations provides as under:

> "15. Operational Data during normal operation and during grid incidents and grid disturbances: All operational data including disturbance recorder and event logger reports, for analyzing the grid incidents and grid disturbance and any other data which in its view can be a help for analyzing grid incident or grid disturbance shall be furnished by all the Entities within twenty four hours to the Regional Load Dispatch Centre and concerned Regional Power Committee. All Equipments such as disturbance recorders and event loggers shall be kept in healthy condition, so that under no condition such important data is lost."

21. As per ERPC`s report dated 4.9.2014 uploaded in its website, number of Third Party Audit`s observations including the important ones such as PLCC links, auto-reclose feature, time synchronization of relays and Event Logger have not been complied with. The detailed report is attached at **Annexure-III**. Further, we note that the protection system has still not improved up to the required level. Even the distance protection zone setting was found to be incorrect.

22. It is noted that JSEB was given number of opportunities to improve its protection systems and to comply with Grid Code and CEA Grid Standards Regulations. In our view, JSEB has failed to comply with the provisions of Regulations 5.1, 5.2(e),

5.2(i), 5.2(r) of the Grid Code, Regulations 3.1(e) and 15 of CEA Grid Standards Regulations and direction of the Commission.

23. We are of the view that the respondents have not only failed to comply with our directions but have also failed to discharge their responsibility under the Grid Code and CEA Grid Standards Regulations. We direct the staff of the Commission to process the case for initiation of action under Section 142 of the Act against the Chairman, Jharkhand State Electricity Board and Officer(s) in-charge, SLDC Jharkhand for non-compliance of our directions and the provisions of the Grid Code and CEA Grid Standards Regulations.

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

sd/-	sd/-	sd/-
(A.K.Singhal)	**(M. Deena Dayalan)**	**(Gireesh B.Pradhan)**
Member	**Member**	**Chairperson**

Annexure-I

The latest status of implementation of recommendations of ERPC team which visited the JSEB Stations for rectification of protection deficiencies in JSEB System

A) Recommendation of ERPC team which visited Chandil on 17.04.2013 to 19.04.2013 in line with the decision taken in the 15th Protection Sub-committee meeting held on 9th April 2013:

Name of line	Protection available	Measures required Immediately	Latest Status
220KV Chandil-Santaldih	SEL(ER) & TJM12	Matter to be taken up with M/S Easun Reyrolle	Complied.
220KV Chandil-Ranchi	SEL(ER) & TJM12	Do	Complied.
220KV Chandil-Ramchandrpur	MiCom (Relay Not working from July 2012	Matter to be taken up with Alstom	Complied.
1x 100MVA, 220/132KV Transformer	RYDSB, R1D1-Status –Not healthy-Because-No test reports-No trippings in the past	The differential relay to be tested & the report to be given to ERPC, ABB to be contacted for any assistance.	Complied
Single Main with Transfer Bus	LBB relay available	The bus to be sectionalized and LBB relay to be made operational.	Complied

B) Recommendation of ERPC team which visited 220kV Hatia s/s(New), 132kV Hatia s/s, Tenughat TPS (2x210MW) & Patratu TPS (2x50+1x100)MW on 11th, 12th & 13th June, 2013 in line with the decision taken in the Special Protection committee meeting held on 5th June 2013:

Recommendations	Latest Status
All the Micom relays at Tenughat TPS, Patratu TPS, Hatia 220KV S/S(New) have to be tested for Reliability, Selectivity, Sensitivity and speed. The manufacturer should be contacted for the above works at the earliest.	Complied
Unless EL inputs are there, the zone indication on different faults for distance protection cannot be identified. Hence the concerned utilities may take up the matter with the manufacturer and relay properly configured to receive EL inputs.	Complied
For Relays other than Micom they should be tested and if found not suitable should be replaced with numerical relay preferably with a different make other than Alstom	Complied

The other mandatory/Routine tests on CTs and PTs should also be carried out and the reports should be submitted to ERPC.	Complied
The PLCC link on 220KV Tenughat-Patratu S/C, 220KV Patratu-Hatia D/C and 220KV Tenughat-Biharshariff S/C should be established immediately.	The latest status on PLCC for all 220 kV lines is given at **Annexure-II**. Tenughat-Biharshariff 220KV PLCC is not looked after by JSEB. As informed by TTPS, 220KV Tenughat-Biharshariff line is under upgradation from 220 kV to 400 kV by PGCIL in which the same will be taken care.
The Auto-reclose feature should also be enabled on all the above 220KV lines immediately.	A/R features will be enabled immediately after restoration of PLCC link.
PGCIL Ranchi S/S is to submit the details of distance relays on their outgoing 220KV lines to ERPC Secretariat. The protections available on the 400/220KV ICTs may also be given. The copy of the test reports of the 220KV side relays may also be made available to ERPC secretariat.	Complied.

C) Recommendation of ERPC team which visited 220kV Ramchandarpur Substation, Chandil Substation, 132 kV Adityapur Substation and 220kV WBPDCL Santhaldih Substation from 18.09.13 to 20.09.13 to ascertain the reasons behind disturbances occurring repeatedly in JSEB system:

1) <u>Ramchandrapur Substation:-</u>

Sl no.	Observations	Recommendations	Latest Status
1	Log register for recording trippings are not being properly filled in by sub-station personnel	Tripping details need to be correctly recorded in the tripping log register for both ends, for proper analysis of the tripping.	Complied.
2	Micom-P430 relay is not showing any fault log history	J.S.E.B needs to immediately take up with the manufacturer, for rectification of the relay.	Complied.
3	Relays are not time synchronized, therefore it is not possible to determine the sequence of events in case of multiple outage	J.S.E.B should install the GPS system and time synchronise all its numerical relays with GPS clock	Material arrived. Expected to be completed by 31/05/2014
4	Earth fault relay for 220/ 132kV Ramchandrapur ICT not properly time graded / co-ordinated with distance relays of 132kV Adityapur-Ramchandapur line.	Necessary action to be taken by JSEB for proper time grading of earth fault relay for 220/132kV ICTs at Ramchandrapur and distance relay of 132kV Adityapur- Ramchandapur line, for ensuring selectivity of relay	Complied.

		operation and avoid unnecessary tripping of ICT on occurrence of line fault.	

2) Adityapur Substation:-

Sl no.	Observations	Recommendations	Latest Status
1	Electromechanical distance relay for 132kV Adityapur-Ramchandrapur line is non-functional	The non-functional relay needs to be immediately replaced with fully functional distance protection relays. Distance relay functionality for other 132kV lines viz. Adityapur-Rajkharswan and Adityapur-Chandil also need to be checked and tested.	Complied.
2	Snapping of earth wire and lightning strike is occurring frequently around Adityapur.	Frequent tripping due to lighting and breaking of earthwire needs to be analysed	Complied. New MiCom 441 Relay has been installed.
3	Log register for recording trippings are not being properly filled in by sub-station personnel	Tripping details need to be correctly recorded in the tripping log register for both ends, for proper analysis of the tripping.	Complied.

3) Chandil Substation:-

Sl no.	Observations	Recommendations	Latest Status
1	Wiring of SEL-311C relay for 220kV Chandil-Ranchi line appears to be erroneous	Wiring of SEL-311C relay for 220kV Chandil-Ranchi line needs to be corrected for sensing of fault in proper direction and appropriate selectivity.	Complied.
2	Wiring of REL-650 relay for 220kV Chandil-Santaldih line appears to be erroneous as on various occasions it has been observed that for reverse zone faults the relay is sensing Z-1 fault.	Wiring of REL-650 relay for 220kV Chandil-Santaldih line needs to be corrected for sensing of fault in proper direction and appropriate selectivity.	Complied.
3	Log register for recording trippings are not being properly filled in by sub-station personnel	Tripping details need to be correctly recorded in the tripping log register for both ends, for proper analysis of the tripping.	Complied.
4	Zone-1 of 220kV Chandil-Ranchi line is set as 78.6 Km in distance relay at Chandil end.	The distance needs to be verified by Off line fault locator equipment, and if required necessary correction in relay setting needs to be incorporated at both ends.	Complied.

5	Micom-P430 relay is not showing any fault log history	JSEB needs to take up with relay manufacturer for necessary rectification / replacement.	Complied.

D) Recommendations of Various Sub-committees

Recommendations	Latest Status
17th PCC meeting held on 11.09.2013	
PCC advised JSEB to install Synchroscope at Chandil S/S.	Synchronoscope installed on 25.02.2014.
Replacement of two CBs in PTPS by single CB.	Complied.
Special meeting on Protection Co-ordination of JSEB system held on 12.11.2013 and 05.12.2013	
Various Zone- settings of all transmission lines of JSEB system were discussed and finalized and advised JSEB to implement the same by 31st December, 2013.	Complied (Except tie lines with NTPC and Uttar Pradesh (NR) where some additional data were required for Z3 settings).
JSEB was advised to place restricted earth fault protection for all transformer with rating >50 MVA.	All new transformer panels of capacity greater than 50 MVA are with REF. For three old 100 MVA, 220 kV Transformers discussion is on with M/S Areva for providing REF relays.

Annexure-II

Latest status of PLCC system of JSEB sub-stations is given as follows:

Sl. No.	Details of 220KV line		Present status of PLCC	Line of action for its commisioning	Work completion date	Responsibility with	Remarks	Auto-reclosure
1	220KV Hatia II-PGCIL	Hatia II end	Not commissioned	For both ends PGCIL have already purchased PLCC panels & switchyard equipments releted to PLCC & protection coupler		POWERGRID	If protection is technically feasible through OPGW then OPGW have already been laid by POWERGRID on these 220KV tran line. And associated terminal equipments are also been supplied at Hatia II, PTPS, Tenughat, PGCIL (Ranchi), Chandil & Ramchandrapur by POWERGRID. POWERGRID may be requested to consider provision of carrier protection also on these OPGW communication link.	Feature is available and will be enabled after commissioning of PLCC
		PGCIL end	Not commissioned					
2	220KV Hatia II-PTPS ckt I	Hatia II end	PLCC panel and switchyard equipments available					
		PTPS end	not available					
3	220KV Hatia II-PTPS ckt II	Hatia II end	PLCC panel and switchyard equipments available					DO
		PTPS end	not available					
4	220KV PTPS-Tenughat	PTPS end	PLCC link available under ULDC project but for speech and data communication only					DO
		Tenughat end						
5	220KV Chandil-Ramchandrapur	Chandil end	PLCC link available under ULDC project but for speech and data communication only					DO
		Ramchandrapur end						
6	220KV Chandil-PGCIL Ranchi	Chandil end	Not commissioned	For both ends PGCIL have already purchased PLCC panels & switchyard equipments releted to PLCC & protection coupler		POWERGRID	POWERGRID has forwarded proposal to JUSNL for laying OPGW on this line	DO
		PGCIL end	Not commissioned					
7	220KV Chandil-STPS	Chandil end	not available				In past PLCC link was available but presently out of order	DO
		STPS end	not available					