CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 535/MP/2020 and 540/MP/2020

Coram:

Shri I. S. Jha, Member
Shri Arun Goyal, Member
Shri P. K. Singh, Member

Date of Order: 27.10.2023

Petition No. 535/MP/2020

In the matter of:

Petition for 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) Regulations, 2010 read along with Regulation 3(e) of the Central Electricity Authority (Grid Standards) Regulations, 2010, providing adequate load shedding through automatic under frequency relays (UFRs) in Tripura Power System, keeping them functional in terms of Regulation 5.2(n) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 read along with Regulation 9 of the Central Electricity Authority (Grid Standards) Regulations, 2010 and ensuring proper inspection & patrolling and maintenance of substation and lines in terms of Regulation 5 read along with Regulations 23 and 24 of Central Electricity Authority (Grid Standards) Regulations, 2010 for ensuring security of North Eastern Grid as well as the interconnected Indian Grid.

And

In the matter of:

North Eastern Regional Load Despatch Centre (NERLDC) ……..Petitioner
Power System Operation Corporation Ltd.
(A Govt. of India Enterprise)
Dongtieh Lower Nongrah, Lapalang
Shillong -793006

Petition No. 540/MP/2020

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 CERC (Indian Electricity Grid Code) Regulations 2010 read along with Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2010, and ensuring proper inspection & patrolling and maintenance of substation and lines in terms of Regulation 5 read along with regulation 23 & regulation 24 of the Central Electricity Authority (Grid Standards)

Regulations, 2010 for ensuring security of the North Eastern Grid as well as the interconnected Indian Grid.

And

In the matter of:

North Eastern Regional Load Despatch Centre (NERLDC) ……..Petitioner
Power System Operation Corporation Ltd.
(A Govt. of India Enterprise)
Dongtieh Lower Nongrah, Lapalang
Shillong -793006

Versus

Petition No.535/MP/2020

1. Chairman-cum-Managing Director, TSECL
   North Banamalipur,
   Agartala, Tripura -799001 and others

……..Respondents

2. NERPC
   NERPC Complex, Dong Parmaw, Lapalang,
   Shillong-793006

…….Proforma Respondent

Petition No. 540/MP/2020

1. Senior Executive Engineer (SLDC),
   Tuikhuahtlang, Aizawl, Mizoram -796001
2. Executive Engineer, (MRT),
   Power & Electricity Department,
   Govt of Mizoram Aizawl, Mizoram -796001 and others
3. Engineer-in-Chief (P&E),
   Department of Power,
   Govt of Mizoram, Aizawl-796001

.....Respondents

4. NERPC
   NERPC Complex, Dong Parmaw, Lapalang,
   Shillong-793006

.....Proforma Respondent

Parties Present:

Shri Samar Chandra De, NERLDC
Ms. Himani Dutta, NERLDC
Shri Alok Mishra, NERLDC

Shri Ranjan Debbarman, TSECL
Shri Lalhmingliani, P & E Deptt. Mizoram
Shri Benjamin L, P & E Deptt. Mizoram
Shri Lalrinmawia, P & E Deptt. Mizoram

ORDER

North Eastern Regional Load Despatch Centre (NERLDC) has filed Petition No. 535/MP/2020 and 540/MP/2020 for the State of Tripura and Mizoram respectively, for providing protection systems having reliability, selectivity, speed and sensitivity and keeping them functional in terms of Regulation 5.2 (l) of the CERC (Indian Electricity Grid Code) Regulations 2010 (hereinafter referred as "Grid Code") read along with Regulation 3 (e) of the Central Electricity Authority (Grid Standards) Regulations, 2010 (hereinafter referred as "Grid Standards") providing adequate load shedding through automatic under frequency relays (UFRs), keeping them functional in terms of Regulation 5.2(n) of the Grid Code read along with Regulation 9 of the Grid Standards, ensuring proper inspection & patrolling and maintenance of substation and lines in terms of Regulation 5 read along with Regulation 23 & Regulation 24 of the Grid Standards for ensuring security of the North Eastern Grid as well as the interconnected Indian Grid.

2. The Petitioner has made the following prayers in each Petition:

Prayer in Petition No. 535/MP/2020

i. TSECL may be directed to:
   a. Put in to service Distance relay for 132kV Agartala - Rokhia I Line at Rokhia and ensure proper co-ordination of relay settings of elements connected to 132 kV Rokhia, 132 kV Agartala & 132 kV Surajmaninagar within 1 month in compliance with the regulation 3 (e) of the CEA (Grid Standards) in terms of IEGC Regulation 5.2 (e).
   b. Ensure proper protection system for the link line connecting the 132 kV old switchyard and 132 kV new switchyard at 132kV Rokhia within 6 months.
   c. Upgrade the existing 132 kV bus sectionalizer isolator(s) at Agartala (79-Tilla) within 3 months. Also, check the operating time of circuit breaker of elements connected to 132 kV Agartala & 132 kV Rokhia and to submit test result to NERPC/NERLDC within 1 month.
   d. Ensure and adopt proper and periodical preventive maintenance norms of substations and transmission lines including RoW clearance, jungle cutting, tightening of loose jumpers etc. for normal terrain, vulnerable terrain and most vulnerable terrain adopting best O&M practices in compliance with the regulation 23 of the CEA (Grid standards).
   e. Ensure strict compliance of regulation 12 (1) of CEA Grid Standards Regulations and IEGC provision under clause 5.2 (r) in promptly furnishing the detailed tripping report along with DR and EL output within 24 hours of the occurrence of the event. Also, time

synchronization issues of disturbance recorder and event loggers to be attended within 1 month.

f. *Implement the recommendations of Protection Audit Team of NERPC, which was submitted on Apr'13 and first phase of Third-Party Protection Audit in 2017.*
g. *Ensure implementation of Under-Frequency Relay based load-shedding schemes as per recommendations of NERPC on a priority basis in accordance with regulation 5.2 (n) of IEGC.*
h. *Furnish details of actual UFR operation to NERLDC as per Regulation 9 (2) of CEA Grid Standards Regulation,2010*
i. *Implement Auto recloser scheme in 132 kV lines of TSECL as per section 43 (4) (c) of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010.*
j. *Form their own expert group in protection audit for periodic protection audit of all sub-stations of 132 kV and above on continuous basis and discuss such Protection Audit Reports in the Protection Co-ordination sub-committee meeting of North Eastern Region.*
k. *Form internal committee to verify whether actual maintenance works are carried out at site in compliance of the procedures and policy as per regulation 29 of the CEA Grid Standards Regulation,2010*
l. *Issue appropriate direction/advice to 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),5.2 (r), 5.9.6 (a) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010*

ii. *NERPC may be directed to:*
a. *Validate relay settings of 132 kV elements in Tripura Power System and ensure its implementation.*
b. *Conduct Protection Audit of 132 kV Agartala (79 Tilla), 132KV Rokhia and 132KV Surajmaninagar within 3 months.*

iii. *Pass such orders as the Hon'ble Commission deems fit and appropriate in the circumstances of the case and in the interest of justice.*

Prayer in Petition No. 540/MP/2020

i. *P&E Dept., Mizoram may be directed to: -*
a. *Ensure proper protection system for all the elements connected at all sub-stations of 132 kV and above owned by P&E Dept., Mizoram within 3 months.*
b. *Ensure and adopt proper and periodical preventive maintenance norms of substations and transmission lines including RoW clearance, jungle cutting, tightening of loose jumpers etc. for normal terrain, vulnerable terrain and most vulnerable terrain adopting best O&M practices in compliance with the regulation 23 of the CEA (Grid standards).*
c. *Ensure strict compliance of regulation 12 (1) and 15 of CEA Grid Standards Regulations and IEGC provision under clause 5.2 (r) in promptly furnishing the detailed tripping report along with DR and EL output within 24 hours of the occurrence of the event.*
d. *Implement the recommendations of Protection Audit Team of NERPC, which was submitted on Apr'13 and first phase of Third-Party Protection Audit in 2017.*

e. *Implement Auto re-closer scheme in 132 kV lines of P&E Dept., Mizoram as per section 43 (4) (c) of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010.*
f. *Form their own expert group in protection audit for periodic protection audit of all sub-stations of 132 kV and above on continuous basis and discuss such Protection Audit Reports in the Protection Co-ordination sub-committee meeting of North Eastern Region.*
g. *Form internal committee to verify whether actual maintenance works are carried out at site in compliance of the procedures and policy as per Regulation 29 of the CEA Grid Standards Regulation,2010*
h. *Issue appropriate direction/advice to the respondent for its failure to comply with the -*
    i. *Regulations 3 (e), of the Central Electricity Authority (Grid Standards) Regulations, 2010*
    ii. *Regulations 5.1, 5.2 (e), 5.2 (l),5.2 (r), 5.9.6 (a) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010*

ii. *NERPC may be directed to:*
a. *Validate relay settings of 132 kV elements in P&E Dept., Mizoram and ensure its implementation.*
b. *Conduct Protection Audit of 132 kV Kolasib, Zuangtui and Luangmual within 3 months.*
c. *Organize Protection Sub-Committee meeting on bimonthly or as and when required to address the issues of urgent nature as per Conduct of Business Rules.*

iii. *Pass such orders as the Hon'ble Commission deems fit and appropriate in the circumstances of the case and in the interest of justice.*

3. Petitioner has referred to previous Order of the Commission vide Order dated 27.11.2015 in Petition No. 113/MP/2014, vide which it was held that constituents of NER should strictly comply with the provisions of the Grid Code and the Central Electricity Authority (Grid Standards) Regulations, 2010, to expeditiously complete the work identified as per Third Party Protection Audit so that frequent tripping in their systems are eliminated and grid security is not endangered, and all STUs, distribution licensees and SLDCs of North Eastern Region (NER) to ensure that UFRs, df/dt and Islanding schemes are always functional in their systems and shall operate to provide adequate load relief as agreed in NERPC forum.

Submissions of Petitioner in Petition No. 535/MP/2020:

4. Petitioner has made the following submissions:

a) In the 50th PCC Meeting held on 10.05.2018, it was noted that disturbance on 30.04.2018 was due to fault in 132 kV Agartala – Rokhia D/C and delayed fault clearance was due to absence of Distance Protection Relay (DPR). PCC Forum

directed TSECL to install DPR in 132 kV Rokhia - Agartala D/C by Aug'2018 & coordinate O/C & E/F relays after installation of DPR. PCC members requested that in view of the large number of grid incidences concerning Tripura, the Renovation & Upgradation (R&U) works to be expedited. In 51st PCCM held on 09.08.2018, PCC forum noted that there were several instances of faults in either circuit of 132 kV Rokhia – Agartala (79 Tilla) D/C in the period Apr-Jul'2018. TSECL informed that R&U works have been taken up in earnest and would be completed by 15.10.2018. In 52nd PCC Meeting held on 13.12.2018, TSECL informed that R&U works for 79 Tilla, Rokhia, Udaipur, P K Bari, Kailashor, Dhalabil and Ambassa has been completed. Even after completion of R & U works in Tripura Power System, 25 nos. of disturbance occurred in Tripura Power System alone with effect from 01.01.2019 and as on 07.06.2020.

b) There were several instances of tripping of units at Tripura Gas Based Power Plant (TGBPP) due to loss of evacuation path. TSECL is constructing 132 kV Monarchak – Surajmaninagar D/C to enhance safe and secure operation of TGBPP. Delay in commissioning of 132 kV Monarchak – Surajmaninagar D/C is affecting the generation at TGBPP. In the 109th OCC meeting of NERPC, TSECL informed that 132 kV Monarchak – Surjamaninagar D/C would be completed by December'2015. Expected date of completion of this line was postponed regularly and as per 156th OCC Meeting, target of completion of this line was Jun'2019. This line is not commissioned and still under construction as on 07.06.2020.

c) NERPC was requested to form a committee comprising of members from NERPC, NERLDC, POWERGRID and NEEPCO/OTPC to conduct protection audit of major 132 kV substations of TSECL like Agartala, Rokhia, Surajmaninagar, Udaipur, Budhjungnagar, Dhalabil, P.K Bari, Kamalpur, Ambassa and NEEPCO stations like Monarchak & AGTCCPP and suggest recommendations within next 3 months vide letter dated 17.07.2019. This committee has not been formed till date.

d) That there were at least 45 (Forty-Five) Grid Disturbance of Category GD-I and 02 (Two) of Grid Disturbance of Category GD-II from April 2018 to 7.06.2020 in Tripura Power System.

Month	GD Count	Month	GD Count	Month	GD Count	Month	GD Count
Apr-18	5	Nov-18	1	Jun-19	5	Jan-20	0

May-18	4	Dec-18	0	Jul-19	2	Feb-20	1
Jun-18	1	Jan-19	2	Aug-19	2	Mar-20	0
Jul-18	1	Feb-19	1	Sep-19	4	Apr-20	2
Aug-18	4	Mar-19	0	Oct-18	0	May-20	1
Sep-18	5	Apr-19	0	Nov-18	2	June-20	1
Oct-18	1	May-19	2	Dec-19	0		

e) Out of these disturbances, power supply to Capital area of Tripura was affected in 6 cases and South Comilla load of Bangladesh Power System was affected in 7 nos. of disturbances. TGBPP generation was affected in 17 cases. Many of the disturbances were either due to delayed fault clearance, downstream fault, unwanted operation or failure to operate of protective relays / schemes, in effect reflecting ineffectiveness of protection schemes. Tripping of certain lines for a period w.e.f 01.04.2018 to 07.06.2020 indicate ineffectiveness of O&M practices like regular patrolling, jungle cutting, jumper tightening, substation equipment & relay testing etc. followed by TSECL. Auto recloser scheme is not implemented in 132 kV lines of TSECL which violates the section 43 (4) (c) of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010.

f) As per recommendations of the Enquiry Committee on Grid Disturbances, it was decided in 47th PCC Meeting to carry out 3rd party protection audit starting from 1st week of Aug'2017 covering 1/3rd of NER substation. In 53rd PCC Meeting, TSECL informed that compliance status of protection audit would be submitted by 30.06.19. The same is yet to be submitted. Also, an action plan for audit of remaining substations of NER in the 2nd phase must be devised at the earliest.

g) There were several instances of violation of Clauses 5.2(a), (b) and (c) of IEGC read with Clause 17.4 of Operating Procedure, when the instructions of NERLDC were not complied with, by TSECL during the grid disturbance period:

i. On 22.06.2019, NERLDC had advised SLDC, Tripura to close 132 kV Agartala – Rokhia 2 line after patrolling and declaring healthiness. 132 kV Agartala – Rokhia 2 line was closed without intimation to NERLDC.

ii. On 27.06.2019, NERLDC had advised SLDC, Tripura at 08:01 Hrs. to close 132 kV Agartala – Surajmaninagar 2 line after patrolling and declaring healthiness. SLDC closed the line at 09:30 Hrs. without intimation to NERLDC.

iii. On 28.06.2019, after the incident of dead bus at 132 kV Rokhia at 05:29 Hrs, NERLDC had advised SLDC to ensure thorough checking of 132 kV Rokhia-Monarchak line before closing as it was reported that line tripped on Distance Protection, Zone-I. SLDC closed the line at 05:55 Hrs.

h) No UFR operation was reported by SLDC, Tripura. It was also observed that intentional time delay of 150-300 msec is provided in under frequency relays and operating time is on the higher side (60-90 msec). Also, upon reducing time delay beyond 150 msec resulted in undesired & abnormal tripping of the feeder.

i) It was noted in the 50th PCC Meeting held on 10.05.2018 that island of Tripura system could not survive in the disturbances occurred in the month of Apr'18 due to load-generation balance mismatch attributed to the network changes mainly the addition of loads. TSECL was directed to identify the feeders for additional shedding through UFR to the tune of 100MW. This is yet to be implemented as on 07.06.2020. NERPC vide letter dated 11.10.2019 has written to CMD, TSECL for procurement & installation of UFRs. In 54th PCC Meeting held on 22.01.2020, TSECL has submitted that the same will be done by January, 2020. However, it is yet to be implemented.

j) There were 3 instances in the month of Jun'19 where grid disturbances in Tripura Power System affected the power supply to South Comilla load of Bangladesh and there were several instances of tripping of multiple elements apart from grid disturbances observed in Tripura Power System in month of Jun'19. These instances were discussed in 53rd PCC Meeting of NERPC and urgent reply from TSECL was requested.

k) TSECL vide letter dated 16.07.2019 intimated that following items will be implemented on arrangement of fund:

i. Replacement of 132 kV circuit breaker (which is out of order now) at Rokhia old switchyard.
ii. Bus Bar Protection at 132 kV S M Nagar Sub-station.

l) NERLDC vide letter dated 18.07.2019 intimated that on 18.07.2019 morning at 07:11 Hrs again there was a Grid Disturbance with tripping of lines connected to Agartala, Rokhia and Monarchak as well as tripping of units at Monarchak. This

nature of recurring Grid Disturbances at Rokhia & Agartala Sub-stations clearly indicates that major focus is required on immediate basis without waiting for funds.

m) NERLDC letter dated 18.07.2019 expressed the concerns of implementation of recommendations of protection audit and protection coordination subcommittee to TSECL within 6 months. But till date no communication has been received from TSECL.

Submissions of Petitioner in Petition No. 540/MP/2020

5. Petitioner has made the following submissions:

a) The protection system of P&E Dept., Mizoram is in an appalling condition since long, resulting in frequent power supply interruptions to Kolasib, Luangmual & Capital area (Zuangtui) of Mizoram Power System and as a result there is reduction of power availability in NER.

b) The number of Grid disturbances in Mizoram system of NER during the past four years are tabled below:

Year	2016	2017	2018	2019	2020 (Till May)
GD Count	23	30	20	39	03

c) There were at least 45 (Forty-Five) times Grid Disturbance of Category GD-I from November 2018 to May 2020 in Mizoram Power System alone as tabulated below:

Month	GD Count	Month	GD Count	Month	GD Count	Month	GD Count
Nov-18	01	Apr-19	01	Sep-19	14	Feb-20	0
Dec-18	01	May-19	09	Oct-19	02	Mar-20	0
Jan-19	0	Jun-19	07	Nov-19	01	Apr-20	2
Feb-19	0	Jul-19	0	Dec-19	01	May-20	0
Mar-19	02	Aug-19	03	Jan-20	01		

d) Zuantui and Lungmual area of Mizoram Power System is not N-1 secure which is a violation of clause 6.2 of Central Electricity Authority (Manual on Transmission

Planning Criteria), 2013 and consequently, tripping of this line has resulted in Grid Disturbances.

e) There have been repeated instances of tripping of associated transmission network of Mizoram Power System (hereinafter referred to as P&E Dept., Mizoram). There were at least 28(Twenty-Eight) instances of tripping of 132 kV Aizwal-Kolasib line and 132 kV Badarpur-Kolasib line w.e.f 01.11.2018 to 26.05.2020 which indicate ineffectiveness of O&M practices like regular patrolling, jungle cutting, jumper tightening, substation equipment & proper relay testing etc. followed by P&E Dept., Mizoram. There were cases of tripping of multiple lines at ISTS nodes due to non-operation/mal-operation of protection system of Kolasib sub-station of P&E Dept., Mizoram.

f) Auto Re closer scheme is not implemented in 132 kV lines of P&E Dept., Mizoram which violates the section 43 (4) (c) of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010. As per recommendations of the Enquiry Committee on Grid Disturbances, it was informed that 1st phase of 3rd Party Protection Audit of NER substations has been completed on 29.11.2017. In 52nd PCC Meeting, P&E Dept., Mizoram has not updated the compliance status of protection audit. In subgroup meeting of NERPC held on 05.11.2019, P&E Dept., Mizoram informed that the compliance status of protection audit would be submitted by 30.11.2019 which is yet to be submitted. P&E Dept., Mizoram in principle agreed for implementation of the recommendations of the Protection Audit.

g) It was recommended in 3rd Party Protection Audit report of 2013 that shortage of man power in each and every substation is a major concern and there is need for strengthening of human resources for efficient management of the system. It was also recommended that operating and maintenance staff of substation needs to be trained properly to handle various modern diagnostic tools and to interpret the test results for taking remedial action. 3rd Party Protection Audit report of 2017 is yet to be released.

h) In most cases (28 times) there has been multiple trippings of lines resulting in grid disturbances. The entities have not submitted DR and EL reports for the above mentioned incidents. As such the root cause analysis for these incidents could not be done. However, such multiple trippings of lines is attributable to deficiency in

protection schemes and lack of protection coordination of relays. The fault clearing time as per PMU analysis is seen to be more than 160 milliseconds in most of the grid disturbances (38 times) in 2019-2020.

i) Letters regarding submission of event information reports as per Regulations 5.9 and 5.2(r) of IEGC & 12 (1) and 15 of Grid Standard are being sent on weekly basis to power utilities of NER. Information of grid events is reported to power utilities of NER on daily and monthly basis apart from the weekly information reports. Replies are not being received on time from P&E Dept., Mizoram and whenever P&E Dept., Mizoram are providing information, they are incomplete.

j) The analysis reports supported by relay indications, DR and Event Logger records in respect of most of the Grid Disturbances are still awaited from P&E Dept., Mizoram. NERLDC vide letter dated 11.11.2019 expressed the concerns of non-compliance of various provisions of IEGC & other regulations of CERC & CEA and requested P&E Dept., Mizoram to intimate the reasons of non-compliance of various provisions of IEGC & other regulations of CERC & CEA within 15 days.

Hearing on 22.04.2021

6. Petitions were admitted on 22.04.2021 and Petitioner was directed to implead the Chief Engineer, Power and Electricity Department, Government of Mizoram as party to the Petition No. 540/MP/2020.

Submission of Petitioner in Petition No. 540/MP/2020

7. Petitioner in Petition No. 540/MP/2020 on 03.05.2021 has filed an "Amended Memo of parties" impleading Engineer-in-Chief (P&E), Department of Power, Government of Mizoram.

Hearing on 27.03.2023

8. Petitioner was directed to identify the sub-stations (on priority basis) of the Respondents, under the respective Petition, which impact the ISTS grid and to provide the latest status of the Protection system at these identified sub-stations.

Submission of Petitioner in Petition No. 535/MP/2020

9. Petitioner vide affidavit dated 06.04.2023 has submitted as follows:

a) The important stations in Tripura that are connected to ISTS network or impact the ISTS grid are Agartala, Rokhia, Surajmaninagar, P K Bari, Ambasa, Bodhjannagar, Dharmanagar, Rabindra nagar, Udaipur

b) None of the sub-station in Tripura (including the stations identified as impacting ISTS grid) have implemented Auto re-closer scheme.

c) Data on number of repeated tripping of ISTS connected elements show that most of the tripping have resulted due to solid/metallic fault. In most of the remaining tripping the reason for tripping cannot be analyzed/concluded and root cause be ascertained due to non-submission of DR/EL or wrong DR/EL being submitted.

d) From the FIR, DR EL submission status in 2022, it is evident that 100% submission of DR EL report is not achieved for some of the important stations in Tripura.

Submission of Petitioner in Petition No. 540/MP/2020

10. Petitioner vide affidavit dated 06.04.2023 has submitted as follows :

a) The important stations in Mizoram that are connected to ISTS network or impact the ISTS grid have been identified as Kolasib, Zuangtui, Lungmual, Sihhmui, Melriat, Lunglei, Serchip, Saitul.

b) None of the sub-station in Mizoram (including the stations identified as impacting ISTS grid) have implemented Auto re-closer scheme.

c) Year wise comparison (for last 3 years) of repeated trippings of ISTS connected elements show that the total number of tripping has increased considerably in 2022 as compared to that in 2021 and 2020.

d) Data on number of repeated tripping are due to fault in downstream element of Kolasib, Zuangtui & Luangmual substations were respective protection system fails to clear the fault. In most of the remaining tripping the reason for tripping cannot be analyzed and root cause be ascertained due to non-submission of DR/EL or wrong DR/EL being submitted.

e) From the FIR, DR EL submission status in 2022, it is evident that 100% submission of DR EL report is not achieved for some of the important stations in Mizoram,

Submission of Respondent in Petition No. 540/MP/2020

11. Respondent P&E Department, Govt. of Mizoram vide affidavit dated 14.06.2023 has mainly submitted as under:

a) There are three (3) state owned 132kV sub-stations in Mizoram which are interfacing with inter State Transmission System (ISTS) maintained by PGCIL. In Kolasib sub-station, Incoming bay of Badarpur - Kolasib line and outgoing bay of Aizawl - Kolasib line, Inter-connecting lines, bays and associated equipment are all owned and operated by PGCIL, whereas in Luangmual sub-station, the state owned interconnections between Aizawl - Luangmual line emanates from bay of Aizawl. Meantime in Zuangtui sub-station, Melriat (PG) - Zuangtui interconnection is owned and operated by PGCIL enters at 132 kV incoming bay owned by P&E Deptt., Mizoram. The protection system of some 132KV sub-stations in Mizoram before Renovation and Up-gradation (R&U) scheme were not satisfactory as most of the relays are of electromechanical type. However, after implementation of R&U scheme, protection system with mechanical relays are replaced with numerical ones; Current Transformers (CT) and Potential Transformers (PT) are replaced with higher accuracy class; some old 132KV Circuit Breakers (CB) are also replaced with new one.

b) Mizoram has small demand with average normal load below 100MW only and because of geographical extreme location, it is the end point of national grid line. Meantime, there is only one Central Generating Station (CGS) within the state - 60MW Tuirial HEP. So, the outage of one or two sub-stations does not have significant impact on NER power availability.

c) The impugned GD counts during 2016 and 2017 are unsubstantiated. Also, out of GD counts of 62 during 2018 to 2020 (May), only 45 counts are substantiated. The unsubstantiated GD counts do not have merits and even the substantiated GD counts happened in the ISTS owned and operated by PGCIL.

d) On careful scrutiny of 45 events recorded from November 2018 to May 2020, P&E Deptt., Mizoram may be held responsible for GD of 6 counts in the 132 kV Aizawl - Luangmual line, because the interconnection is owned and operated by the Department. In the GD of 11 counts between 132 kV Melriat (PG) - Zuangtui line, vast majority of the trippings are attributable to PGCIL as the interconnection elements are owned and operated by them. Few trippings only are noticed due to downstream problem. In the GD of 28 counts between 132 kV Aizawl - Kolasib and Badarpur - Kolasib line, PGCIL is largely responsible for tripping as the ISTS is owned and operated by them. P&E Deptt., Mizoram does not have access into their assets - the bays and associated equipments of PGCIL at Kolasib sub-station is rather unmanned. Moreover, the lines are lengthy from Badarpur - Kolasib and Aizawl - Kolasib are 107 KM and 66 KM respectively. The transmission line runs through difficult terrain inside Mizoram passing through good vegetation. So, frequent trippings due to lengthy line and unmanned sub-stations are quite obvious. Had the tripping records from Disturbance Recorder (DR) and Event Logger (EL) output of these lines are regularly available with NERLDC, the actual cause of tripping can be correctly identified.

e) 132KV Aizwal - Zuangtui (Zemabawk-II) was commissioned on 01.09.1998 and 132KV Aizawl - Liangmual was commissioned on 08.12.1998. The 3rd Standing Committee Meeting (SCM) of NER held on 21.12.2011 approved the LILO of 132KV Aizawl-Zuangtui at Melriat (PG) and the same is commissioned on 01.12.2018. Non-satisfaction of N-1 should be taken up in the SCM/NERPTCTP and appropriate intra-state forum.

f) Repeated instances of tripping attributable to Mizoram network in Kolasib area was drastically reduced after joint Inspection with NERPC team on 30.10.2019 and rectification thereafter - CT for 132KV Bairabi feeder replaced, CT of 132/66KV ICT replaced and relay settings corrected.

g) The protection system of Kolasib sub-station have been improved under R&U scheme - Replacement of old relays with numerical relays; Replacement of PTs, CTs and CBs are completed under the same scheme. The effectiveness is substantially improved after rectification as evinced by the statistics. Even the maintenance personnel of PGCIL attended to their equipment after NERPC team

inspection at random intervals. So, the joint efforts of PGCIL and P&E Deptt., Mizoram brought significant improvement in grid operation.

h) The Auto-Reclosure (AR) installation in the 132 kV Melriat (PG) - Zuangtui line is the assets of PGCIL and is placed under their purview as per NER scheme. Whereas, AR to be installed in the 132 kV Aizawl - Luangmual line is under implementation by P&E Deptt., Mizoram. AR enabled relay of MiCOM P442 is already installed and 3 pole CB is already in place. OPGW line under SLDC scheme is laid up to Luangmual sub-station by PGCIL, fibre optic link will be utilized for tele-protection and communication instead of PLCC very soon.

i) The compliance report has been sent to NERPC for their records on 14.07.2020.

j) P&E Deptt., Mizoram in the past used to send FIR through letter/email when the tripping is caused by downstream faults. Moreover, any specific events as sought from NERPC/NERLDC are furnished as per data findings at site. Since Mizoram systems are always in the downstream of ISTS, large number of tripping in the grid are not recorded in Mizoram system relays. Even if incomplete, whatever data available is uploaded in the Web based portal. Especially after the implementation of R&U scheme in the state, the protection systems greatly improved and the FIR, DR and EL output can now be properly uploaded in the Tripping Monitoring Portal.

k) The recommended action plan by visiting NERPC inspection team on 30.10.2019, other than tripping report, are fully carried out. All the elements connected at all 132kV Sub-Stations owned by Power & Electricity Department, Government of Mizoram have been equipped with protection system.

l) All essential parameters which indicates the healthiness of the equipment in a Sub-Station is inspected by the Site Engineer one in each shift and periodically by the Officer-in-Charge as per Operation and Maintenance Guidelines for Lines and Sub-Stations practiced by Power & Electricity Department, Govt. of Mizoram. Overhead lines are patrolled periodically as per Operation and Maintenance of Guidelines for Lines and Sub-Station practice. Patrolling schedule for ground inspection of line is done as per Operations and Maintenance Guidelines for Lines and Sub-Station. The important lines are inspected by Senior Engineer after patrolling by Junior staff and maintenance work such as tree cutting and replacement of damaged insulators was carried out immediately after patrolling.

m) Detailed tripping report along with DR and EL output are submitted to NERLDC. Power & Electricity Department will try utmost effort in achieving 100% submission in future.

n) Inspection status of the recommendations of Protection Audit terms of NERPC which was submitted on April 13 and first phase of Third Party Protection Audit in 2017 was submitted to NERLDC vide email dated 14.07.2020. Power & Electricity Department will try utmost effort in achieving 100% recommendations of NERLDC Protection Audit.

o) Auto re-closure scheme of 132kV lines of Power & Electricity Department have been implement in the following lines.

   a. Zuangtui - Serchhip 132kV Line
   b. Luangmual - Melriat 132kV Line
   c. Zuangtui - Saitual 132kV Line
   d. Kolasib –Tuirial 132kV Line
   e. Kolasib - Bairabi 132kV Line

   Efforts are being made to implement the Auto re-closure scheme in the remaining 132kV lines of Power & Electricity Department.

p) Meter Relay and Testing Division of Power & Electricity Department is expert group in protection and they are doing all possible to implement Protection Audit Recommendation and discuss such Protection Audit Report in the Protection Co-Ordination Sub Committee meeting of North Eastern Region.

q) Internal committee to verify whether actual maintenance works are carried out at site in compliance of the procedures and policy as per Regulation 29 of the CEA can be formed by selecting personnel having expertise in this filed.

Submission of Respondent in Petition No. 535/MP/2020

12. Tripura Power Transmission Limited (TPTL) representing the Respondent No -1 TSECL vide affidavit dated 15.06.2023 has mainly submitted as under:

i. In the 58th PCC Meeting held on 10th May 2018 it was noted that disturbance on 30th April 2018 was due to fault in 132 kV Agartala-Rokhia Double Circuit and

delayed fault clearance was due to absence of distance protection Relay (DFR), PCC Forum directed TSECL to install DPR in 132 kV Rokhia-Agartala Double Circuit by August 2018 along with renovation and upgradation (R&U) for all 132 kV sub-station in Tripura Power system. Accordingly, R&U works under Power System Development Fund (PSDF) had been taken up and it was completed on 4th April 2022 for 132 kV sub-stations in Tripura power system with installation & commissioning of DPR. A major renovation work has been taken for 132 KV Agartala-Rokhia Transmission Line by providing HTLS Conductor replacing the old aged Panther conductor in the entire line and the work has also been completed. For reduction of number of tripping & Grid disturbances, action has already been taken from TSECL end in respect of monitoring of important elements of sub-stations and continuous patrolling of Line followed by vegetation clearance of Transmission lines.

ii. Transmission evacuation path for evacuation of power from Tripura Gas based Power has already been established by TSECL through 132KV Monarchak (TGBPP) - Rokhia, 132kV Monarchak (TGBPP)-Udaipur TL and 132kV Monarchak to Rabindranagar TL since commissioning of the Monarchak (TGBPP). From the inception of Monarchak TGBPP the entire generation of Monarchak i.e. 101 MW is being evacuated by the above 3 (three) lines and integrate to the intra-state Grid transmission system. Special Protection Scheme (SPS) has been implemented in Monarchak (TGBPP). Associated transmission system of Monarchak to SM Nagar which was envisaged and planned earlier is getting delayed due to severe RoW issues, high cost private compensation. Tripura is continuously pursuing for overcoming these RoW issues with State administration also. Presently 82% of work has already been completed and remaining portion is targeted by March 2024.

iii. With commissioning of distance protection relay, backup over current earth fault relay, ICT differential relay, LBB relay, Circuit Breakers, CTs, CVTs, SA, Isolators etc. including replacement of old aged obsolete elements such as MOCBs, OCBs, electromagnetic relays etc. under PSDF funding and TSECL own funding in 132 kV systems, the unwanted incidences in Tripura power system such as fault clearance, downstream fault, unwanted operation or failure to operate of protective relays / schemes has been moderately reduced. Monthly routine inspection of the lines is being taken up and necessary action such as regular patrolling, jumper

tightening, hot spot checking by thermal camera, sub-station equipment and relay testing etc. are being regularly taken care by TSECL. Several training programs are being attended by TSECL engineering officials as well as technicians under Capacity Building program under NERPSIP with a view to acquainted with state-of- the- art technology to maintain the grid safety, security and reliability.

iv. As per deliberation and decision of 57th and 56th PCC Forum (meeting held on (04.05.2023), the approval has been extended to the implementation of Auto Reclosure on Z-1 without carrier check for all lines except the lines with Generating Stations at both the end. Decision has also been taken from TSECL to configure the Auto Reclosure on Z-1 in the numerical relay by September 2023.

v. Third party protection audit of Tripura Sub-stations had been conducted by a team comprising representatives from NERPC, AEGCL, PGCIL, OTPC and NEEPCO in the year 2016, 2017. The observations and recommendations put forwarded by audit team for respective sub-stations has already been complied and resolved.

vi. SLDC Tripura has always abided by the real time instructions of NERLDC for safe, secure and reliable Grid operation in NER. As per decision of OCCM and 19th TCC / NERPC meeting, a committee comprising of NERTS, NERLDC, NERPC and TSECL visited all the stations of TSECL for UFR installations. As per recommendation of the committee, UFR commissioning has been completed on 20.10.2022.

vii. 9 (nine) no. new 132 kV sub-stations (7 Nos. to be up-graded from 66 kV to 132 kV, 2 Nos. in new locations) and 7 nos. existing old 132 kV sub-station augmentation works respectively are presently in progress by Power Grid (implementing agency under NERPSIP). All SLDs of these sub-stations were / will be shared to NERLDC by TSECL as and when integrated in the intra- state Grid. Providing of Line Differential Protection (LDP) along with replacement of circuit breaker at Rokhia link feeder has already been planned by TSECL for implementation by December 2023. Bus bar protection in 132 kV S.M. Nagar sub-station will be considered under Phase - II R&U scheme and TSECL has explored the matter of installation of breaker at bus sectionalizer at 132 kV sub-station, Agartala and the said scheme will be considered by TSECL under Phase -II R&U scheme.

viii. Presently breaker fail protection scheme is available at SM Nagar and P.K Bari sub-station and left out EHV sub-stations will be considered by TSECL under Phase-II R&U scheme. In recent time TSECL is regularly uploading DR & EL reports after occurring any incidence / disturbance in Tripura power system in the NERLDC tripping monitoring portal in time.

ix. Completion status of recommendations of protection audit 2016, 2017 has been intimated in different sub-group / NERPC Forum. Maintenance of power system elements is being carried out in accordance with CEA regulation 2010 and Standard Operating Procedure (SOP) of TSECL.

Hearing on 20.06.2023

13. Petition No. 535/MP/2020 and Petition No. 540/MP/2020 were reserved for order on hearing held on 20.06.2023. Petitioner and Respondents were directed to conduct a meeting to formulate an implementation plan along with time line (in priority-wise) for implementation of protection system at the sub-stations identified by the Petitioner in compliance with the CEA Grid Standards and relevant provisions of the Grid Code and submit the same. Subject to it , the order in the matter was reserved.

Submission of Respondent in Petition No. 535/MP/2020

14. Tripura Power Transmission Limited (TPTL) vide affidavit dated 04.08.2023 has submitted the Minutes of Meeting (MoM) held between NERLDC and TSECL, on 18.07.2023. The relevant extracts of this MoM are as under:

"1. NERLDC has identified the following important substation that are connected to ISTS/ISGS network or impacting the ISTS grid:

i. Agartala
ii. Rokhia
iii. Surajmaninagar
iv. P K Bari
v. Ambasa
vi. Bodhjannagar
vii. Dharmanagar

viii. *Rabindra nagar*
ix. *Udaipur*

In these sub-stations proper protection system healthiness is to be ensured at all the times for which substation wise timeline needs to be provided by TSECL.
TSECL has informed that Numerical relays are already installed and commissioned in all 132kV Sub-Stations and all protection relays are in good working condition.

*2**. Grid Disturbance in Tripura system:** Grid Disturbance is one of the key parameters to understand reliable power supply in a state/area. Total 6 GD's occurred in last year, 2022. Significant amount of load & generation affected due to blackout of the Rokhia, Monarchak and Surajmaninagar substations. TSECL has to take necessary action to prevent such blackouts.*
TSECL has informed that the issues pertaining to all the Grid disturbances were resolved after the occurrence of the GD.

*3**. FIR, DR & EL Submission:** In the year 2022 FIR, DR& EL submission rate is only 15%, 65 % & 62% for TSECL.*
- In this regard it was enquired by NERLDC whether there is any problem being faced by Tripura in uploading 100% FIR, DR & EL.
- A time-bound action plan for achieving 100% FIR, DR& EL to be provided by TSECL. This is as per the regulation 12 (1) of CEA Grid Standards and Regulations 5.2 (r) of Indian Electricity Grid Code (IEGC)-2010.
……..
TSECL has conveyed that the average submission percentage for the past three months (May to July 2023) are as follows:
FIR – 83%
DR – 89%
EL- 89%

However, TSECL assures 100% submission of FIR, DR and EL data in future.

*4.**Element wise Multiple/Repeated Tripping:** …….*
TSECL has informed that most of the transmission lines are passing through rubber and bamboo plantations and due to that, maximum tripping are occurring. Presently TSECL is taking up vegetation trimming including ROW clearances on monthly basis besides major maintenance twice in a year i.e. pre- puja maintenance & pre-monsoon maintenance activities to avoid repeated tripping and for achieving 100% availability.

5. Grid Disturbance due to Protection Issues :

- *NERLDC pointed out that in **Surajmaninagar (TSECL),** there were 2 nos. of Grid Disturbances attributed to protection-related issues. These issues were primarily due to positive DC earth fault and Protection system at Surajmaninagar(TSECL) for 132 kV Surajmaninagar(ISTS) line fails to clear fault which led to LBB Operation.*
- *In Monarchak & Rokhia SS, there was 1 no of Grid Disturbance attributed to protection-related issues. This issue was mainly caused by vegetation fault was behind the Rokhia Substation (main bus of Switchyard). The protection system, which is responsible for isolating the faults at Rokhia, failed to do so at that time, leading to the tripping of healthy lines.*
- *In Ambassa SS, there was one number of GD attributed to protection-related issues caused by error in Protection Relay Coordination.*
- *In Udaipur SS**,** there was one number of GD attributed to protection-related issues caused by Non-clearance of fault in LT feeder.*
- *A time-bound action plan for resolving all existing protection related issues, if any, in all important substations of Tripura is to be provided by TSECL…….*

TSECL has informed that the issues highlighted above are already resolved after the occurrence of the GDs.

Positive DC EF at Surajmaninagar (TSECL) resolved on 13.02.2023

Mechanical Issues in Breaker Auxiliary switch at Surajmaninagar (TSECL) resolved on 02.10.2022.

Vegetation blown by wind from nearby at main bus of Rokhia switchyard. Vegetation trimming is carried out on monthly basis.

The CT has been replaced by 400/1-1-1 A on 26.09.2022. The distance protection relay MICOM P-442 has also been connected at Ambassa SS.

Previously relay setting in Udaipur for 66 kV Udaipur - Gumti Line was I > 1.00, TMS = 0.07, Curve IEC S1. Now, setting done as I > 1.00, TMS = 0.05 & Curve IEC S1 dated on 19.05.2023

6. ***Bus Bar protection at Surajmaninagar (TSECL):***
NERLDC highlighted the importance of BB protection at Surajmaninagar (TSECL)SS.
TSECL has conveyed that the scheme is under preparation stage for PSDF funding.

7. CB and LDP at Rokhia Station:
NERLDC highlighted the urgent requirement of CB in the both end of the link feeder and Line Differential Protection in the link feeder.
TSECL has communicated that the installation of both CB & LDP is scheduled to be completed by December 2023.

8. Autorecloser Implementation in Tripura System:
In Tripura system, 16 lines are kept for implementation of auto-recloser.
NERLDC enquired about the status for implementation of AR(Auto-recloser) in all those line and requested to furnish action plan.
TSECL has conveyed that the Zone I AR scheme scheduled to be completed by September 2023. The Zone I AR scheme will be there till the implementation of Carrier aided protection scheme for which DPR is in the preparation stage.

9. NERLDC recommended to ***form own expert group in protection audit*** *that would also include SLDC personnel for periodic protection audit of all sub-stations of 132 kV and above on continuous basis and discuss such Protection Audit Reports in the Protection Co-ordination sub-committee meeting of North Eastern Region.*

TSECL has conveyed that the Protection expert group comprising of engineering officials posted under Testing & Communication Division, TSECL & under the direct control of AGM (Transmission) is already assigned by the top management of TSECL.

10. Ensure availability of ***maintenance procedures for each equipment*** *in line with the manufacturer's recommendations and prudent utility practices in compliance with regulation 20 of CEA (Grid standards), 2010*
TSECL has conveyed that TSECL always ensures and adopts proper and periodical preventive maintenance norms of sub-stations and transmission lines including ROW clearance, jungle cutting, tightening of lose jumpers etc. for normal terrain, vulnerable terrain, most vulnerable terrain adopting best O&M practices in compliance with CEA (Grid Standards) & approved SOP of TPTL.

Form ***internal committee*** *to verify whether actual maintenance works are carried out at site in compliance of the procedures and policy as per Regulation 29 of the CEA Grid Standards Regulation, 2010.*

TSECL has conveyed that the Internal monitoring committee comprising of higher officials posted under various transmission Divisions of TPTL, headed by the AGM (Transmission) & under authority of GM (Transmission), TPTL is already entrusted for such verification of maintenance works are done as per approved SOP of TPTL.

15. Further, TPTL on behalf of Respondent TSECL has submitted the following Time line as per the decision in the MoM of the meeting held on dated 18.07.2023.

i. Substation wise GD trend in Tripura system:

SS Name	2022
Surajmaninagar-Radially feeding Comilla area of Bangladesh power system	2
Ambasa (ISTS connecting SS)	1
Monarchak G S & Rabindranagar	5
Rokhia GS	2

All the above listed GDs have been resolved. Presently TSECL is carrying major maintenance twice in a year i.e. pre- puja maintenance & pre-monsoon maintenance activities. Besides these, periodic maintenance is also being carried out monthly for the EHV transmission lines and substations for achieving 100% availability & reliability.

ii. DR & EL Submission status in 2022 for Substations impacting ISTS network: Currently average percentage submission for the last three months is as follows: FIR=83%, DR Output = 89% and EL Output =89%. However, TSECL assures 100% submission of FIR, DR and EL data in future.

iii. Repeated Tripping counts: Most of the transmission lines are passing through rubber and bamboo plantations and due to that, maximum trippings are occurring. Presently TSECL is taking up vegetation trimming including ROW clearances on monthly basis besides major maintenance twice in a year i.e. pre- puja maintenance & pre-monsoon maintenance activities to avoid repeated trippings and for achieving 100% availability

iv. Protection Issues in Surajmaninagar (TSECL), Monarchak (Rokhia), Ambassa and Udaipur Sub-station has been sorted and resolved.

v. Bus Bar protection and Line Differential Protection (LDP) Timeline:

Bus Bar protection at Surajmaninagar (TSECL)	Timeline for Implementation	Remarks
As per Minutes of Special Review Meeting held on 19th May, 2022 at Agartala, GM, TSECL informed that 132kV Bus-Bar Protection is under planning stage and has been included in the DPR of R&U Phase-II.	-	DPR is in the preparation stage for PSDF funding.
CB and LDP at Rokhia Station. CBs to be installed at both ends of link feeder at Rokhia. Line differential protection to be installed for link feeder at Rokhia	December 2023	Both CB & LDP

vi. Timeline for Implementation of Auto Recloser in Tripura System:

SI No.	Name of Element	Owner
1	132 kV Agartala-AGTCCP Ckt 1	POWERGRID
2	132 kV Agartala-AGTCCP Ckt 2	POWERGRID
3	132 kV Agartala - Bodhjungnagar	TSECL
4	132 kV Agartala – Dhalabil Line	TSECL
5	132 kV Agartala – Rokhia Ckt 1	TSECL
6	132 kV Agartala – Rokhia Ckt 2	TSECL
7	132 kV Ambasa – Gamaitila Line	TSECL
8	132 kV Ambasa – Kamalpur Line	TSECL
9	132 kV Ambasa – P K Line	TSECL
10	132 kV Baramura – Gamaitila Line	TSECL
11	132 kV Baramura – Jiranla Line	TSECL
12	132 kV Bodhjangnagar – Surajmaninagar Line ckt1	TSECL
13	132 kV Bodhjangnagar – Surajmaninagar Line ckt2	TSECL
14	132 kV Dhalabi – Kamalpur Line	TSECL
15	132 kV Dharmanagar – P K Bari Line	TSECL
16	132 kV Kamalpur – P K Bari Line	TSECL
17	132 kV Kumarghat – P K Bari Line	TSECL
18	132 kV Palatana – Udaipur Line	TSECL

Timeline for completion of Auto Recloser works in substations listed above is September 2023. TSECL is to implement the AR on the Z-1 in the Distance protection relays for the transmission lines till the implementation of Carrier aided protection scheme for which DPR is in the preparation stage

vii. Protection related matters of State EHV substations & transmission lines are regularly discussed among all members of the Protection expert group in the

Protection planning meetings held by TPTL as well as in NER PCC forum. However, the discussions on Protection Audit reports in NER PCC forum is noted for future compliance.

viii. TSECL always ensures and adopts proper and periodical preventive maintenance norms of sub-stations and transmission lines including RoW clearance, jungle cutting, tightening of lose jumpers etc. for normal terrain, vulnerable terrain, most vulnerable terrain adopting best O & M practices in compliance with CEA (Grid Standards) & approved SOP of TPTL.

ix. Internal monitoring committee comprising of higher officials posted under various transmission Divisions of TSECL, headed by the AGM (Transmission) & under authority of GM (Transmission), TPTL is already entrusted for such verification of maintenance works which are done as per approved SOP of TPTL.

Analysis and Decision

16. We have considered the submissions of the Petitioner, Respondents and have also perused the relevant provisions of the Act, the Grid Standards, Central Electricity Authority (Manual on Transmission Planning Criteria) and the Grid Code. The main issue raised by the Petitioner NERLDC, through these Petitions, is to seek directions to the Respondents for providing protection systems having reliability, selectivity, speed and sensitivity and keeping them functional in terms of Regulation 5.2 (l) of the Grid Code read with Regulation 3 (e) of the Grid Standards, ensuring proper inspection & patrolling and maintenance of substations and lines in terms of Regulation 5 read along with Regulation 23 & Regulation 24 of the Grid Standards for ensuring security of the North Eastern Grid as well as the interconnected Indian Grid and reliable operation as per Clause 6.2 of Central Electricity Authority (Manual on Transmission Planning Criteria), 2013.

17. Petitioner NERLDC has submitted that there have been repeated instances of tripping of associated transmission network of Tripura State Electricity Corporation Limited (TSECL) and Mizoram Power System (P&E Dept., Mizoram) and as a result there is reduction of power availability in NER. The repeated instances indicate ineffectiveness of O&M practices like regular patrolling, jungle cutting, jumper tightening, substation equipment & proper relay testing etc.

18. Petitioner submitted that there were at least 45 (Forty-Five) Grid Disturbance of Category GD-I and 02 (Two) Grid Disturbances of Category GD-II from April 2018 to 7.06.2020 in Tripura Power System. Out of these disturbances, power supply to Capital area of Tripura was affected in 6 cases and South Comilla load of Bangladesh Power System was affected in 7 nos. of disturbances. TGBPP generation was affected in 17 cases. Similarly, there were at least 45 (Forty-Five) Grid Disturbances of Category GD-I from November 2018 to May 2020 in Mizoram Power System. Many of the disturbances were either due to delayed fault clearance, downstream fault, unwanted operation or failure to operate of protective relays / schemes, in effect reflecting ineffectiveness of protection schemes. Petitioner has pointed out issues related to Auto recloser scheme and non reporting by Disturbance recorder and Event logger.

P&E Department, Govt. of Mizoram has submitted that after implementation of Renovation & Upgradation (R&U) scheme, protection system with mechanical relays are replaced with numerical ones; Current Transformers (CT) and Potential Transformers (PT) are replaced with higher accuracy class; some old 132KV Circuit Breakers (CB) are also replaced with new ones and DR and EL output can now be properly uploaded in the Tripping Monitoring Portal. Auto re-closure scheme has been implemented in Zuangtui - Serchhip 132kV Line, Luangmual - Melriat 132kV Line, Zuangtui - Saitual 132kV Line, Kolasib –Tuirial 132kV Line,

Kolasib - Bairabi 132kV Line and efforts are being made to implement the Auto re-closure scheme in the remaining 132kV lines of Power & Electricity Department. Respondent is making constant efforts to keep up maintenance of sub-station equipment, transmission lines, protection systems and relays etc. Respondent has also submitted that majority of the tripping in 132 kV Melriat (PG) - Zuangtui line, are attributable to PGCIL as the interconnection elements are owned and operated by them, similarly for tripping of 132 kV Aizawl - Kolasib and Badarpur - Kolasib line, PGCIL is largely responsible for tripping as the ISTS is owned and operated by them. Further, all essential parameters which indicate the healthiness of the equipment in a Sub-Station is periodically inspected and overhead lines are patrolled periodically as per Operation and Maintenance Guidelines for Lines and Sub-Station practiced by Power & Electricity Department, Govt. of Mizoram.

19. TPTL has submitted that with commissioning of various relays including replacement of old aged obsolete elements such as MOCBs, OCBs, electromagnetic relays etc., the unwanted incidences in Tripura power system such as fault clearance, downstream fault, unwanted operation or failure to operate of protective relays / schemes have been moderately reduced. Monthly routine inspection of the lines is being taken up and necessary action such as regular patrolling, jumper tightening, hot spot checking by thermal camera, sub-station equipment and relay testing etc. are being regularly taken care by TPTL. The Distance Protection relay for 132kV Agartala – Rokhia Line 1 at Rokhia and 132 kV Agartala – S.M Nagar 1 line have been implemented and as per recommendation of NERPC. Implementation of under frequency relay (UFR) based on load shedding scheme has been completed at Ambasa, Dhalabadi, Udaipur and Rokhia substations and details have been furnished to NERLDC/NERPC. Further, the observations and recommendations by third party

protection audit team have already been complied and resolved. TPTL has also submitted that protection expert group is already assigned by the top management of TSECL and internal monitoring committee headed by the AGM (Transmission) & under authority of GM (Transmission), TPTL is already entrusted to verify the maintenance works.

20. NERLDC and TSECL conducted meetings on 18.07.2023 for formulating a time bound action plan for implementation of the protection system in Tripura Power System. TPTL on behalf of Respondent TSECL has submitted the Time line on the various points as per the decision in the MoM of the meeting held on 18.07.2023 and the timeline in respect of the implementation of Bus Bar protection and LDP and Auto recloser in Tripura System. Further, issues in respect of multiple Grid disturbances, DR & EL Submission, protection issues in Surajmaninagar (TSECL), Monarchak (Rokhia), Ambassa and Udaipur Sub-station, have been sorted and resolved and as per the decision in the meeting Protection expert group and Internal monitoring committee is already assigned by the top management of TSECL.

21. We have considered the submissions of the Petitioner and Respondents and have also perused relevant sections of the Act, the Grid Standards, Central Electricity Authority (Manual on Transmission Planning Criteria) and the Grid Code.

22. We note that Tripura Power Transmission Limited (TPTL) has made submissions vide affidavit dated 15.06.2023 and 04.08.2023, representing TSECL under Petition No. 535/MP/2020. However, TPTL is not impleaded as a Respondent separately. We further note that in order dated 04.08.2023 in Petition No. 197/MP/2020 and batch, considering the unbundling of TSECL and subsequent

formation of a separate transmission company as TPTL, the Commission has considered the submission made by TPTL on behalf of TSECL.

23. We observe that the non-availability of proper Protection System at the grid connected sub-stations and non-practicing of periodical preventive maintenance of sub-stations and transmission lines are serious concern for the safe, secure and reliable operation of the grid. As the matter is concerned with the safety and security of the grid operation, the Commission takes it very seriously and directs that all the provisions of the Grid Code and Grid Standards should be complied by the Respondents.

24. In the absence of proper Protection System, any mis-happening in the grid may have a catastrophic effect on the grid. Therefore, there is an imperative need for all the users to establish the Protection System having reliability, selectivity, speed and sensitivity along with ensuring of proper inspection & patrolling and maintenance of substation and adoption of best O&M practices, in strict compliance with the provisions under the CERC Grid Code and CEA Grid Standards, so that the power system can be operated in a safe, secure and reliable manner.

25. We note that the Respondent P&E Dept., Mizoram under the Petition No.540/MP/2020 is yet to conduct the meeting with NERLDC to finalize the tentative timeline for implementation of protection system at the sub-stations identified by the Petitioner.

26. Petitioner has not filed any rejoinder to the submission made by the P&E Dept., Mizoram claiming that the majority of the tripping in 132 kV Melriat (PG) - Zuangtui line, 132 kV Aizawl - Kolasib and Badarpur - Kolasib line, are attributable to PGCIL. We direct PGCIL to ensure that substations operated by PGCIL are

operated and maintained by PGCIL in terms of CEA Grid Standards and Grid Code so that trippings of Mizoram lines are minimized.

27. We note that Tripura State Electricity Corporation Limited (TSECL) and P&E Dept., Mizoram have also taken various steps and implemented Renovation & Upgradation (R&U) scheme to reduce the grid disturbances and to improve the protection system of their associated transmission system. Further, TSECL complied and resolved the observations and recommendations by third party protection audit team. We also note that TSECL has formed their own protection expert group headed by the AGM (Transmission) to perform periodic protection audit and also formed internal monitoring committee to verify the maintenance works.

28. Considering the discussions above, we direct the following:

i. Tripura State Electricity Corporation Limited (TSECL) and P&E Dept., Mizoram shall implement proper protection system, inter-alia including Distance protection relay, upgradation of bus sectionalizer isolator(s), Under-Frequency Relay, Auto recloser scheme, and shall also ensure healthiness & smooth functioning of these system, at the substations identified by the petitioner, in strict compliance with the provisions under the CERC Grid Code and CEA Grid Standards.

ii. TSECL and P&E Dept., Mizoram shall practice periodic preventive maintenance of the associated transmission system at the identified substations and the transmission lines in compliance with the provisions under the CERC Grid Code and CEA Grid Standards.

iii. P&E Dept., Mizoram shall Implement the recommendations of Protection Audit Team of NERPC.

iv. P&E Dept., Mizoram to form their own expert group to perform periodic protection audit of the associated transmission system and also to form internal committee for monitoring of the maintenance works.

v. The own expert group of the TSECL and P&E Dept., Mizoram shall carry out the periodic protection audit of all sub-stations of 132 kV and above on continuous

basis and discuss such Protection Audit Reports in the Protection Co-ordination sub-committee meeting of North Eastern Region.

vi. TSECL and P&E Dept., Mizoram shall furnish information/data including disturbance recorder/sequential event recorder output to RLDC in strict compliance to the Regulation 12 (1) of CEA Grid Standards and Regulation 5.2 (r) provisions of the CERC Grid Code.

vii. TSECL, shall adhere to the timelines mentioned at Para 15 of this Order, which have been finalized in their meetings with the NERLDC.

viii. P&E Dept., Mizoram and SLDC, Mizoram shall conduct a meeting with NERLDC within a month of issuance of this order to finalize the timelines for implementation of protection systems having reliability, selectivity, speed and sensitivity.

ix. NERPC shall monitor the work of the implementation of Protection system by TSECL and P&E Dept., Mizoram and shall submit a quarterly progress report to the Commission till the establishment of the Protection system at the substations identified by the NERLDC.

x. NERPC shall validate relay settings, conduct periodic Protection Audit of the associated transmission system at the substation and transmission lines of the TSECL and P&E Dept., Mizoram and shall discuss at Protection sub-committee meeting to address the protection issues, if any. Any issue faced during the implementation of Protection system or observed during protection audit shall be discussed in Protection Sub-Committee meeting at the RPC forum and sorted out.

xi. NERLDC shall take up the matter with PGCIL, wherever the grid disturbance or the grid protection issue in State of Mizoram are attributable to PGCIL. In case of any conflict, the matter shall be discussed at the RPC forum and sorted out.

xii. NERLDC shall monitor the establishment & maintenance of Protection system by the users of the North-Eastern Region and update the status every month at their web-site till the establishment of the Protection system at the substations identified by the NERLDC.

xiii. TSECL and P&E Dept., Mizoram shall identify one person from their top management as a nodal officer, who shall submit a monthly progress report on the implementation of the protection system to the NERPC and NERLDC, till the establishment of the Protection system at the substations identified by the NERLDC.

29. The Petition No. 535/MP/2020 and Petition No. 540/MP/2020 are disposed of in terms of the above.

Sd/	Sd/	Sd/
(P. K. Singh)	**(Arun Goyal)**	**(I. S. Jha)**
Member	**Member**	**Member**