National Electric Power Regulatory Authority
Islamic Republic of Pakistan

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No. NEPRA/DG(M&E)/LAT-01/5634

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Subject: **Order of the Authority in the matter of Review filed by NTDC under Regulation 5 of the NEPRA (Review Procedure) Regulations, 2009 against the Fine imposed by the Authority vide its Order dated September 30, 2022 I.R.O Tripping of 500/220 KV Jamshoro Grid Station Resulting in Power Blackout in K-Electric & HESCO Regions**

Enclosed please find herewith the Order of the Authority (total 14 Pages) in the subject matter for information and compliance.

Enclosure: As above

(Engr. Mazhar Iqbal Ranjha)

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ORDER IN THE MATTER OF REVIEW FILED BY NTDC UNDER REGULATION 5 OF THE NEPRA (REVIEW PROCEDURE) REGULATIONS, 2009 AGAINST THE FINE IMPOSED BY THE AUTHORITY VIDE ITS ORDER DATED SEPTEMBER 30, 2022 I.R.O TRIPPING OF 500/220KV JAMSHORO GRID STATION RESULTING IN POWER BLACKOUT IN K-ELECTRIC & HESCO REGIONS

ORDER

1. This Order shall dispose of the review proceedings initiated in the matter of review petition filed by National Transmission & Despatch Company (hereinafter referred to as the "NTDC/Licensee") under Regulation 5(3) of the National Electric Power Regulatory Authority (Review Procedure) Regulations, 2021 (hereinafter referred to as "Review Regulations") against Order of the Authority dated September 30, 2022 (the "Impugned Order"), imposing a fine of ten million Rupees (Rs. 10 Million) for violation of Section 18 of the NEPRA Act, Authority's Directions/Order vide Para 172 (amongst other Directions related completion of its planned activities within prescribed timeframe to avoid tripping incidents in future and to ensure implementation of reliability indices for all in process and future projects communicated vide NTDC Tariff Petition FY 2019-20, 2020-21 & 2021-22, Article 31 (2) Industry Standards and Codes of Conduct of the Transmission License, O.C OC 8.1.1, O.C 8.1.4, (System Recovery of Grid Code), O.C 4.9.5 (Transformer Loading Criteria), Section B of the main Objectives of the Grid Code as well as Licensee's own SOP w.r.t Maintenance and Inspection of Transmission Lines for Grid System Operation & Maintenance dated June 2013 by failing to stop the repeated trend of overloading of Transformers and tripping of Grid Stations of NTDC in its South network.

Background of the Case:

2. Brief facts of the case are that pursuant to the Section 17 of the NEPRA Act, 1997 (the Act), the Authority granted a Transmission License (**No. TL/01/2002, 31/12/2002**) to National Transmission & Despatch Company Ltd (NTDCL).

3. An incident of partial blackout occurred on September 01, 2021 at 16:09 hours due to lightning on the isolator D8Q11 thus leading to flashover on red phase of isolator D8Q11

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causing tripping at the said Grid Station. The generation units of K2 (1030 MW), Hub Power (60MW), China Hub Power (600 MW) and Wind Power (310 MW) (total 2000 MW) were affected. The event resulted in power supply failure to K-Electric and HESCO jurisdiction. The power supply to all the affected areas of K-Electric, HESCO grids, Wind IPPs other power plants was restored at 18:42 except 500 kV HUBCO-Jamshoro Ckt which was energized at 21:54 Hrs. The overall normalcy was regained within 2.33 hours.

4. The Authority, took a serious notice of the above incident and on September 06, 2021, the Authority directed the Licensee to conduct a detailed enquiry into the matter and submit its final report along with relevant evidence to the Authority. Accordingly, NTDC constituted a committee comprising of different officers, and thereon, the Licensee submitted the inquiry report dated October 29, 2021 (received on November 02, 2021). As per the enquiry committee report (background/history section b.); during the process of enquiry it was revealed that the Transformer (ATB-I) has been operating continuously on full load and temperature of ATB-1 has also been observed upto 100°C. The pollution/contaminations on disconnector and aging of the ATB-1 was indicated as the main cause(s) of the tripping, the Inquiry Committee (IC) constituted by NTDC further concluded that the primary and secondary equipment have exhausted their useful life and the same should be replaced, which is prima facie, in violation of section (b) of the main Objectives of the Grid Code.

5. Further, the Authority also observed that the licensee is not properly utilizing the amount allowed by the Authority under the head of "Repair and Maintenance", which is prima facie, in violation of the Authority's Directions/Order vide Para 172 of the licensees' tariff determination FY 2019-20, FY 2020-21 and FY 2021-22. The continuous violation of permissible limits prescribed under Grid Code by NTDC w.r.t overloading of Grid Station Transformer for the quarter of April 2021- June 2021 the loading of ATB-I remained 96%. Whereas, for the quarter of July 2021 - September 2021 the said transformer was loaded up to 88.89%, which is prima facie a violation of O.C 4.9.5 of Operation Code (Transformer Loading Criteria) of the Grid Code.

6. In view of the above, the Authority decided to initiate legal proceedings against the Licensee under NEPRA Fine Regulations, 2021 (hereinafter referred to as the "Fine Regulations").

Explanation to the Licensee:

7. Accordingly, an Explanation dated February 17, 2022 was issued to the Licensee under Regulation 4(1) of the Fine Regulations. The salient features of the Explanation are as follows:

   i. *An incident of partial blackout occurred on September 01, 2021 at 16:09 hours due to lightning on the isolator D8Q11 thus leading to flashover on red phase of isolator D8Q11 causing tripping at the said Grid Station. The generation units of K2 (1030 MW), Hub Power (60MW), China Hub Power (600 MW) and Wind Power (310 MW) (total 2000 MW) were affected. The event resulted in power supply failure to K-Electric and HESCO jurisdiction. The power supply to all the affected areas of K-Electric, HESCO grids, Wind*

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IPPs other power plants was restored at 18:42 except 500 kV HUBCO-Jamshoro Ckt which was energized at 21:54 Hrs. The overall normalcy was regained within 2.33 hours.

ii. *The Authority, took a serious notice of the above incident and on September 06, 2021, the Authority directed NTDC to conduct a detailed enquiry into the matter and submit its final report along with relevant evidence to the Authority. Accordingly, NTDC constituted a committee comprising of different officers, and thereon, NTDC submitted the inquiry report dated October 29, 2021 (received on November 02, 2021). As per the enquiry committee report (background/history section b.); during the process of enquiry it was revealed that the Transformer (ATB-I) has been operating continuously on full load and temperature of ATB-1 has also been observed upto 100*C.*

iii. *From the perusal of the available record with the Authority, it was also revealed that ATB-1 was overloaded beyond the permissible limits i.e. for the quarter of April 2021-June 2021 the loading of ATB-1 was 96%, whereas for the quarter of July 2021 - September 2021 the said transformer was loaded up to 88.89%, which is prima facie a violation of O.C 4.9.5 of Operation Code (Transformer Loading Criteria) of the Grid Code. With regards to grid maintenance, the inquiry committee observed that the pollution/contaminations on Disconnector and aging of the ATB-1 as the main cause(s) of the tripping, IC further concluded that the primary and secondary equipment have exhausted their useful life and the same should be replaced, which is prima facie, in violation of section (b) of the main Objectives of the Grid Code.*

iv. *This also demonstrates that the licensee was not properly utilizing the amount allowed by NEPRA under the head of "Repair and Maintenance", which is prima facie, in violation of the Authority's Directions/Order vide Para 172 of the licensees' tariff determination FY 2019-20, FY 2020-21 and FY 2021-22. The licensee was required to follow the provisions of NEPRA Act, Rules & Regulations made thereunder, generation license, tariff determinations and other applicable documents and any violations thereof attracts appropriate proceedings against the licensee including but not limited to the imposition of fines under NEPRA (Fines) Rules, 2002*

v. *Clause OC 8.1.1 of Operation Code-System Recovery of Grid Code deals with the procedures for the restoration of power supplies following a Total Shutdown or a Partial Shutdown of the System and the re-synchronization of specific parts of the System that have been islanded. Clause OC 8.1.4 of Operation Code-System Recovery of Grid Code states that OC 8 applies to the System Operator, NTDC, distribution companies, Operators of power plants, and Users of the System. Contingency arrangements are required to be established by the System Operator with each externally-connected Party/consumers.*

8. In response, the Licensee submitted its reply vide letter dated April 06, 2022. The Authority after detailed deliberations rejected the response submitted by the Licensee against the above Explanation giving reasons for such rejection vide Order dated July 06, 2022.

Show Cause Notice to the Licensee:

9. Accordingly, a Show Cause Notice dated July 06, 2022 was issued to the Licensee under Fine Regulations, based on violations alleged in the Explanation.

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Non-Submission of the reply against the Show Cause notice by the Licensee:

10. The Licensee was required to submit its response to the above Show Cause Notice dayed July 06, 2022 with fifteen (15) days. However, the Licensee failed to submit its response to the Show Cause Notice despite passage of given time period and issuance of Final Notice dated August 16, 2022, whereby NTDC was given additional 7 days and was further warned that in case of non-submission ex-parte proceedings will be initiated against NTDC. However, no response was received from NTDC despite lapse of the extended time period. Thereby, *the Authority decided to initiate ex-parte proceedings against NTDC.*

11. Keeping in view of above and the relevant provisions of the NEPRA Act, Grid Code, applicable documents, submissions of the Licensee and available record, the Authority observes that the Licensee has constituted violation of *Section 18 of the NEPRA Act, Authority's Directions/Order vide Para 172 (amongst other Directions related completion of its planned activities within prescribed timeframe to avoid tripping incidents in future and to ensure implementation of reliability indices for all in process and future projects communicated vide NTDC Tariff Petition FY 2019-20, 2020-21 & 2021-22, Article 31 (2) Industry Standards and Codes of Conduct of the Transmission License, O.C OC 8.1.1, O.C 8.1.4, (System Recovery of Grid Code), O.C 4.9.5 (Transformer Loading Criteria), Section B of the main Objectives of the Grid Code as well as Licensee's own SOP w.r.t Maintenance and Inspection of Transmission Lines for Grid System Operation & Maintenance dated June 2013* by failing to stop the repeated trend of overloading of Transformers and tripping of Grid Stations of NTDC in its South network. Therefore, the Authority decided to impose a fine of Ten Million Rupees (**Rs. 10 Million**) on the Licensee.

Review Petition filed by the Licensee:

12. In response to above, NTDC filed its Review dated October 28, 2022, re-submitted on November 04, 2022 under Regulation 3(2) of the Review Regulations against the Impugned Order of the Authority dated September 30, 2022. The grounds of the review petition as submitted by the Licensee (inter-alia) are summarized as follows:

A. **Right to be Heard Violated:** NEPRA fined NTDC without providing a reasonable opportunity to respond, violating Section 27B of the NEPRA Act. Despite a short deadline and complex technical issues, NTDC submitted a comprehensive report. However, NEPRA disregarded it and proceeded with the fine.

B. **No Opportunity to Defend:** NEPRA's order lacked due process. Regulation 4(11) and Section 27B of the NEPRA Act require the opportunity to defend oneself. NTDC was not given this opportunity.

II. Factual Misconceptions

C. **Natural Disaster Caused Outage:** The Inquiry Committee confirmed a severe weather event caused the power outage. NEPRA disregarded this finding and blamed NTDC.

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D. **New Allegations Introduced Later:** NEPRA raised new accusations against NTDC after the initial explanation, denying them a chance to respond.

E. **Unreasoned Order:** NEPRA's order lacked sufficient reasoning, failing to consider all legal and factual aspects. This renders the order invalid under Section 24(A) of the General Clauses Act 1897.

III. Specific Rebuttals

A. Inquiry Committee Findings Misinterpreted (Issue No. 1): NEPRA misinterpreted the Inquiry Committee's findings regarding the cause of the outage.

B. Power Supply Failure Responsibility (Issue No. 2): The responsibility for supplying power to K-Electric falls under a separate agreement not finalized by the government yet. K-Electric, a separate utility, is responsible for ensuring the safety and stability of their own network.

C. Transformer Overloading (Issue No. 3): The transformers were not overloaded and operated within permissible limits.

D. Pollution and Aging of Transformer (Issue No. 4): The Inquiry Committee did not conclusively determine that pollution or aging caused the issue. NTDC is undertaking a pollution study to investigate further.

E. Repair and Maintenance Funds (Issue No. 5): NTDC provided a detailed budget breakdown for repair and maintenance, but NEPRA rejected it without proper review.

F. Primary Protection System Failure (Issue No. 6): NEPRA raised a new issue about the primary protection system failing, without giving NTDC a chance to explain. Backup systems functioned as intended.

Hearing:

13. A hearing in the matter was scheduled to be held on January 24, 2023. However, the same was rescheduled due to Total Power System Blackout / Breakdown in the country occurred on January 23, 2023. Accordingly, the hearing was again re-scheduled to February 13, 2023, this time the Authority decided to postpone the hearing due to non-availability of MD-NTDC and the hearing was postponed to May 23, 2023. The hearing was once again postponed on the request of NTDC due to unavailability of its higher management.

14. Finally, the hearing in the matter of Review filed by NTDC was held on June 05, 2023, whereby DMD-NTDC along with its relevant professionals/officers attended the hearing and reiterated its earlier version and advanced their arguments based upon the submissions made in the Review petition. During the hearing, following submission were made by NTDC's representatives;

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a) Mishap was partly due to a natural incident i.e. severe rain and wind storm resulting in damage of Red Phase disconnector D8Q11 and was not due to poor maintenance as routine testing has been carried out. Further, the incident was not due to any technical fault. However, Pollution /contamination on Disconnector & Aging and overloading of transformers might have led to the equipment damage.

b) NTDC is responsible to supply power to K-Electric as per draft Interconnection Agreement. It is K-Electric responsibility to implement cross trip schemes, under-frequency schemes, operating voltage limits and installation of protective relays.

c) NTDC operated the transformers within the loading range and the in compliance to the Grid Code. Even in specific cases, Grid Code itself allows overloading for a period of two hours.

d) Load on transformers of Jamshoro depends on demand of HESCO network, wind generation and KE withdrawal. Instances have been recorded that KE withdrawal exceeded its limit on 26-09-2021 which was repeatedly highlighted by NPCC. Wind generation suddenly dropped which consequently overloaded the ATBs at 500 kV Jamshoro.

e) A Pollution study to measure the intensity of pollution in different areas of Pakistan is underway and consultants have already been engaged.

f) The Busbar Protection sensed the fault but did not operate on the phase to ground fault during flash over /damage to Red Phase 220 kV D8Q11 disconnector as a result of which insulation became weak and unit got damaged. Moreover, NEPRA also itself highlighted the provision of the Grid Code specifically PMC 2.2 d (ii).

g) Respondents concluded that if the primary protection has operated there would be a chance to avoid damage. However, it (NEPRA) failed to appreciate the fact that PMC 2.2 (d) does not impose an obligation on the petitioner (NTDC) to ensure primary protection operates every time. The said PMC 2.2 (d) clause itself states that *"In case of failure of the primary protection, the backup protection must operate"*. In this specific case, the Backup protection did operate in a timely manner, successfully isolating the whole system.

15. During hearing, the issue of overloading also came into discussion, whereby NTDC claimed that the Transformers installed at 500kV Jamshoro G/Station are well within the prescribed limits of loading and in line with the applicable rules and regulations. Upon which, the issue was discussed at length and NTDC was directed to submit any new grounds which can substantiate their claim of not operating the ATB-1 beyond its permissible limits. Further, the Authority showed its displeasure over the absence of MD-NTDC and further observed that there were no new grounds which can be taken into consideration for Review motion. However, upon request of NTDC, the Authority granted 7 days' additional time period to NTDC for submitting any other additional documentary evidence as claimed by NTDC during the proceedings of the hearing.

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16. The above directions of the Authority were conveyed to NTDC vide letter dated June 14, 2023. In response, NTDC submitted its response vide its letter dated June 16, 2023 (received on June 23, 2023). The said response submitted by NTDC was reviewed in detail and from the perusal of the same following was revealed;

i. NTDC provided the details of Loading Position of ATB-I from Jan-2021 to Oct-2021 and hourly loading position from March 2021 to September 2021.

ii. From the above data, it was revealed that 450MVA (ATB-I) has been loaded beyond the applicable limit i.e. 80% from April 2021 to Oct 2022 at various instances and time period. During this, at various times the 450MVA ATB-I has been observed to be operated beyond 90% to 96% loading.

iii. Considering the fact that the ATB-I has operated beyond its life span i.e. 34% and has been responsible for various trippings from year 2020 to 2023 (this can be verified from Jamshoro G/Station tripping data), NTDC should have replaced the said power transformer. Regrettably, the same transformer is still in operation to this date.

iv. It has been further observed that only 24 days hourly loading data of March 2021 to April 2021 & July 2021 to September 2021 instead of entire month i.e. 30/31 days.

17. The above response submitted by NTDC was reviewed in detail and from the perusal of the same it was revealed that NTDC has failed to produce/provide any new grounds/facts that can substantiate its claims made during the hearing.

Analysis/Findings of the Authority

18. NTDC stance with regards to not providing sufficient time period bears no factual ground and stand null and void as the Authority provided more than sufficient time period to NTDC for submitting its version. This can be verified from the fact that after issuance of the Explanation dated February 17, 2022, NTDC was bound to submit reply within 15 days as per relevant provisions of NEPRA Fines Regulations, 2021. However, on March 09, 2022 (after 19 days of issuance of explanation) NTDC submitted its request for grant of 3 weeks extension for submission of reply against the explanation, which was graciously granted by the Authority. Despite the expansion of time period, NTDC submitted its reply against the Explanation on April 06, 2022 i.e. after passage of 28 days and total 47 days.

19. The Authority being unsatisfied with the reply submitted by NTDC against the Explanation by NEPRA, issued SCN on July 06, 2022 and as per the relevant provisions of NEPRA Fines Regulations 2021, NTDC was bound to submit response against the said SCN within 15 days. Despite of said, the Authority while taking lenient view issued a Final Reminder dated August 16, 2022 and extended the stipulated time again (after 41 days of issuance of SCN). However, NTDC failed to submit the response against the said SCN and eventually the Authority having no other remedy available issued a Fine Order on September 30, 2022 on ex-parte basis i.e. after passage of 86 days subsequent to the issuance of SCN dated July

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06, 2022. In view thereof, the stance of NTDC with regards granting a very short time for submission of response is false & frivolous and does not merit any consideration.

20. Moreover, NTDC stance with regards to not providing an opportunity of hearing also stands nullified as NTDC being a defendant had a chance to avail the opportunity of hearing at the stage of SCN as per the relevant provisions of NEPRA Fines Regulations, 2021. However, NTDC did not submit its request for hearing at any stage of the proceedings.

21. NTDC claim with regards to misreading the findings of NTDC Inquiry Committee is also unjustified as the report is silent w.r.t the proof of heavy windy/stormy weather and flashover (lightning) that struck on the red phase of 220kV disconnector D8Q11 resulting in tripping of 500kV T/Ls, 500/220kV disconnector D8Q11 (red phase) and 450 MVA, 500/220kV Auto Transformer T-1, Red Phase Unit. NTDC has not provided any data/proof (CCTV footage etc. if any) from which it can be proved that the said incident was caused only due to flashover (lightning) and the same does not merit any consideration.

22. Outage of 2000 MWs K2 (1030 MW), Hub Power (60MW), China Hub Power (600 MW) and all wind power plants (310 MW): The partial blackout due to tripping of 500 kV Jamshoro Grid Station occurred at 16:10 Hrs., and the system was restored at 18:42 Hrs., which means that the supply to service areas of K-Electric & HESCO remained suspended for nearly 2.32 hours in addition to the outage of 2000 MWs from the system. Whereas, the HUBCO-Jamshoro was energized at 21:54 Hrs. meaning thereby that the said IPP remained on outage for 5.44 hours.

23. Damaged 220 kV Disconnector D8Q11 (D8Q11):

a. The damaged disconnector D8Q11was manufactured in 1997 by Ping Ding Shan China and was commissioned in 2005 at Jamshoro Grid. As per the report, the Busbar-I sensed the fault (as per the indications noted by AM) but did not operate on the phase to ground fault during flashover/damage of Red Phase of D8Q11. But as per the record, the relay responsible for operating the D8Q11 was tested on December 15, 2020 and was found operational. However, no SOP, record (age, make, type etc.), proof of testing or the fact that why the relay did not operate has been provided in the inquiry report.

b. The report further states that one side structure of the D8Q11 was not directly earthed in 220kV Dia-08. But the IC has not deliberated its impacts i.e. whether this was a potential reason behind the tripping? Or the fact that why it was not properly earthed? Had it been earthed properly, then was it possible to avoid this event of tripping due to flashover. The IC further states that grounding conductor size of the all structures of Fia-08 was 95mm^2, but does not discuss that whether it was sufficient to sustain the overload sustained due to flashover.

c. As per the report, the porcelain bushings or supports were polluted due to adjusting Jamshoro Power Plants and when its contamination was tried to be cleaned (as test case) with water/ WD40 thinner at site on broken D8Q11 porcelain insulator, the pollutant deposits could not be removed. However, the report does not state/discuss

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that why it remained contaminated for so long, whether it was properly RTV coated or the fact that whether the washing of the insulators is covered under any weekly/monthly/quarterly/biannually/annually maintenance SOP/ or log report.

d. In the report it has been mentioned that after close observation of the broken insulator and metal parts, it was revealed that the porcelain was already cracked and the same could not be detected during live (running) condition. The IC also admits that the D8Q11 was aged and its insulators were contaminated due to which the red phase of D8Q11 subsequently got damaged. In the report, IC also come to an agreement that the resultant single phase to ground fault in 220kV busbar-1 protection zone should have been cleared by the busbar differential protection. However the busbar protection did not operate. It has also been mentioned that the 220kV disconnector/isolator D8Q11 got damaged as it was aged and broken/contaminated porcelain of insulator. Once again this raises a serious question over the fact that why the aged material was/equipment was not changed in a timely manner. Whether NTDC has any policy w.r.t to replacement of aged equipment? Or why the staff/officials stationed at Grid Station changed/replaced/reported about the broken insulator of the D8Q11 or D8Q11 entirely? Or the fact that was it possible that this tripping could have been avoided had the D8Q11 operated? Further, the report do not discuss/deliberate upon the fact that why the busbar protection not sensed the fault and failed to operate in a timely manner?

e. Finally, the report states that the fault was rectified by backup protections on 500kV & 220kV Transmission Lines & Transformers. It can be construed that the primary protections of the Grid Station failed to operate, however, the report does not discuss/deliberate the failure of primary protections and its role in the tripping caused by the incident. It is evident from the report that this short circuit might have weakened the insulation of already aged red phase of ATB-1, later-on which was damaged during switching energization. However, when NTDC was enquired regarding the status of the same, it agreed in principle that there are some issues in the tertiary busbar at 500kV Jamshoro G/Station and NTDC plans to address this issue. Regrettably, no update was provided thereafter in this behalf.

24. **Damaged Red Phase Unit of 500/220kV 450 MVA Auto Transformer Bank T-1 (ATB-1) & Overloading of ATB-I:**

a. IC also mentions that as per the availed record, the said Transformer has been operating continuously on full load and its temperature was observed up to 100^0C. The report reveals that the overloading and subsequent increase of temperature and ageing of transformers are key factors to decrease the life of transformer which is in service since 1987. The IC in its report has informed that during the restoration operation at 17:17, September 01, 2021, the damaged Red Phase Unit of 500 kV/220kV of ATB-I again tripped through circuit breaker B1Q1. The damaged Red Phase Unit was replaced with spare unit and the ATB-1 was energized at 09:17 Hrs. on September 09, 2021. Meaning thereby that the ATB-1 was restored after lapse of nearly 9 days.

b. As per the Grid Code O.C 4.9.5 (Transformer Loading Criteria) the Grid station transformers including three phase and single phase banks that are normally operated

at the voltage levels of 220/132kV and 500/220kV shall be loaded under normal and contingency conditions according to applicable relevant standards (IEC, ANSI/IEEE etc.). Thereby, NTDC is bound to maintain the loading of the ATB-1 within permissible limits defined therein.

c. The loading position of the ATB-1 on quarterly basis from the available record (i.e. quarterly progress report of NTDC w.r.t the compliance with the directions of the Authority given to NTDC in tariff determination for FY 2017-18 & FY 2018-19) is as under:

Period	Percentage loading (%)
January 2021- March 2021	57.78%
April 2021 – June 2021	96%
July 2021-September 2021	88.89%

Similarly, as per the State of Industry report 2021 the percentage loading of the ATB-1 was reported as 96% of its rated capacity. Further, it is relevant to state that NTDC vide its monthly report regarding removal of System Constraints for the month of October 2021 received vide NTDC letter dated November 10, 2021 submitted that the ATB-I has been continuously operating at overloaded position from June 2017 and the said constraint has been removed on January 09, 2020 by addition of 1x450 MVA transformer at 500kV Jamshoro Grid Station.

d. However, it is evident from the IC report as well as from the quarterly reports of NTDC that the said transformer is still running at overloaded position. This constitute the continuous violation of Grid Code O.C 4.9.5 (Transformer Loading Criteria). In this regard, NTDC is required to explain as to why ATB-1 is still overloaded despite addition of 1x450 MVA transformer.

e. During system restoration operation at 17:17 Hrs. when the ATB-1 was restarted, it again tripped through B1Q1 and later on the same was restored on September 09, 2021 at 09:17 Hrs. It is important to mention that the report does not cover that whether the ATB-I was restarted by following the relevant system protocols of protections or not. Because, after the tripping, the staff stationed at the Grid Station was bound to follow the protocol of checking the site for protection/short circuits. As the report clearly mentions that the '' *the fault was cleared by backup protections on 500kV & 220kV Transmission Lines & Transformers short circuit might have weakened the insulation of already aged Red phase of ATB-1,* later-on which was damaged during switching energization ''

25. **Five year Investment & Repair & Maintenance Expenditure allowed in the tariff determination for FY 2017-18 to FY 2021-22:**

a. In order to make the system more stable, reliable and to have the capacity to accommodate future load, and to ensure/attain optimal level of transmission network reliability and sustainability through the regular repair and maintenance,

NEPRA in its tariff determination for the period FY 2017-18 to FY 2021-22 allowed substantial amount to NTDC under the head of "**Investment**" & "**Repair and Maintenance expenditure**". The details are as under:

Investment detail of NTDC from FY 2017-18 to FY 2021-22

Description	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**
Requested by NTDC	46,428	49,815	39,062	56,443	69,046
Allowed by NEPRA	42,336	41,380	32,000	40,526	50,560
Actual expenditure by NTDC	42,336	47,406	32,000	----	----

Repair and Maintenance expenditure detail of NTDC from FY 2017-18 TO FY 20-21

Description	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**
Requested by NTDC	744	988	1,010	1,207	1,439
Allowed by NEPRA	671	988	655	719	790
Actual expenditure by NTDC	671	585	755	----	----

b. NTDC in its tariff determination FY 2017-18, 2018-19 dated July 31, 2019 under para 34 submitted that the 500kV Jamshoro Grid Station is overloaded. Further, under 37 Para of the said tariff petition, it has also been mentioned that a partial blackout occurred on August 17, 2018 at 500 kV Jamshoro Grid Station due to flash over at 132 kV line isolator no. 105, which resulted in tripping of 220/132 160 MVA ATF T-3 & T-7. From this it is also evident that this even of flashover and tripping thereof has not happened for the first time.

c. NTDC in its tariff determination FY 2019-20, 2020-21 dated November 04, 2021 under para 58. (1) Informed that 2x450 MVA T/Fs of 500kV Jamshoro Grid Station were under constraint. For the constraint removal plan, NTDC proposed an addition of 1x450 MVA T/F and the same was commissioned in January 2020. Despite of the stated fact, the affected ATB-1 of 500kV Jamshoro Grid Station was operating at overloaded position.

26. In addition to above, the inquiry report revealed that the Busbar protection of 220 kV Busbar-I sensed the fault but did not operate on the phase to ground fault during flashover/damage of Red Phase 220 kV D8Q11 disconnector and the 450 MVA ATB T-1 fed the fault of Red Phase 220 kV disconnector D8Q11 of 34.5 KA for about 1300 milliseconds, insulation became weak and unit got damaged. The fault was cleared by the backup protections on 500 kV and 220 kV Transmission Lines and Transformers. In this reference the clause PMC 2.2 d (ii) of the Protection and Metering Code of the Grid Code states that;

"Substation secondary or back up protection will be required to withstand, without tripping the loading incurred during clearance of a fault by a breaker fall protection on the NTDC Transmission System Back-up protections in the substation and NTDC Transmission System shall be coordinated to provide discrimination".

In this regard, it is observed that primary protection failed to operate due to which 220 KV Busbar disconnector D8Q11 red phase and 450 MVA, 500/220 kV transformer T-1 red phase unit got damaged and thereafter backup protection operated to prevent further damages. Has the primary protection been operated, there would have a chance to avoid such serious damages. Hence, NTDCL is in violation of the clause PMC 2.2 d (ii) of the Protection and Metering Code of the Grid Code.

27. NTDC claim w.r.t defense of failure of Primary Protection at 220kV Busbar is also negated as the fact remains that although the secondary protection operated but non-operation of primary protection at 220kV Busbar resulted in damaged unit of ATB-I as its insulation became weak. Further, had the fault been arrested by the Primary Protection, then the blackout of entire region covering K-Electric & HESCO for nearly 2.32 hours in addition to the outage of 2000 MWs from the system could have been avoided.

28. Moreover, stance of NTDC with regards to loading of ATB-I for a shorter period of time is also negated as from the perusal of the hourly data for the months of March 2021 to September 2021 has revealed that there has been many instances where ATB-I has been operated beyond the permissible limits for more than 2 hours.

29. The recent data submitted by NTDC with regards to speed of wind in the neighboring regions bears no signature, stamp or attached letter of PMD which can substantiate and justify the results submitted by NTDC, thereby, it bears no legal grounds. Further, the PMD recorded data (34.5, 69.9 & 9.2 Miles/Hr) is clearly below the wind limits at which the tower is designed i.e. 169km/hr.

30. NTDC in its review petition has mentioned the tower collapse incidents occurred in transmission network of Argentine, New Zealand, Canada & Australia (where tornados and windstorms have occurred on a greater scale) in its support and has tried to portray the tower collapse incident as a normal phenomenon. However, NTDC has failed to address the issue of Tower Collapse within its transmission network and most of the tower collapse areas do not have history of any tornados or windstorms of the similar scale as mentioned in above countries, this can be ascertained from the fact that from the last 10 years, nearly 298 (500kV & 220kV) towers have collapsed within its network till date and the number of collapsed tower is growing by each passing day. However, no concrete strategy/mitigation plan has been taken by NTDC so far, which clearly demonstrates the mismanagement, mis-governance, seriousness of NTDC & their attitude towards resolving this issue. Therefore, the argument put forth by NTDC does not merit any consideration.

31. The study results and the timelines of completion for the design verification of towers specially in South region of NTDC is still awaited and no fruitful outcome of the said contract has come to fold even after passage of 2 years.

32. NTDC has again failed to produce any cogent proof w.r.t non-testing and failure to recalibrate/redesign its towers according to the ground realties and environmental impacts existing in the region, where the said T/Line was supposed to be erected and has reiterated its earlier version regarding individual testing of towers for 500kV Port Qasim T/Line i.e. *Selection of tower family for a particular transmission line is based on parameters like power transfer, insulation levels, size and bundling of conductor and wind loads. In the Petitioner's network, the towers are designed region wise and the Thar-Matiari T/L is in the same region as the TDS tower family and the conductor size and configuration is also the same for both.*

33. No details or timelines have been provided by NTDC w.r.t High Intensity Wind (HIW) mapping being carried out by NESPAK. Further, this further proves the fact that NTDC has only realized the need for the said assessment right after the Authority raised the subject issue with NTDC.

34. The absence of T/Line Security SOP/Policy has rendered NTDC incapable to deal with the increasing theft of tower braces and associated material within its transmission network. Due to the said, the Authority directed NTDC to draft a T/Line Security SOP/Policy, in response thereto, NTDC submitted a draft SOP without the approval of its BoD. Upon which, NTDC was directed to submit approved copy of T/Line Security SOP, however, the same it still awaited even after passage of more than 10 months, which tantamount to the violation of the directions of the Authority u/s 48 of the NEPRA Act.

35. The financial impact amounting to 1.587 Billion Rs. worked out by CPPA-G only covers the cost of running expensive power plants during the outage of PQEPC for 10 days and does not warrant for the Capacity Charges that have been claimed by PQEPC during the period of its outage. This further proves the Authority's concern that with each collapsing tower, the national exchequer has to bear losses of billions of rupees beside the inconvenience to the areas being served by the respective DISCOs.

36. In addition to the above, all of the issues raised by NTDC in its review petition under Issue Wise Submission have been adequately addressed in the SCN dated July 06, 2022 & Fine Order dated September 30, 2022 issued by the Authority. Therefore, the stance adopted by the Licensee does not merit consideration.

Decision

37. Keeping in view the relevant provisions of the NEPRA Act & Rules, Regulations made thereunder, NTDC Tariff Determination, Grid Code 2005, applicable documents, submissions of the Licensee and available record, the Authority decides that the Licensee has not provided sufficient or plausible grounds that would result in altering/reversing the Authority decisions dated September 30, 2022 regarding imposition of Rs. 10 Million fine on the Licensee. Therefore, the Authority hereby maintains the fine of Rs. 10 Million as imposed vide Order dated September 30, 2022 in this regard.

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38. Accordingly, the Licensee is directed to pay the fine to the tune of Rs. 10 Million in designated bank of the Authority within a period of 15 days after the date of issuance of this order and forward a copy of the paid instrument to the Registrar Office for information, failing which the Authority shall recover the amount due under Section 41 of the Act read with relevant provisions of the NEPRA Fine Regulations, 2021 as arrears of the land revenue.

39. The upshot of the above discussion is that no ground for review was made out. Hence, review petition stands dismissed.

Authority

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26/04/24

Announced on 26/04/2024 at Islamabad.