NATIONAL TRANSMISSION & DESPATCH COMPANY LTD

Chief Engineer (HVDC) NTDC

No.3930-37 **/CE/HVDC/LHR** **Dated:**06 **/05/ 2021**

Chief Executive Officer,
Pak Matiari-Lahore Transmission Company,
Lahore.

Project: ±660KV MATIARI-LAHORE TRANSMISSION LINE (CPEC PROJECT)

Subject: **NTDC SUGGESTIONS REGARDING ADDITIONAL COMMISSIONING TESTS (A-7) AND SUBMISSION OF SCHEDULE**

Ref: **[i].** Owner Engineer Email Dated: 05.05.2021.
[ii]. Your Office Letter No. PTC-02-20210430-3, Dated: 30.04.2021.
[iii]. NPCC NTDC Letter No. 5930-36 GM (SO)/NPCC/HVDC, Dated: 23.04.2021.

Apropos to the subject matter, it is apprised that the Owner Engineer vide e-mail referred at [i] has furnished comments regarding your reply cited at [ii] on additional Commissioning Tests suggested by NPCC vide letter [iii] and endorsed that these tests are required to be conducted prior to High Power Test to ensure the stability, reliability and smooth running of the system.

In the light of these comments (attached for reference) NTDC is also of the same viewpoint to conduct these tests prior to High Power Test, to fulfill the requirement of HVDC system in all respect. You are therefore advised to submit the schedule for additional commissioning tests (A-7) at the earliest so that same may be conducted prior to commencement of High Power Test. Please be apprised that any delay in the compliance of above needful and any financial implications thereon will be on the part of Project Company.

06/5/2021

(Engr. Amjad Ali)
P.D/Focal Person for HVDC Project

DA/As Above:

CC To:

1. DMD (P&E) NTDC, 419 WAPDA House, Lahore.
2. GM (SO) NPCC NTDC, Islamabad.
3. GM (PSP) NTDC, PIA building, Lahore
4. Chief Engineer (P&C) NTDC, WAPDA House, Lahore
5. PS to MD NTDC, 414 WAPDA House, Lahore.
6. M/s HATCH Canada (Owner Engineer for HVDC Project)
7. M/s CESI (Independent Engineer), Italy.

- M/R-File

Room No. 618, WAPDA House, Lahore, Pakistan. Phone#0335-7403400, Email: cehvdc@ntdc.com.pk

Chief Engineer HVDC

From: Khan, Iftikhar
Sent: Wed May 05 2021 13:53:06 GMT+0500 (Pakistan Standard Time)
To: Chief Engineer HVDC
Cc: DMD PE; Muhammad Yaseen; bruno bisewski; Joanne Hu; GM SO; saeed.npcc@gmail.com; General Manager Power System Planning; Chief Engineer Protection And Control; CE TELECOM; Waseem Younas; Waseem Younas; mywaseem.100@gmail.com; Hussain, Sajid
Subject: Matiari-Lahore HVDC Transmission Project: NTDC SUGGESTIONS REGARDING ADDITIONAL COMMISSIONING TESTS (A-7)
Attachments: OE Comments to NTDC A7 tests.xlsx

Dear Sir,
We have reviewed the CET Response per their letter PTC-02-20210430-3 to the Tests requested by NTDC and attach herewith our comments to each of the point. In our view, the Tests should be conducted. We are available to provide any clarifications.
Best regards,
Iftikhar Khan
OE Representative

From: Chief Engineer HVDC <cehvdc@ntdc.com.pk>
Sent: Monday, May 3, 2021 2:25 AM
To: GM SO <gmso@ntdc.com.pk>; saeed.npcc@gmail.com; General Manager Power System Planning <gm.psp@ntdc.com.pk>; Chief Engineer Protection And Control <ce.pac@ntdc.com.pk>; CE TELECOM <ce.telecom@ntdc.com.pk>; Waseem Younas <mss1@ntdc.com.pk>; Waseem Younas <waseemyounas@ntdc.com.pk>; mywaseem.100@gmail.com
Cc: DMD PE <dmdpe@ntdc.com.pk>; Khan, Iftikhar <iftikhar.khan@hatch.com>; Muhammad Yaseen <yaseen@ntdc.com.pk>
Subject: NTDC SUGGESTIONS REGARDING ADDITIONAL COMMISSIONING TESTS (A-7)

Enclosed please find herewith letter on the subject matter for your response at the earliest, please.

P.D/Focal Person HVDC Project

item	Test suggested by NTDC	Purpose of test	CET Response	OE comment	OE Recommends to perform the test	Procedure is needed
1	Last line protection test	To demonstrate that last breaker open is detected in the dc controls and the dc controls have sufficient time to force retard to reduce the current to zero during the breaker opening time prior to blocking. Failure to reduce the dc current to zero can result in the last two valve remaining in conduction and could result in damage to the breaker. If the breaker does interrupt and there is still dc current flow it will result in very high overvoltage between the ac breaker and the current transformer limited only by the AC arresters on the converter transformers.	It is not suggested to perform this test in Matiari-Lahore Project, because the Last Line Protection was introduced when there are very few AC lines in inverter station, usually /only one or two lines, just like CASA-I 000 (2 lines), to protect HVDC system from over voltage in. case the last AC line tripped. However, in Lahore C/S, there are four lines, .and another r 2 lines ill be construction in future, which means N-4 or N-6 should be precondition for the last line protection action. As such, it is not necessary to conduct this test.	In our understanding the test is to check the timeing of the dc control forced response in relation to the trip of the converter circuit breakers. It has nothing to do with the number of lines coming into the station. the purpose is to safely force retard and block the HVDC before the converter before the ac breaker is open . Therefore we don't agree with CET's reasons for not performing the test. In view of the risk to equipment this test should be performed off-line first on both poles at each station to see that breaker opening is detected the force retard timings are correct. A final live test could be done for each pole at each station to demonstrate that the function and timings are correct. It would be prudent to do the test at less than full dc current.	yes	Yes
2	Electrode line open circuit test in Bipolar operation	To demonstrate that bipolar operation is possible in this scenario and that tripping would not occur on detection and that there would be an alarm but no protection induced operations other than closing of the NBGS. To demonstrate that the protection will trip both poles if one pole is block due to protection operation. To demonstrate that manual stopping either pole of the bipole is inhibited by interlocking if the neutral bus ground switch is closed.	It is not suggested to repeat this test again. Because this test has been verified in Bipole low power test (No 6.3.1 Pole tri[, Open line fault at electrode at Lahore and Pole trip Open line trip at Matiari, the result was satisfactory.	This test can result in high voltage at the neutral bus with possible high energy dissipation in the neutral arrester if not alleviated. The protection response should be to close the high speed switch at the affected converter station. This will result in some unbalance current dc current flow in the ground grid of the converter station. this should not normally cause a problem as the unbalance current between the two poles is small in balanced bipolar mode. and the dc should continue to operate normally. However if the two poles were in Pole poler control with different power settings in each pole the unbalance current could be high enough to cause unidirectional offset saturation in the converter transformers or other grounded transformers at the converter stations or nearby substations. If one pole were to block in this scenario then then both should trip. (tested in test 6.3.1 at Lahore) Not sure which test at Matiari	CET to advise which test applies to Matiari. It is not clear that a test has been performed at Maitari. If there is no test already done at Matiari it should be performed.	Yes
3	Overload timer Automatic Reset	This test is already included in the most recent A5 test procedure and will be carried out as part of the heat run on both poles.	It is already in testing plan. This function can be verified in monopole high power commissioning, a two hours overload test will be conducted during testing.	Test will be carried out on each pole as part of scheduled A5 tests.	yes	Already done
4	Electrode line ground fault in bipolar mode	To demonstrate that the ELIS is working correctly and is sensitive enough to detect a fault anywhere on the electrode line	When electrode line ground fault happens in Bipolar operation there-.is an alarm on OWS to ·indicate the impedance change on electrode line. If NPCC wants to perform the test, it .can be arranged	This test should be performed off-line first on both electrode lines to est the function of the Elis. Then later it can be performed on-line.	yes	yes

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	Other tests to be considered Suggested by OE					
5	Dc line fault Locator Accuracy test	To demonstrate that the LFL is working correctly and can locate faults withing the specified accuracy of 1km		The dc line faults performed to date have only been inside at the station and do not demonstrate the accuracy of the LFL. Faults are required at least one other point on the line to demonstrate the accuracy.	yes	yes
6	Electrode line ground fault in monopolar operation	To demonstrate the sensitivity of the Electrode ground fault line protections. To demonstrate the electrode line ground fault clearing sequence in monopole mode (force retard, wait, restart, etc.).			yes	yes

06/5/2024