



NATIONAL TRANSMISSION & DESPATCH COMPANY LTD.
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**General Manager
(System Operation)**

Letter No. 330-410 GM (SO)/NPCC/DD(S/D).
Dated: 11-01-2021.

Managing Director NTDC,
WAPDA House Lahore.

Subject: Complete Power System Breakdown on 09-01-2021

On 09-01-2021, at 23:41:10 Hrs, 500 kV Guddu – Shikarpur circuit # 01 & 02 tripped and at the same time 500 kV Guddu - Muzaffargarh and Guddu – DG Khan transmission line also tripped as per sequence of events in SCADA system. System Conditions before tripping are listed as under:

System Status Before Collapse:

Total System Generation: **10311 MW**

WAPDA Hydel **1257 MW**

GENCO's **983 MW**

IPPs **8071 MW**

System Frequency: **49.85 Hz**

Load on 500kV circuits before Tripping:

500kV Guddu- Shikarpur circuit # 01= 800A/615MW (towards Guddu)

500kV Guddu- Shikarpur circuit # 02= 825A/635MW (towards Guddu)

500kV Guddu- DG Khan circuit = 800A/615MW (towards DG Khan)

500kV Guddu- M/Garh circuit = 950A/731MW (towards M/Garh)

500kV Guddu- Guddu 747 circuit = 450A/346MW (towards Guddu 747)

500/220kV 450MVA T2 at Guddu=133MW (Step up)

Tripping Indications appeared on 500 kV transmission lines (as conveyed) by concerned GSO staff which resulted in cascaded tripping is as under:

500 kV Guddu - Shikarpur circuit # 01:

Guddu End:

DTT Trip

Shikarpur End: Power swing, R, Y, B Pick, O/V trip, F. L= 301.5KM

500 kV Guddu-Shikarpur circuit # 02:

Guddu End:

D/R, Z2,22 Trip F.L: -35.9km

Shikarpur End: Power swing, R, Y, B Pick, O/V trip, F. L= 495 KM

500 kV Guddu-Muzaffargarh circuit:

Guddu End:

Distance Relay: Red, Yellow, Blue phase, F.L:12KM

Muzaffargarh End:

NIL

500 kV Guddu - DG Khan circuit:

Guddu End: Z1, ABC trip, F.L:27.90KM

DG Khan End: SET 1: D/R, L2, L3 F.L:169.4km Power swing indication

SET 2: D/R F.L:200km

500 kV Guddu – Guddu 747 circuit:

Guddu End: DTT received, Transfer trip

Guddu 747 End:

500/220kV T/F T-2 at Guddu: HV O/C operated

RESTORATION

Restoration process was started immediately through Hydel Power plants Tarbela, Mangla, Warsak in North but the units kept on tripping due to unstable system conditions as a result of vide variation of frequency and voltages which was causing tripping on the ISPR - Rawat circuit and finally the interlink established between Mangla & Tarbela Power house through 220kBV network and the system started to stabilize.

Sequence and Time of restoration is as under:

At 03:48 Hrs 220 kV Mangla –Gujrat circuit # 02 normalized (**Supply to 220 kV Gujrat restored**).

At 04:20 Hrs 220 kV Mangla –Rawat circuit # 01 normalized (**Supply to 220 kV Rawat restored**).

At 04:48 Hrs 220 kV ISPR –Rawat circuit normalized (**Supply to 220 kV ISPR restored**).

At 05:00 Hrs 220kV Tarbela- Burhan circuit # 02 normalized (**Supply to 220kV Burhan restored**)

At 05:05 Hrs 220 kV Rawat -Bahria town circuit normalized (**Supply to 220 kV Bahria Town restored**).

At 05:07 Hrs 220 kV ISPR - Bahria town circuit normalized

At 05:19 Hrs normalized (**Supply to 220 kV University restored**).

At 05:28 Hrs Gujrat –Ghakkar circuit normalized (**Supply to 220 kV Ghakkar restored**).

At 05:51 Hrs 220 kV Tarbela - Mardan circuit # 02 normalized (**Supply to 220kV Mardan restored**).

At 06:10 Hrs 500 kV Tarbela- Rawat circuit normalized.

At 06:15 Hrs 220 kV Chakdara - Mardan circuit normalized (**Supply to 220 kV Chakdara restored**).
At 06:26 Hrs 220 kV Mangla-Kala shah Kaku circuit # 01 normalized (**Supply to 220 kV Kala shah kaku restored**).
At 06:28 Hrs 220 kV Chakdara – Shahibagh circuit normalized (**Supply to 220 kV Shahibagh restored**).
At 06:40 Hrs 220 kV Mangla –Ghakkar circuit normalized
At 06:52 Hrs 500 kV Tarbela- Barotha circuit # 02 normalized (**Supply to Barotha Power House restored**)
At 06:53 Hrs 220 kV Mangla–Kala shah Kaku circuit # 02 normalized
At 06:54 Hrs 500 kV Rawat – Nokhar circuit normalized (**Supply to 500kV Nokhar restored**)
At 07:09 Hrs 220 kV Kala Shah Kaku – Ravi circuit normalized (**Supply to 220kV Ravi restored**)
At 07:09 Hrs 220 kV Kala Shah Kaku –Bund Road circuit # 01 & 02 normalized (**Supply to 220kV Bund Road restored**)
At 07:14 Hrs 220 kV Sheikhupora – Bund Road circuit # 04 normalized (**Supply to 220kV Sheikhupora restored**)
At 07:15 Hrs 500 kV Tarbela- Barotha circuit # 01 normalized
At 07:15 Hrs 500 kV Barotha - Rawat circuit # 01 normalized
At 07:16 Hrs 220 kV Sheikhupora – Bund Road circuit # 02
At 07:18 Hrs 220 kV Kala Shah Kaku – Mangla circuit # 03 normalized
At 07:23 Hrs 220 kV Sheikhupora – Bund Road circuit # 01
At 07:23 Hrs 220 kV Kala Shah Kaku – Ghazi circuit (**Supply to 220kV Ghazi Road restored**)
At 07:25 Hrs 220 kV Sheikhupora – Bund Road circuit # 03
At 07:26 Hrs 220 kV Kala Shah Kaku – Sahowala circuit normalized (**Supply to 220kV Sahowala restored**)
At 07:28 Hrs 500 kV Sheikhupora – Nokhar circuit normalized (**Supply to 500 kV Sheikhupora restored**)
At 07:28 Hrs 220 kV Ghakkar –Gujrat circuit normalized
At 07:29 Hrs 220 kV Nowshehra– Sheikh Muhammadi circuit normalized (**Supply to 220kV sheikh muhammadi restored**)
At 07:33 Hrs 220 kV Kala Shah Kaku – Bandala circuit # 01 & 02 (**Supply to 220 kV Bandala restored**)
At 07:35 Hrs 220 kV Gatti – Bandala circuit # 01 & 02 (**Supply to 220 kV Gatti restored**)
At 07:35 Hrs 220 kV Sheikhupora –Wapda Town circuit (**Supply to 220 kV Wapda Town restored**)
At 07:39 Hrs 220 kV Sheikhupora – New Kotlakhpat circuit (**Supply to 220 kV New Kotlakhpat restored**)
At 07:53 Hrs 500 kV Gatti–Barotha circuit # 01 (**Supply to 500 kV Gatti restored**)

At 07:55Hrs 220 kV Ghazi Road –Sarfarznagar circuit (**Supply to 220 kV Sarfarznagar restored**)
At 07:56 Hrs 220 kV Gatti –Jaranwala circuit # 01 & 02 normalized (**Supply to 220 kV Jaranwala restored**)
At 07:59 Hrs 220 kV Okara–Sarfarznagr circuit # 01 normalized (**Supply to 220 kV Okara restored**)
At 07:59 Hrs 220 kV Gatti –Nishatabad circuit # 01 normalized (**Supply to 220 kV Nishatabad restored**)
At 07:59 Hrs 220 kV Okara –Yousafwala circuit # 02 normalized (**Supply to 220 kV Okara restored**)

At 08:01 Hrs 220 kV Gatti –Nishatabad circuit # 02 normalized
At 08:20 Hrs 220 kV Gatti–Ludewala circuit # 01 normalized (**Supply to 220 kV Ludewala restored**)
At 08:21 Hrs 220 kV Sammundri–Nishatabad circuit # 01 normalized (**Supply to 220 kV Sammundri restored**)
At 08:35 Hrs 220 kV Sheikhupura–ATLAS circuit normalized (**Supply to ATLAS Power House restored**)
At 08:37 Hrs 220 kV Sammundri –Toba Tek Singh circuit normalized (**Supply to 220kV TobaTek Singh restored**)
At 08:38 Hrs 220 kV Ravi –Shalamar circuit normalized (**Supply to Shalamar restored**)
At 08:40 Hrs 220 kV Manshera –ISPR circuit # 02 normalized (**Supply to 220 kV Manshera restored**)
At 08:45 Hrs 220 kV Manshera –Allai circuit # 02 normalized.
At 08:50 Hrs 220 kV Ghakkar –Sahowala Sialkot circuit normalized.
At 08:53 Hrs 220 kV Ghazi Road – Sarfarznagar circuit normalized.
At 08:55 Hrs 500 kV Gati –Rousch circuit normalized. (**Supply to Rousch Power plant restored**)
At 09:11 Hrs 500 kV Sheikhupora– Bhikki circuit normalized (**Supply to Bhikki Power House restored**)
At 09:15 Hrs 500 kV Gatti– Bhikki circuit normalized.
At 09:36 Hrs 500 kV Tarbela –Sheikh Muhammadi circuit normalized (**Supply to 500kV Sheikh Muhammadi restored**)
At 09:45 Hrs 500 kV New Lahore – Nokhar circuit normalized (**Supply to 500kV New Lahore restored**)
At 09:46 Hrs 220 KV Chasnapp 1,2– Ludewala circuit normalized (**Supply to 220kV Ludewala restored**)
At 09:48 Hrs 220 kV New Lahore – New Kotlakhpait circuit # 02 normalized
At 09:48 Hrs 220 kV New Lahore – New Kotlakhpait circuit # 01 normalized
At 09:52 Hrs 500 kV New Lahore – Balloki circuit # 02 normalized (**Supply to Balloki Power House restored**)
At 10:03 Hrs 500 kV New Lahore – Sahiwal Coal circuit normalized (**Supply to Sahiwal Coal Power House restored**)
At 10:09 Hrs 220 kV Sahiwal Coal–Yousafwala circuit normalized (**Supply to 500kV Yousafwala restored**)

At 10:11 Hrs 220 kV Gatti–Yousafwalai circuit # 02 normalized

At 10:14 Hrs 500 kV Multan –Yousafwala circuit normalized (**Supply to 500kV Multan restored**)

At 10:37 Hrs 500 kV Multan – Rahim Yar Khan circuit normalized (**Supply to 500kV Rahim Yar Khan restored**)

At 10:38 Hrs 500 kV Guddu 747 – Rahim Yar Khan circuit normalized (**Supply to Guddu 747 restored**)

At 10:40 Hrs 500 kV Guddu 747 –Guddu circuit normalized (**Supply to 500kV Guddu restored**)

At 10:43 Hrs 220 kV New Lahore–Ghazi circuit normalized

At 10:55Hrs 220 kV Multan – New Muzaffargarh circuit normalized (**Supply to 220kV New Muzaffargarh restored**)

At 10:58Hrs 500 kV Guddu–Shikarpur circuit # 01 normalized (**Supply to 500kV Shikarpur restored**)

At 11:05Hrs 220 kV UCH I–Shikarpur circuit normalized (**Supply to 220kV UCH I power plant restored**)

At 11:07Hrs 220 kV UCH II–Shikarpur circuit normalized (**Supply to 220kV UCH II power plant restored**)

At 11:25Hrs 220 kV ISPR–Mansehra circuit # 01 normalized

At 11:26 Hrs 220 kV DM Jamali –UCH I circuit normalized (**Supply to 220kV DM Jamali Restored**)

At 11:32 Hrs 220 kV DM Jamali –Sibbi circuit normalized (**Supply to 220kV Sibbi Restored**)

At 11:52Hrs 220 kV Rohri–Shikarpur circuit # 02 normalized (**Supply to 220kV Rohri restored**)

At 12:11 Hrs 220 kV Quetta –Sibbi circuit # 01 normalized (**Supply to 220kV Quetta restored**)

At 13:14Hrs 500 kV Dadu –Shikarpur circuit # 01 normalized (**Supply to 500kV Dadu restored**)

At 13:38Hrs 220 kV Rohri–Shikarpur circuit # 01 normalized

At 13:36Hrs 500 kV Guddu–Muzaffargarh circuit normalized

At 13:36Hrs 500 kV Dadu – Jamshoro circuit normalized (**Supply to 500kV Jamshoro restored**)

At 14:35Hrs 500 kV Guddu–Muzaffargarh circuit normalized (**Supply to 500kV Muzaffargarh restored**)

At 15:02 Hrs 500 kV Jamshoro –TM Khan circuit # 02 normalized (**Supply to 220kV TM Khan restored**)

At 15:03 Hrs 500 kV Jamshoro –TM Khan circuit # 01 normalized (**Supply to 220kV TM Khan restored**)

At 15:06 Hrs 500 kV Jamshoro –Port Qasim circuit normalized (**Supply to 500kV Port Qasim Power Plant restored**)

At 15:11 Hrs 220 kV Daud Khel–Sheikh Muhammadi circuit # 01 normalized (**Supply to 220kV Daudkhel restored**)

At 15:17 Hrs 220 kV Daud Khel–Bannu circuit # 01 normalized (**Supply to 220kV Bannu restored**)

At 15:18 Hrs 500 kV Jamshoro –Halaroad circuit # 01 normalized (**Supply to 220kV Halaroad restored**)

At 15:19 Hrs 500 kV Moro – Rahim Yar Khan circuit normalized (**Supply to 500kV Moro restored**)

At 15:19 Hrs 500 kV Moro –Dadu circuit normalized

At 15:55 Hrs 500 kV China Hub– Jamshoro circuit normalized (**Supply to 500kV China Hub Power Plant restored**)
At 16:57 Hrs 500 kV Matiari– Jamshoro circuit normalized (**Supply to 500kV Matiari restored**)
At 17:02 Hrs 500 kV Jamshoro –Halaroad circuit # 02 normalized
At 18:16 Hrs 500 kV Jamshoro–NKI circuit normalized (**Supply to 500kV NKI restored**)
At 18:44 Hrs 500 kV KDA –NKI circuit normalized (**K-Electric Synchronised with NTDC network**)
At 19:40 Hrs 500 KV Engro Thar –Matiari circuit # 02 normalized (**Supply to 500kV Engro Thar Power Plant restored**)

Present Status:

Power Supply to all 500/220kV NTDC grid stations from Sheikh Muhammadi up to Jamshoro has been restored. K-Electric Network Synchronized with NTDC Network at 18:44 Hrs dated 10-01-2021.

Back supply to all Power plants has been restored.

All Furnace oil operated plants have been synchronized. Chasma Nuclear Power Plants and Coal fired Power Plants i.e. China hub, Port Qasim, Engro Thar and Sahiwal Coal are under start up. Unit # 01 of Sahiwal coal and unit # 02 of China Hub have been synchronized.

This is for your kind information please.

(Engr. Muhammad Ayub)
General Manager (System Operation)
NPCC, NTDC, Islamabad

Copy to:

- Secretary Ministry of Energy (Power Division), Islamabad.
- Managing Director (PEPCO), WAPDA House, Lahore.
- CEO GENCO Holding Company, G-5/2, Islamabad
- Deputy Managing Director (P & E), NTDC, WAPDA House Lahore.
- General Manager (Technical), WAPDA House Lahore.
- General Manager (Asset Management), North, NTDC, WAPDA House Lahore.
- General Manager (Asset Management), South, NTDC, Hyderabad.
- Chief Engineer (Protection & Control), NTDC, WAPDA House Lahore.
- Chief Technical Officer, CPPA-G, Islamabad
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