Minutes
of
61st PCC meeting

Date: 12.12.2017
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 61ST PROTECTION SUB-COMMITTEE MEETING HELD AT ERPC, KOLKATA ON 28.11.2017 (TUESDAY) AT 11:00 HOURS

List of participants is enclosed at **Annexure-A.**

Member Secretary, ERPC chaired the meeting. He welcomed ED (ERLDC), Director (NPC) and all the other participants in the meeting. He informed that a draft of Reliability Standards for Protection System for Indian Power System has been prepared by NPC and draft has been circulated to all the constituents. He requested all the constituents to furnish the comments for finalizing the standard.

Thereafter, he requested EE (PS), ERPC to take up the agenda points in seriatim.

PART – A

ITEM NO. A.1: Confirmation of minutes of 60th Protection sub-Committee Meeting held on 24th October, 2017 at ERPC, Kolkata.

The minutes of 60th Protection Sub-Committee meeting held on 24.10.17 circulated vide letter dated 31.10.17.

Members may confirm the minutes of 60th PCC meeting.

Deliberation in the meeting

Members confirmed the minutes of 60th PCC meeting.

PART – B

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN OCTOBER, 2017

ITEM NO. B.1: Disturbance at 400 kV Teesta-V S/s on 12-10-17 at 12:55 hrs

At 12:55 hrs, heavy sound was observed in the vicinity of 400kV Teesta V and 400 kV Teesta - Rangpo - II tripped on zone 2, Y-N fault from Rangpo end. Teesta end distance protection not observed any fault in the line. Carrier received at Teesta end and Auto reclose operation of 400 kV Teesta - Rangpo - II was successful at Teesta end. In the mean time, B/C at Teesta tripped on O/C, E/F protection, high set stage II resulting tripping of unit III due to loss of evacuation path.

Relay Indications:

Time	Name of the element	Relay at Local end	Relay at remote end
12:55:43 hrs	400 kV Teesta - Rangpo - II	Y-N, AR initiated. Tripped on receipt of carrier trip	Y-N, F/C: 4.789, Zone 2, F/D: 18.25 KM. Line length actually 12.323 km. Current:- IA: 173.8A, IB: 4.789 kA, IC: 356.3A Voltage:- VAN: 244.7KV, VBN: 190.5KV, VCN: 236.1KV
12:55:37 hrs	400kV Bus coupler at Teesta	O/C, E/F relay (stage 2)	
12:55:48 hrs	Unit III of Teesta V	Over frequency relay	

Generation loss 170 MW

Fault clearing time as per PMU data is 600 ms.

NHPC informed that stage-II high set setting of O/C, E/F protection of Bus coupler has been revised from 2A, Instantaneous to 2A, 100 ms time delay.

Powergrid and NHPC may explain the following:

- Powergrid may explain the status of Auto reclose operation at Rangpo end.
- Location of the fault

Deliberation in the meeting

Powergrid explained that there was a high resistance Y-N fault in 400 kV Teesta - Rangpo – II close to Teesta V bus. Initially the fault was seen in zone 3 characteristics of distance protection at Rangpo end. Later the fault was evolved into zone 2 characteristics. Since it was an evolving fault the Autorecloser was not initiated at Rangpo end as per the scheme and 400 kV Teesta - Rangpo – II tripped from Rangpo end. DT was sent to Teesta-V end.

NHPC informed that as per the DR of distance protection at Teesta V end the fault was identified in forward zone but the apparent impedance was much greater than the zone characteristics of the both Main-I & II distance protection. Hence no tripping was initiated from Teesta V end. Autorecloser operation was initiated on receipt of DT from Rangpo end. But in the mean time, 400kV Bus coupler tripped on over current, E/F protection (stage-II high set setting).

NHPC informed that stage-II high set setting of O/C, E/F protection of Bus coupler has been revised from 2A, Instantaneous to 2A, 100 ms time delay.

PCC opined that fault in 400 kV Teesta - Rangpo – II near to Teesta-V bus should be detected by Teesta end distance protection and initiate tripping. Teesta-V end distance relays were not able to identify the high resistance fault because of insufficient resistive reach setting. The 400kV bus coupler at Teesta-V should not trip in this case.

PCC advised NHPC to take the following measures:

- *Any one (Main I or II) distance protection should have quadrilateral characteristics to accommodate arc resistance of the fault. The zone settings and starter settings should be modified accordingly in coordination with Rangpo, Powergrid.*
- *The 400kV bus coupler overcurrent setting should be properly coordinated with the distance protection of transmission lines. Otherwise bus coupler will trip for the faults in transmission line. Since busbar protection is available for 400kV bus at Teesta-V, the over current setting of bus coupler can be reviewed and time setting should be coordinated at least with zone 2 time of the transmission line protection.*

PCC opined that since length of 400 kV Teesta - Rangpo D/C line is 12 km and it is in high resistance fault prone area, PCC recommended for differential protection using OPGW to improve the reliability.

ITEM NO. B.2: Repeated disturbances at 400kV Teesta III on 13-10-17 at 14:39 hrs, 26-10-17 at 12:02 hrs and 27-10-17 at 13:17 hrs

- **13-10-17 at 14:39 hrs**

400 kV Teesta III - Rangpo S/C tripped due to Y-B fault resulting tripping of unit I, III, IV, V & VI at Teesta III and running unit at Dikchu.

Relay indication: Y-B, Z-I, 29.4 km from Teesta III, F/C 4.16 kA, 3.22 kA. (Loss of generation at Teesta III: 0.1299 MU).

Generation loss 750 MW. Fault clearing time as per PMU data is less than 100 ms.

Teesta Urja and Powergrid may explain with the relay indications and DR.

Deliberation in the meeting

Teesta Urja explained that 400 kV Teesta III - Rangpo S/C tripped on Zone 1 due to Y-B phase fault at 29.4 km from Teesta –III.

Powergrid informed that Rangpo end was also tripped on zone 1, Y-B fault.

- **19-10-17 at 11:55 hrs**

400 KV Teesta III-Dikchu S/C tripped on Y-B-N fault resulting loss of unit II at Dikchu.

Generation loss 58 MW

Fault clearing time as per PMU data is less than 100 ms.

Teesta Urja and Dikchu may explain with the relay indications and DR.

Deliberation in the meeting

*Teesta Urja explained the tripping with a presentation. Presentation is enclosed at **Annexure-B2.2**.*

Teesta Urja explained that there was a Y-B phase fault in 400 KV Teesta III-Dikchu S/C and the fault was cleared by SOTF trip of Main 1 distance protection at Teesta III. Teesta Urja explained that SOTF trip was initiated before the distance protection due to incorrect SOTF detection logic. Detection logic of SOTF has been revised.

Dikchu informed that no tripping was initiated from their end.

It was informed that Dikchu is not sending any disturbance report.

PCC felt that fault pickup should be observed at Dikchu end and advised Dikchu to send the details to ERPC and ERLDC after verification.

PCC advised Dikchu to upload the disturbance report in www.erpc-protectiondb.in for any tripping in their control area otherwise it will be treated as non-compliances of IEGC.

Dikchu agreed.

- **26-10-17 at 12:02 hrs**

400 kV Teesta III – Dikchu S/C along with all running units at Teesta III tripped on O/V (as reported by Teesta III) at Teesta III end. Running unit (U#1) at Dikchu tripped due to loss of evacuation path. Breaker of 400 kV Teesta III – Dikchu S/C at Dikchu end was manually opened at 12:07 hrs.

No fault is observed in PMU data. Voltage at Teesta III is 409 kV (as per ERLDC SCADA data). Both the buses in Teesta III were in live condition as 400 kV Teesta III – Rangpo S/C did not trip.

Generation loss 460 MW

Teesta Urja and Dikchu may explain with the relay indications and DR.

Deliberation in the meeting

Teesta Urja explained that DC ground fault was observed in 220V DCDB Bus -1 and Bus-2. At the same time, all unit controllers read Control watchdog faulty and tripped all the running unit CBs and Teesta III – Dikchu line CB. No tripping was initiated from protection relays.

Teesta Urja informed that one DC positive wire was found open in dewatering panel, which was sometimes touching to the panel body during starting of the dewatering pump and causing earth fault of DC system. PLC controller was mal-operating during earth fault.

Teesta Urja added that they have taken the following corrective actions:

1) *Loose wire was connected properly in the dewatering panel.*
2) *Software for the controller modified by OEM which was creating tripping signal on event of ground fault.*
3) *System tested by creating earth fault three times and observed no abnormal signals & no tripping of the system.*

- **27-10-17 at 13:17 hrs**

400 kV Teesta III – Dikchu S/C along with all running units at Teesta III tripped due to DC earth fault at Teesta III end. Running unit (U#1) at Dikchu tripped due to loss of evacuation path. Breaker of 400 kV Teesta III – Dikchu S/C at Dikchu end was manually opened at 13:20 hrs.

No fault is observed in PMU data. Voltage at Teesta III is 409 kV (as per ERLDC SCADA data). Both the buses in Teesta III in live condition as 400 kV Teesta III – Rangpo S/C did not trip.

Generation loss 850 MW

Teesta Urja and Dikchu may explain with the relay indications and DR.

Deliberation in the meeting

Teesta Urja explained that the incident was similar to 26-10-17 at 12:02 hrs as discussed in Item no. B2.3.

ITEM NO. B.3: Disturbance at 132 kV Purnea S/s on 18-10-17 at 18:19 hrs

At 18:19 hrs, 132 KV Purnea(PG) - Purnea(BSPTCL) T/C tripped (from PG end only) due to failure of B phase jumper of line isolator at Bihar end of 132 KV Purnea-Purnea - III. 132 KV Purnea (BSPTCL)- Purnea (PG) CKT-III tripped at Purnea (BSPTCL) end on O/C & E/F relay (Micom 142) and Master trip relay in 411 ms. All the three ckts tripped from Powergrid.

Simultaneously 132 KV Purnea (PG) - Phorbisganj S/C tripped on overload resulting total power failure at 132 /33KV Purnea S/S (BSPTCL). 132 KV Khagaria & Naugachia shifted to Barauni source.

Load loss 200 MW

Fault clearing time as per PMU data is 350 ms.

Powergrid and BSPTCL may explain with the relay indications and DR.

Deliberation in the meeting

Powergrid informed that there was a B-N fault in 132 KV Purnea(PG)-Purnea(B) line- III but Purnea(B) end failed to clear the fault. As a result, 132 KV Purnea (BSPTCL)- Purnea (PG) T/C line

tripped from Purnea (PG) end.

BSPTCL informed that 132 KV Purnea(PG)-Purnea(B) line- III tripped from Purnea (BSPTCL) end on O/C & E/F relay.

PCC opined that there was a delayed fault clearing from Purnea (BSPTCL) end which caused the tripping of all three ckts from PG end.

PCC advised BSPTCL to coordinate the O/C & E/F relays with other end and check the healthiness of the CB at Purnea(B) of 132 KV Purnea(PG)-Purnea(B) line- III.

Powergrid informed that they are installing differential protection for 132 KV Purnea (BSPTCL)-Purnea (PG) T/C line. The differential protection will be commissioned in January 2018 subjected to availability of shutdown.

ITEM NO. B.4: Disturbance at 220 kV Madhepura S/s on 20-10-17 at 23:53 hrs

Total power failure occurred at Madhepura, Saharsa, Sonebarsa and Udaikishanganj due to tripping of 220 kV Purnea - Madhepura D/C on Y-N fault.

Load loss 124 MW

Fault clearing time as per PMU data is less than 100 ms.

Powergrid and BSPTCL may explain with the relay indications and DR.

Deliberation in the meeting

Powergrid informed that there was a Y-N fault in 220 kV Purnea(PG) – Madhepura line – II and the fault current was 9kA (approx). Purnea(PG) end tripped on zone 1, Y-B fault but Madhepura end failed to clear the fault as a result 220 kV Purnea(PG) – Madhepura line – I also tripped from Purnea(PG) end.

PCC advised BSPTCL to check Madhepura end relay of 220 kV Purnea(PG) – Madhepura line – II.

ITEM NO. B.5: Disturbance at 132 kV Sultanganj S/s on 26-10-17 at 09:22 hrs

Total power failure occurred at Sultanganj, Tarapur and Part of Munger after tripping of 132 kV Banka – Sultanganj D/C in R-N fault (Relay Indication: Ckt II: R-N, F/C 2.19 kA, 41.27 km from Banka, Ckt I: R-N, 2.8 kA, 31.62 km from Banka).

Load loss 32 MW

Fault clearing time as per PMU data is less than 100 ms.

Powergrid and BSPTCL may explain with the relay indications and DR.

Deliberation in the meeting

Powergrid informed that there are multiple R-N faults in both the lines of 132 kV Banka – Sultanganj D/C line with 3 ms time delay. Both the lines tripped from Banka end on zone 1, R-N fault.

BSPTCL informed that no tripping was initiated from Sultanganj end.

BSPTCL failed to explain how the fault got cleared from their end.

PCC advised BSPTCL to collect the details and submit the report to ERPC and ERLDC within a week.

ITEM NO. B.6: Disturbance at 220 kV Chandaka(OPTCL) on 17-10-17 at 10:23 hrs

220 kV Mendasal - Chandaka Q/C line tripped due to fault in 220 kV Mendasal - Chandaka - I resulting total power failure at Chandaka end. Power was extended to Chandaka by charging circuit II.

Load loss 230 MW. Fault clearing time as per PMU data is 1000 ms.

OPTCL may explain with the relay indications and DR.

Deliberation in the meeting

OPTCL shared the presentation on the disturbance. Presentation is enclosed at Annexure-B6.

OPTCL informed that there was a R-N fault in 220 kV Mendasal - Chandaka – III at 15 km from Mendhasal end. Mendhasal end cleared the fault on zone 1 but Chandaka end failed to clear the fault as a result other three 220kV lines of 220 kV Mendasal – Chandaka tripped from Mendhasal end on back up over current relay on high set feature.

PCC advised OPTCL to take the following corrective actions:

- *Chandaka end distance protection of 220 kV Mendasal - Chandaka – III should be tested.*
- *Back over current protection relays at Mendhasal and Chandaka are to be properly coordinated*

ITEM NO. B.7: Disturbance at 220 kV Budhipadar S/s on 01-10-17 at 09:25 hrs

Prior to the incident, 220 kV Korba III feeder was in idle charged up to location 24 from Budhipadar end. At 09:25 hrs, fault occurred at idle charged portion and line tripped from Budhipadar end in Z-I protection. At same time, all elements connected to 220 kV Bus I tripped at Budhipadar due to operation of bus bar protection.

It is observed that, the fault current recorded by Korba-3 feeder in B-phase is IL3/In=15.0. The sum of the fault current contribution from all other feeder of Bus-I also found to be IL3/In=15.0. So, no differential current is available but Bus bar relay operates for Bus-1 & tripped all the feeders of Bus-I.

Fault clearing time as per PMU data is less than 100 ms.

OPTCL may explain with the relay indications and DR.

Deliberation in the meeting

OPTCL explained that fault occurred in idle charged portion of 220kV Korba-Budhipadar line at 2.5 km from Budhipadar. The line tripped from Budhipadar end in Z-I protection. At same time, all elements connected to 220 kV Bus I tripped at Budhipadar due to operation of bus bar protection. After tripping of all feeders on BUS -1, the central unit of Bus Bar relay was in REBOOTING mode. Therefore proper analysis could not be ascertained.

PCC advised OPTCL to explain the operation of bus bar protection of Bus 1 in next PCC meeting with proper analysis.

ITEM NO. B.8: Disturbance at 400 kV Kahalgaon S/s on 15-10-17 at 10:15 hrs

Unit - I was being taken shutdown due to boiler tube leakage. During shutdown process, BFR operated and all breakers connected to bus I tripped. On investigation, it was found that resistance of trip coils of Y & B phase of aforesaid unit #1 main bay breaker was high.

NTPC may explain.

Deliberation in the meeting

NTPC submitted that Unit - I was being taken shutdown due to boiler tube leakage. The BHEL make 400 KV Circuit breakers installed in main & tie bay were manually switched off. At that time, BFR relay of unit#1 main bay breaker operated & tripped all 400 KV main bay breakers associated with 400 KV Bus#1 as per the scheme. No line & unit tripped additionally.

NTPC explained that during preliminary observations it was identified that Y& B pole of Unit#1 main bay circuit breaker did not trip in time resulting into BFR operation. Subsequently, 400 KV BUS#I tripped after approx 200 ms time delay through BFR operation as per settings.

During detailed breaker testing of unit#1 main bay breaker, Resistance of Trip coils of Y & B phase of aforesaid unit#1 main bay 400 KV circuit breaker was found at higher side. These faulty trip coils were replaced immediately. Breaker was again tested & all testing parameters of aforesaid circuit breaker were found in order.

PCC advised NTPC to explain the reason for BFR operation in next PCC meeting.

ITEM NO. B.9: Tripping incidences in the month of October, 2017

Other tripping incidences occurred in the month of October 2017 which needs explanation from constituents of either of the end is given at **Annexure- B9**.

In 58th PCC, ERLDC informed that most of the constituents are not submitting the DR and EL data for single line trippings.

PCC advised all the constituents to upload the details along with DR and EL in PDMS on-line portal and referred the issue to TCC for further guidance.

In 36th TCC, all the constituents were advised to use the PDMS on-line portal for uploading the single line tripping details along with DR (comtrade files), EL and other relevant files for all trippings of August 2017 onwards. Otherwise, it will be considered as violation of compliance of clause 5.2(r) & 5.9 of IEGC.

Members may discuss.

Deliberation in the meeting

Members explained the tripping incidences. Updated status is enclosed at **Annexure-B9***.*

PART- C:: OTHER ITEMS

FOLLOW-UP OF DECISIONS OF THE PREVIOUS PROTECTION SUB-COMMITTEE MEETING(S)

(The status on the follow up actions is to be furnished by respective constituents)

ITEM NO. C.1: Preparation of reliability standards for protection system for Indian Power System--NPC

CEA vide letter dated 12th September 2017 informed that CERC in its Order dated 05.08.2015 wrt Petition No. 009/SM/2015 in the matter of following up actions on the recommendations of CAC Sub-Committee on Congestion in Transmission, directed National Reliability Council for Electricity (NRCE) to prepare Standards for Protection System.

NRCE in its 6th meeting held on 17th March 2016 had formed a Subgroup for Preparation of the Reliability Standards for Protection system and Communication system for Indian Power System. Five meetings were held by the Subgroup. A draft of Reliability Standards for Protection System for Indian Power System has been prepared.

It is requested to furnish the comments from Eastern Region constituents for finalizing the standard.

The draft copy of Reliability Standards for Protection System for Indian Power System is circulated with Agenda and also available at ERPC website.

In 59th & 60th PCC, all the constituents were advised to go through the draft and send their comments to ***erpcprotection@gmail.com*** *with a copy to* ***mserpc-power@nic.in*** *by 30th October 2017****.***

Members may update.

Deliberation in the meeting

Director, NPC informed that they have not yet received comments from ER constituents and he requested all the ER constituents to give their comments at the earliest to finalize the draft.

Constituents informed that more emphasis has been given to transmission line protection in the draft reliability standards for protection system and transformer protection was not included the draft.

ED, ERLDC informed that reliability standards for protection system for Indian Power System was prepared based on the recommendations of CERC Order dated 05.08.2015 wrt Petition No. 009/SM/2015 and CAC Sub-Committee on Congestion in Transmission. Therefore more emphasis has been given to transmission line protection in the standard. He advised ERPC to share the above reports to all the constituents to know the background and purpose of the standard.

Member Secretary, ERPC suggested that a small committee needs to be formed to study and compile the observations received from different constituents of ER.

PCC agreed and formed a committee of following protection engineers to study and compile the observations:

- Shri Surajit Bannerjee Asst GM, ERLDC
- Shri J. G. Rao, EE, ERPC -- Coordinator
- Shri S. Maiti, S.D.E, DVC

- Shri P. Ghosh, Dy. Manager, PGCIL
- Shri. Jayanta Kanjilal, ACE, WBSETCL

*PCC advised all the constituents to go through the draft and send their comments to **erpcprotection@gmail.com** with a copy to **mserpc-power@nic.in** by 5th December 2017. The comments will be shared to all the committee members. The committee will meet at ERPC, Kolkata on 7th December 2017 to study and compile the observations. The final report will be prepared and sent to CEA on 8th December 2017.*

ITEM NO. C.2: Checklist for submission of updated data for Protection Database

The network data in Protection Database needs to be updated on regular basis on account of commissioning of new elements in the CTU as well as STU networks. Accordingly a checklist has been prepared which is enclosed in **Annexure-C2**.

All the constituents requested to submit the checklist on monthly bases in every OCC/PCC meetings.

Constituents may update.

Deliberation in the meeting

All the constituents were advised to submit the details as per the checklist for all new commissioned elements.

ITEM NO. C.3: Repeated disturbances at 132 kV Rangit, Kurseong, Melli and Rangpo on 30-08-17 at 05:15 hrs and 31-08-17 at 00:39 hrs

30-08-17 at 05:15 hrs:

At 5:15 hrs. 132 KV Siliguri-Kurseong S/C, 132 KV Siliguri Melli S/C and 132 KV Rangit-Rangpo S/C tripped on R-B-N fault. As a result, all running units of Rangit(3 x 20 MW) tripped on over frequency and subsequently,132 KV Rangit-Kurseong S/C and 132 KV Rangit-Sagbari S/C were hand tripped.

31-08-17 at 00:39 hrs

At 00:39 hrs. 132 KV Siliguri-Kurseong S/C, 132 KV Siliguri Melli S/C and 132 KV Rangit-Rangpo S/C tripped on R-B-N fault. As a result, all running units of Rangit(3 x 20 MW) tripped on over frequency and subsequently,132 KV Rangit-Kurseong S/C and 132 KV Rangit-Sagbari S/C were hand tripped.

In 59th PCC, Powergrid informed that fault was in both 132 KV Siliguri-Kurseong S/C and 132 KV Siliguri-Melli S/C lines due to lightening strike as both the lines are in same tower. Both the lines tripped from Siliguri end on zone 1.

NHPC informed that Rangit units tripped on over frequency due to non availability of evacuation path.

PCC advised Powergrid to send the complete details along with sequence of tripping and DR to ERPC and ERLDC for further analysis.

Powergird may update.

Deliberation in the meeting

Powergird uploaded the details in along with DR in PDMS.

30-08-17 at 05:15 hrs:

- *132 KV Siliguri-Melli line: at Siliguri end: R-B-N Fault, Fault current Ir=3.88 KA, Ib=3.46 KA, Fault distance: 16.7 KMS, Zone-I*
- *132 KV Siliguri-Kurseong line: at Siliguri end: R-B-N Fault, Fault current: Ir=4.48 KA, Ib=4.4 KA, Fault distance: 17 KMS, Zone-I*

31-08-17 at 00:39 hrs

- *132 KV Siliguri-Melli line: at Siliguri end:Y-N fault, Fault current 2.68 KA, Fault distance: 26.3 KMS, Zone-I*
- *132 KV Siliguri-Kurseong line: at Siliguri end: Y-N fault, Fault current: 2.65 KA, Fault distance: 23.9 KMS, Zone-I*

ITEM NO. C.4: Multiple elements tripping at 220/132 kV Lalmatia (JUSNL) S/s on 06-02-17 at 16:40 Hrs.

At 16:40hrs, blasting of 132 kV Y & B phase CTs of 132 kV bus sectionalizer at 220/132kV Lalmatia S/s resulted in following events:

- 132 kV Lalmatia - Kahalgaon and 132 kV Lalmatia - Dumka – II tripped from Lalmatia end on zone IV protection.
- 132 kV Lalmatia -Dumka – I feeder tripped from both end.
- Farakka end of 220 kV Farakka Lalmatia line, remain picked up the fault in zone 1 for 880 ms but no line breaker was tripped.

Analysis of PMU plots:

- At 16:40 hrs, 4 kV voltage dip observed in all three phases.
- Fault clearance time is 700 ms. Though the voltage fully recovered to pre-fault value after 600 ms of the fault.

In 53rd PCC, NTPC informed that 132 kV Y & B phase CTs of 132 kV bus sectionalizer were busted at 220/132kV Lalmatia S/s and Bus bar protection was failed to operate. One 220/132kV ATR at Lalmatia (under NTPC control area) tripped on backup E/F protection other ATR which is under JUSNL control area was failed to clear the fault. As a result, 220kV Lalmatia-Farakka line tripped from Farakka end on directional E/F protection.

JUSNL informed that 132kV Lalmatia-Dumka D/C line and 132kV Lalmatia-Khahalgaon S/C line tripped from Lalmatia end on non directional over current protection. The 220/132kV ATR at Lalmatia under their control area also tripped on over current E/F protection.

PCC observed that 220kV Lalmatia-Farakka line tripped from Farakka end after 6 sec which is not acceptable and tripping of 220/132kV ATRs is not clear.

PCC advised the following:

- NTPC should check the reason for non-operation of busbar protection at 132kV Lalmatia S/s.
- NTPC and JUSNL should jointly test the healthiness of the busbar protection at 132kV Lalmatia S/s
- NTPC and JUSNL should place the details of ATR tripping along the relevant DR.
- JUSNL should disable the non-directional over current protection feature in all 132kV lines and enable directional over current protection with proper relay coordination.

PCC advised JUSNL and NTPC to submit the action taken report to ERPC and ERLDC within a week.

In 54th PCC, NTPC and JUSNL informed that they will test the healthiness of the busbar protection at 132kV Lalmatia S/s in May 2017.

JUSNL informed they have not yet disabled the non-directional over current protection feature in all 132kV lines.

In 58th PCC, JUSNL informed that they have disabled the non-directional over current protection feature in all 132kV lines and enabled directional over current protection on 30th July 2017.

PCC advised JUSNL and NTPC to comply the other observations and submit the action taken report to ERPC and ERLDC.

In 60th PCC, NTPC informed that protection equipment and CBs are very old at Lalmatia S/s which are the property of ECL. NTPC added that they are facing difficulty to maintain the Lalmatia S/s and 220kV Farakka-Lalmatia line with such old equipment.

PCC felt that Lalmatia S/s is covered under Farakka islanding scheme and ineffective protection/communication system at Lalmatia will affect successful operation of Farakka islanding scheme.

PCC advised NTPC to submit the healthiness status of protection/communication equipment to ERPC and ERLDC. PCC also advised NTPC to pursue with ECL for further necessary action.

NTPC and JUSNL may update.

Deliberation in the meeting

NTPC vide letter dated 24.11.2017 informed the following

- *Bay equipment, Auto transformers and protection system at both FSTPS and Lalmatia are healthy. However, bay equipment (CT, CVT, CB, isolators), Auto transformer and protection system are very old. Spares and service support from the OEM are not available due to obsolescence. In case of any equipment failure, defect and relay malfunction, the situation will be difficult to manage.*
- *NTPC, Farakka has already communicated the issue to ECL for urgent hand over of O&M of Farakka-Lalmatia transmission system.*

ITEM NO. C.5: BSPTCL may update the latest status of following PCC recommendations

1. Disturbance at 220 kV Motipur S/s on 05-09-17 at 10:17 hrs

In 60th PCC, BSPTCL was advised to take the following remedial actions:

- Relay at Musahari end of 220 KV Motipur- Musahari line should be tested
- Darbanga end relay of 220kV Musahari-Darbanga line should be tested
- Motipur end backup O/C, E/F protection of 220kV Motipur-Darbanga line should be enabled and coordinated with adjacent line relays.

Deliberation in the meeting

BSPTCL updated the status as follows:

- *Relay at Musahari end of 220 KV Motipur- Musahari line has been tested and found all right.*
- *220kV Musahari-Darbanga line was LILOd at Musahari. However the relay settings at Darbanga end were not revised as per the new configuration. Now the settings have been revised at Darbanga.*

2. Disturbance at 132 kV Lakhisarai S/s on 09-09-17 at 10:42 hrs

In 60th PCC, BSPTCL was advised to check Lakhisarai(B) end relay of 132 KV Lakhisarai(PG)-Lakhisarai(B) line-II.

Deliberation in the meeting

BSPTCL informed that Lakhisarai(B) end relay of 132 KV Lakhisarai(PG)-Lakhisarai(B) line-II is not operating properly because of incorrect settings.

BSPTCL informed that the settings have been corrected.

3. Disturbance at 220 kV Hazipur on 07-09-17 at 18:57 hrs

In 60th PCC, BSPTCL was advised to test the bus bar protection relay at 220kV Hazipur.

BSPTCL may update.

Deliberation in the meeting

BSPTCL informed that testing is in progress but the relay is old EM type.

PCC advised BSPTCL to replace the relay with numerical bus bar protection relay.

ITEM NO. C.6: Repeated pole blocking at HVDC Sasaram

S. No.	Tripping Date	Tripping Time	Brief Reason/Relay Indication	Restoration Date	Restoration Time	Duration
1	17-07-17	5:41	System failure alarm	17-07-17	6:38	0:57
2	17-07-17	16:35	System failure alarm	17-07-17	17:34	1:00:00
3	20-07-17	8:29	System failure alarm	20-07-17	9:25	0:56
4	31-07-17	18:34	System failure alarm	31-07-17	19:45	1:11:00
5	29-05-17	00:15	System failure alarm	29-05-17	01:24	1:09:00
6	25-04-17	06:03	Auxiliary supply failure	25-04-17	07:14	1:11:00
7	01-04-17	09:15	Tripped due to Valve cooling system problem	01-04-17	12:56	3:41:00
8	11-04-17	23:32	System failure alarm	12-04-17	00:17	0:45:00
9	30-04-17	03:24	Due to tripping of filters on eastern side	30-04-17	16:13	12:49:00
10	12-01-17	13:36	Blocked due to unbalanced auxiliary system	12-01-17	15:06	1:30:00
11	14-01-17	05:03	Tripped due to system failure alarm	14-01-17	08:57	3:54:00
12	10-01-17	13:23	Filter problem at Sasaram	12-01-17	11:24	46:01:00
13	03-01-17	11:00	To take pole in service in HVDC mode	10-01-17	07:42	164:42:00
14	03-12-16	12:15	Converter control protection operated	03-12-16	13:22	1:07:00

15	06-12-16	19:12	Tripped due to CCP east side M1, M2 major alarm and observed sys fail in East side	06-12-16	20:55	1:43:00
16	19-12-16	12:43	Due to tripping of 400 kv Biharshariff-Sasaram-II	19-12-16	13:35	0:52:00
17	05-11-16	04:51	System fail alarm	05-11-16	06:57	2:06:00
18	22-11-16	12:12	CCP Main-2 major alarm	22-11-16	13:35	1:23:00
19	26-11-16	09:36	CB filter bank burst	27-11-16	11:31	25:55:00

Regarding pole block on 25-05-17, there is back up in the station in the following form:

132/33 KV Pusauli	315 MVA ICT-2 tertiary	01 No. DG set of 1500 KVA	Battery available for valve cooling system only. It can provide auxiliary supply for at max 2 minutes.

In 56th PCC, Powergrid was advised to submit the details to ERLDC and ERPC.

In 36th TCC, Powergrid informed that pole blocking at HVDC Sasaram system is being initiated on system failure alarm. They have contacted OEM and OEM is also failing to conclude and rectify the issue.

Powergrid added that since the HVDC control system is quite old and it is not operating satisfactorily the HVDC control system at Sasaram needs to be upgraded. Powergrid requested TCC to consider.

TCC felt that Powergrid has not placed any report in the PCC meeting and advised Powergrid to take the issue seriously.

TCC opined that system upgradation needs detailed discussion in lower forums and advised Powergrid to place the details in forthcoming PCC meeting scheduled to be held on 20th September 2017.

In 59th PCC, Powergrid informed that the issue has been referred to their corporate office and they will submit the report soon.

In 60th PCC, Powergrid informed that M/s Alstom has inspected the site and collected all the details. They will submit the report within a month.

Powergrid may update.

Deliberation in the meeting

Powergrid informed that M/s Alstom will submit the report in January 2018.

ITEM NO. C.7: Third Party Protection Audit

1. Status of 1st Third Party Protection Audit:

The compliance status of 1st Third Party Protection Audit observations is as follows:

Name of Constituents	Total Observations	Complied	% of Compliance
Powergrid	54*	46	85.19
NTPC	16	14	87.50

NHPC	1	1	100.00
DVC	40	26	65.00
WB	68	27	39.71
Odisha	59	38	64.41
JUSNL	34	16	47.06
BSPTCL	16	5	31.25
IPP (GMR, Sterlite and MPL)	5	5	100.00

** Pending observations of Powergrid are related to PLCC problems at other end.*

The substation wise status of compliance are available at ERPC website (Observations include PLCC rectification/activation which needs a comprehensive plan).

Members may update.

Deliberation in the meeting

PCC advised all the constituents to comply the observations at the earliest.

2. Schedule for 2nd Third Party Protection Audit

Sl No	Proposed Date	Substation
1	Dec, 2017	400kV Baripada (PG)
2		400kV Jaypore(PG)
3		220kV Jeynagar (OPTCL)
4		400kV Indravati (PG)
5		400kV Indravati (OHPC)
6	Jan, 2018	400kV Bolangir (PG)
7		400kV Rengali (PG)
8		220kV Theruvali (OPTCL)

The 2nd third party protection audit observations of competed substations are available in the ERPC website in important documents.

PCC advised all the constituents to comply the observations at the earliest.

Members may decide the dates.

Deliberation in the meeting

PCC decided to carry out the protection audit of 400kV Jaypore(PG), 220kV Jeynagar (OPTCL), 400kV Indravati (PG) and 400kV Indravati (OHPC) in first week of January 2018.

PCC also decided to carry out UFR testing of OPTCL system in around Jeypore, Jeynagar, Teruvali and Indravati.

PCC advised ERLDC, NTPC, Powergrid and OPTCL to nominate one protection engineer for third party protection audit and UFR testing.

It was informed that ERPC Secretariat will prepare the detailed schedule and will communicate to all the members of the audit.

ITEM NO. C.8: Non-commissioning of PLCC / OPGW and non-implementation of carrier aided tripping in 220kV and above lines.

According to CEA technical standard for construction of electric plants and electric lines -Clause 43(4) (c), transmission line of 220 KV and above should have single-phase auto-reclosing facility for

improving the availability of the lines. However, from the tripping details attached June-August, 2016 it is evident that the some of 220kV above Inter & Intra-Regional lines do not having auto-reclose facility either at one end or at both ends. Out of these for some of the lines even PLCC/OPGW is not yet installed and carrier aided protection including Autorecloser facility is not yet implemented. Based on the trippings of June- August, 2016 and PMU analysis a list of such lines has been prepared and as given below:

List of line where auto reclose facility is not available(Information based on PMU data analysis)

S. No	Transmission Lines name	Date of Tripping	Reason of Tripping	Owner Detail		Present Status	
				End-1	End-2	OPGW/PLCC Link available	AR facility functional
10	400KV PATNA-BALIA-II	21.06.16	B-N FAULT	PGCIL	PGCIL		
12	400KV PATNA-BALIA-I	21.06.16	R-N FAULT	PGCIL	PGCIL	PLCC available	
13	220KV BUDIPADAR-KORBA-II	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC available	will be activated in consultation with Korba
14	400 KV ARAMBAGH - BIDHANNAGAR	02.07.16	Y-N FAULT	WBSETCL	WBSETCL	PLCC available	Rectified and in service from 7th June 2017
16	400 KV NEW RANCHI - CHANDWA - I	13.07.16	B-N FAULT	PGCIL	PGCIL	PLCC available	
17	220 KV TSTPP-RENGALI	17.07.16	EARTH FAULT	NTPC	OPTCL		
18	220KV BUDIPADAR-RAIGARH	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective	
19	400 KV KOLAGHAT-KHARAGPUR	03.08.16	Y-N FAULT	WBPDCL	WBSETCL		
20	220 KV FARAKKA-LALMATIA	03.08.16	B-N FAULT .	NTPC	JUNSL	Yes	Old Relay and not functional. 7-8 months required for auto re-close relay procurement.
21	400 KV PURNEA-MUZAFARPUR-I	03.08.16	R-N FAULT	PGCIL	PGCIL	PLCC available	
23	220 KV MUZAFFARPUR - HAZIPUR - II	10.08.16	B-N FAULT	PGCIL	BSPTCL		Voice established. For carrier required shutdown
24	220 KV ROURKELA - TARKERA-II	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	Expected to install protection coupler by Jan 17
25	220 KV CHANDIL-SANTALDIH	25.08.16	R-N FAULT	JUSNL	WBPDCL	PLCC available	In service

26	400 KV MPL-RANCHI-II	02.09.16	R-N FAULT	MPL	PGCIL	PLCC available	
27	220 KV BIHARSARIF-TENUGHAT	07.09.16	B-N FAULT	BSPTCL	TVNL		
29	220 KV RAMCHANDRAPUR - CHANDIL	22.09.16	B-N FAULT	JUSNL	JUNSL		
31	400 KV KOLAGHAT - CHAIBASA	28.09.16	B-N FAULT	WBPDCL	PGCIL	PLCC available	
32	220KV Bidhannagar-Waria-II			WBSETCL	DVC		
33	220KV Jamshedpur-Jindal-SC						

34th TCC advised all the respective members to update the above list along with the last tripping status in next PCC meeting.

TCC further advised all the constituents to give the latest status of PLCC of other 220kV and above lines under respective control area.

OPTCL:

1. 220kV Rengali(PG)-Rengali S/Y (Proposal for Commn. in OPGW is pending): *PSDF appraisal committee accepted the proposal*
2. 220kV Indravati(PG)-Indravati(PH) (Proposal for Commn. in OPGW pending): *PSDF appraisal committee accepted the proposal*
3. 220kV Baripada(PG)-Baripada (Tendering in Progress for OPGW): *Contract awarded*
4. 220kV Baripada(PG)-Rairangpur (Tendering in Progress for OPGW): *Contract awarded*

BSPTCL:

1. 220kV Purnea (PG)-Madhepura line
2. 220 kV Biharshariff- Begusarai line
3. 220 kV Biharshariff- Bodhgaya line

Work is in progress expected to be commissioned by December 2017.

4. 220kV MTPS-Motiari line
5. 220KV Madhepura-New Purnea-I — Auto recloser is out of service at Madhepura
6. 220KV Muzaffarpur-Hajipur D/C line — Auto recloser is out of service at Hazipur
7. 220KV FSTPP-Lalmatia-1 — Auto recloser is out of service at Lalmatia
8. 220KV Patna-Khagaul-SC — Auto recloser is out of service at Khagual

Members may update the status.

Deliberation in the meeting

WBSETCL and JUSNL updated the status of Sl no. 14 and 25 as updated in above table.

PCC advised all the respective constituents to take appropriate action to restore PLCC system and Auto reclose function.

ITEM NO. C.9: Non-commissioning / non-functional status of bus-bar protection at important 220 kV Sub-stations.

It has been observed that at many 220 kV substations particularly that of STU, bus-bar protection is either not commissioned or non-functional. The non-availability / non-functionality of bus bar protection, results in delayed, multiple and uncoordinated tripping, in the event of a bus fault.This in turn not only results in partial local black out but also jeopardises the

security of interconnected national grid as a whole. The matter was also pointed out during the third party protection audit which is being carried out regularly. Constituents are required to meet the audit compliance and commission or made bus –bar protection functional where ever it is not available. A list of such important 220 kV sub-stations as per the first third party audit is placed in the meeting.

In 34th TCC, members updated the status as follows:

Bus Bar Protection not available (record as per third party protection audit)

Bihar				
Sl No	**Name of Substation**	**Bus Bar protection status**	**Date of audit**	**Present Status**
1	220 kV Bodhgaya	Not available	28-Dec-12	*Single bus and there is no space available for busbar protection*
Jharkhand				
1	220 kV Chandil	Not available	29-Jan-13	*LBB available*
2	220 kV Tenughat	Not available	12-Apr-13	
DVC				
1	220 kV Jamsedpur	Not available	10-Apr-13	*Single bus. Bus bar will be commissioned under PSDF.*
West Bengal				
1	220 kV Arambah	Not available	24-Jan-13	*Available in alarm mode. Planning to replace with numerical relay*
2	220 kV Jeerat	Not available	20-Dec-12	*Relays have been received at site. Installation is in progress.*

TCC further advised all the constituents to give the latest status of Bus Bar protection of other 220KV S/S under respective control area.

TCC advised to review the status of above in lower forums report back in next TCC.

58th PCC advised DVC to install numerical bus bar protection at 220kV Bokaro, Kalyaneswari, Chandrapura and Durgapur S/s to improve the reliability.

In 36th TCC, *DVC informed that they have already covered the upgradation of busbar protection for 220kV Kalyaneswari and Durgapur in PSDF proposal. They will place their action plan for 220kV Bokaro and Chandrapura in upcoming PCC meeting.*

Members may update.

Deliberation in the meeting

Members noted for compliance.

ITEM NO. C.10: Overvoltage tripping of 400 KV lines from Biharshariff --ERLDC

Overvoltage tripping of lines and healthy phase voltage rise at Biharshariff PMU during nearby SLG fault have become very frequent. In the month of September and august there are frequent such tripping. There are also some discrepancies like high harmonic content, sudden loss of one phase voltage with other two phase voltage rising even when there is no fault etc. In few cases of SLG fault serious high voltage is captured in Biharshariff PMU and in almost all cases of SLG fault near

Biharshariff Voltage rise of other phases is very common suggesting that Z0/Z1 ratio at Biharshariff looking into the fault is very high. List of such tripping are as follows:

400KV NEW PURNEA-BIHARSARIFF-II	05-08-17	13:44	05-08-17	20:44	Tripped on O/v from Biharsharif end (Mal-operation, voltage at Biharsharif-410KV).DT received at New Purnea
400KV NEW PURNEA-BIHARSARIFF-II	11-08-17	17:52	11-08-17	18:17	DT RECEIVED AT PURNEA END
400KV BIHARSARIFF-LAKHISARAI-II	16-09-17	16:11	16-09-17	22:01	O/V AT BSF (MAL-OPERATION)
400KV BIHARSARIFF-LAKHISARAI-II	16-09-17	22:46	17-09-17	2:37	Faulty O/V Relay Oprtd
Disturbance at Biharshariff on 25-09-17 at 09:32 hrs (Serious voltage of healthy phases)					

In 60th PCC, ERLDC informed that 400KV NEW PURNEA-BIHARSARIFF-II has been tripped on over voltage but no over voltage condition was observed as per PMU data.

Powergrid informed that line CVTs at Biharshariff end was faulty. The CVT has been replaced.

ERLDC added that they have observed severe voltage rise in healthy phases of 400kV Biharshariff PMU data during single phase to ground faults.

PCC advised Powergrid to take appropriate action to reduce voltage rise in healthy phases during SLG faults.

POWERGRID may explain.

Deliberation in the meeting

Powergrid informed that they are suspecting earthing problem at Biharshariff S/s. Earthing audit has been done and the audit team will submit the report.

ITEM NO. C.11: Any other issues.

1. Over voltage settings of 400kV HEL-Subashgram D/C line

In 139th OCC Meeting held on yesterday, OCC felt that in view of high voltage condition at 400kV Subashgram during the winter the over voltage settings of 400kV HEL-Subashgram D/C line need to be reviewed to avoid cascaded tripping of both the lines. OCC referred the issue to PCC meeting.

Deliberation in the meeting

PCC felt that proper time delay should be maintained in the settings so that after tripping of one line, the line loading of other line will increase and provide voltage relief. PCC decided the following over voltage settings:

- 400kV HEL-Subashgram line 1 112% with 8 sec delay
- 400kV HEL-Subashgram line 2 111% with 5 sec delay

PCC advised HEL and Powergrid to implement the settings.

CESC informed that they will communicate the PCC decision to HEL for implementation of the settings.

2. PRDC visit newly commissioned substations in ER for data collection

Substation data of newly commissioned substations needs to be collected and incorporated in PDMS. PRDC representatives will visit the newly commissioned substations for collection of name plate details and relay setting data. A tentative schedule has been prepared which is enclosed at Annexure-C11.2.

Deliberation in the meeting

PCC advised all the constituents to allow PRDC representatives to collect the data in the substation.

3. Installation of Check/Standby meter at 220kV Subashgram (WB)

In 139th OCC held on yesterday, Powergrid informed that SEM is available at Subashgram (PG), the meter is to be collected by WBSETCL and to be put in service.

WBSETCL representative informed that their testing team is having some reservations on installation of SEM at 220kV Subashgram (WB) and he advised to discuss the issue in PCC meeting.

Deliberation in the meeting

PCC clarified that any tie line should have main meter one end and check/stand-by meter at other end. It is the responsibility of the respective constituent to install SEM at their end as per the CEA meter regulation. Powergrid is only providing the SEM to respective constituents.

WBSETCL agreed to collect the SEM from Powergrid and agreed to install.

Meeting ended with vote of thanks to the chair.

****

Annexure –A

Participants in 61st PCC Meeting of ERPC

Venue: ERPC Conference Room, Kolkata Time: 11:00 hrs Date: 28.11.2017 (Tuesday)

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"Coming together is a beginning, staying together is progress, and working together is success." –Henry Ford

Participants in 61st PCC Meeting of ERPC

Venue: ERPC Conference Room, Kolkata   Time: 11:00 hrs   Date: 28.11.2017 (Tuesday)

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TRIPPING ANALYSIS REPORT

Annexure-B2.2

DATE & TIME : 19/10/2017 , 11:55:31 HRS

FEEDER / UNIT : 400kV Teesta III – Dikchu Line (Line-2)

Preconditions –

1) Line-1 and Line-2 in charged condition

Tripping -

1) Teesta III – Dikchu line tripped on SOTF protection by main1 distance relay.

Observation –

Line-2 :

Main-1 distance Relay : SOTF trip, YB phase, Fault currents IR- 30A, IY- 8.29kA, IB- 7.52kA , Voltage observed VRN- 235kV, VYN- 122.8kV, VBN- 116.2kV

Main-2 Relay : YB-phase, Fault currents IR-39A, IY- 9.22kA, IB- 8.61kA, IN- 639A, Voltage observed VRN- 234kV, VYN- 122kV, VBN- 116kV, VN- 13.5 kV

Setting SOTF :
Current – 3kA
Time - Instantaneous

1.1 Trip Log - 000032 / 10/19/2017 11:55:31.738 AM - alam / Folder / 7SA611 V4.6 Var/7SA611 V04.65.01

Trip Log - 000032 / 10/19/2017 11:55:31.738 AM - alam / Folder / 7SA611 V4.6 Var/7SA611 V04.65.01

Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	32 - ON	19.10.2017 11:55:31.738		
00302	Fault Event	32 - ON	19.10.2017 11:55:31.738		
04283	SOTF-O/C Pickup L2	ON	0 ms		
04295	SOTF-O/C TRIP command L123	ON	0 ms		
00533	Primary fault current IL1	0.03 kA	2 ms		
00534	Primary fault current IL2	8.29 kA	2 ms		
00535	Primary fault current IL3	7.52 kA	2 ms		
00590	Line closure detected	OFF	37 ms		
04281	SOTF-O/C PICKED UP	OFF	72 ms		

Analysis –

LINE 1 :

Main 1 distance relay - As per DR & ER of the relay, during the fault line closure detected ON and OFF recorded by the relay. So, SOTF enabled and as the fault current was higher than the SOTF current setting , SOTF tripping generated.

Main2 distance relay – As fault cleared by the main1 relay , so only earth fault pickup observed.

Action taken-

1) **Informed to TPTL for patrolling. After clearance from TPTL, line charged at 17:37hrs.**
2) **Line closer detection will be modified as follow**

Existing : Voltage Or Current Or Manual closer (voltage / current above threshold value is detected)

Planned : Current Or Manual closer (current above threshold value is detected)

Annexure-B6

ANALYSIS OF SYSTEM DISTURBANCE ON 17.10.17 AT CHANDAKA GRID

PRESENTATION AT ERPC ON 28TH NOV.2017

OPTCL, BHUBANESWAR

SYSTEM DISTURBANCE ON 17.10.17 at 10.23 HRS.

INCIDENT :- ***On dated 17th OCT-2017 , There had been a (R ph Tree touching Earth fault) on 220KV Mendhasal-Chandaka line No3, tripping of all the 4 Feeders at Mendhasal end, resulted power supply interruption to Chandaka Grid.***

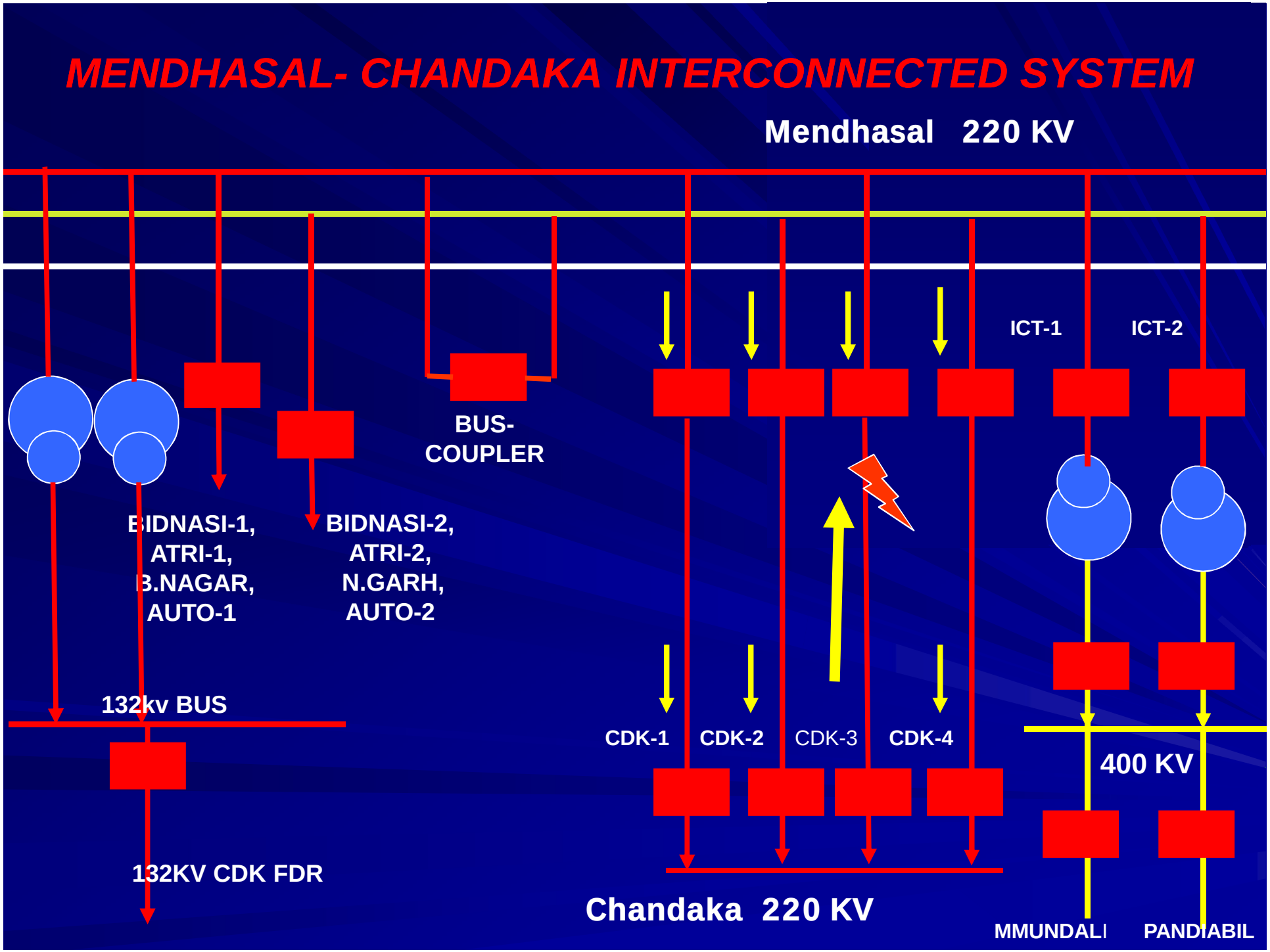
TRIPPING DETAILS AT MENDHASAL AT 10.22 HRS

SL	FEEDERS	RELAY	REMARKS/ INDICATIONS
1.	**220 CDK-1**	O/C, E/F	BU, O/C and E/F on RE with **IL1= 3.73KA, HS**
2.	**220 CDK-2**	O/C, E/F	BU, O/C and E/F on RE with **IL1= 2.29KA, HS**
3.	**220 CDK-3**	**DP-1/2**	DP1 RE Zone-1, Dist =***1314.5 KM*** with **IL1= 3.64 KA** DP2-Zone-1, RE, Dist =15.1 KM with **IL1= 3.64KA**
4	**220 CDK-4**	O/C & E/F	BU, O/C and E/F on RE with **IL1= 1.84KA, HS**

NO TRIPPING AT REMOTE END (CHANDAKA)

NO SYSTEM DISTURBANCE AT MENDHASAL

NO SUPPLY AT CHANDAKA GRID


MENDHASAL- CHANDAKA INTERCONNECTED SYSTEM
Mendhasal 220 KV
ICT-1
ICT-2
BUS-
COUPLER
BIDNASI-1,
ATRI-1,
B.NAGAR,
AUTO-1
BIDNASI-2,
ATRI-2,
N.GARH,
AUTO-2
132kv BUS
132KV CDK FDR
CDK-1
CDK-2
CDK-3
CDK-4
Chandaka 220 KV
400 KV
MMUNDALI
PANDIABIL

ANALYSIS OF THE DISTURBANCE

1. R-Ph TREE TOUCH Earth fault on 220KV Mendhasal-Chandaka line No3 at 15Kms from Mendhasal, resulted correct tripping on Zone-1 at Mendhasal end, ***but did not trip at Chandaka end (due to DP relay Error) and IDMT feature on DIRECTIONAL BU relay and delay actuation as compared to relays at Mendhasal end.***

2. The NON-TRIPPING of this feeder at Chandaka end and fault persistence in the system, caused tripping of all the feeders (Line-1,2 and4) at Mendhasal on Back up relay on HS feature.

3. Relays at Chandaka end did not actuate due to fault in REVERSE ZONE and CHANDAKA was radially fed from Mendhasal only.

4. DP Relays on other feeders at Mendhasal end initiated only on Zone-2 because of RESISTIVE fault, but tripped on Directional Back up relays on HS feature.

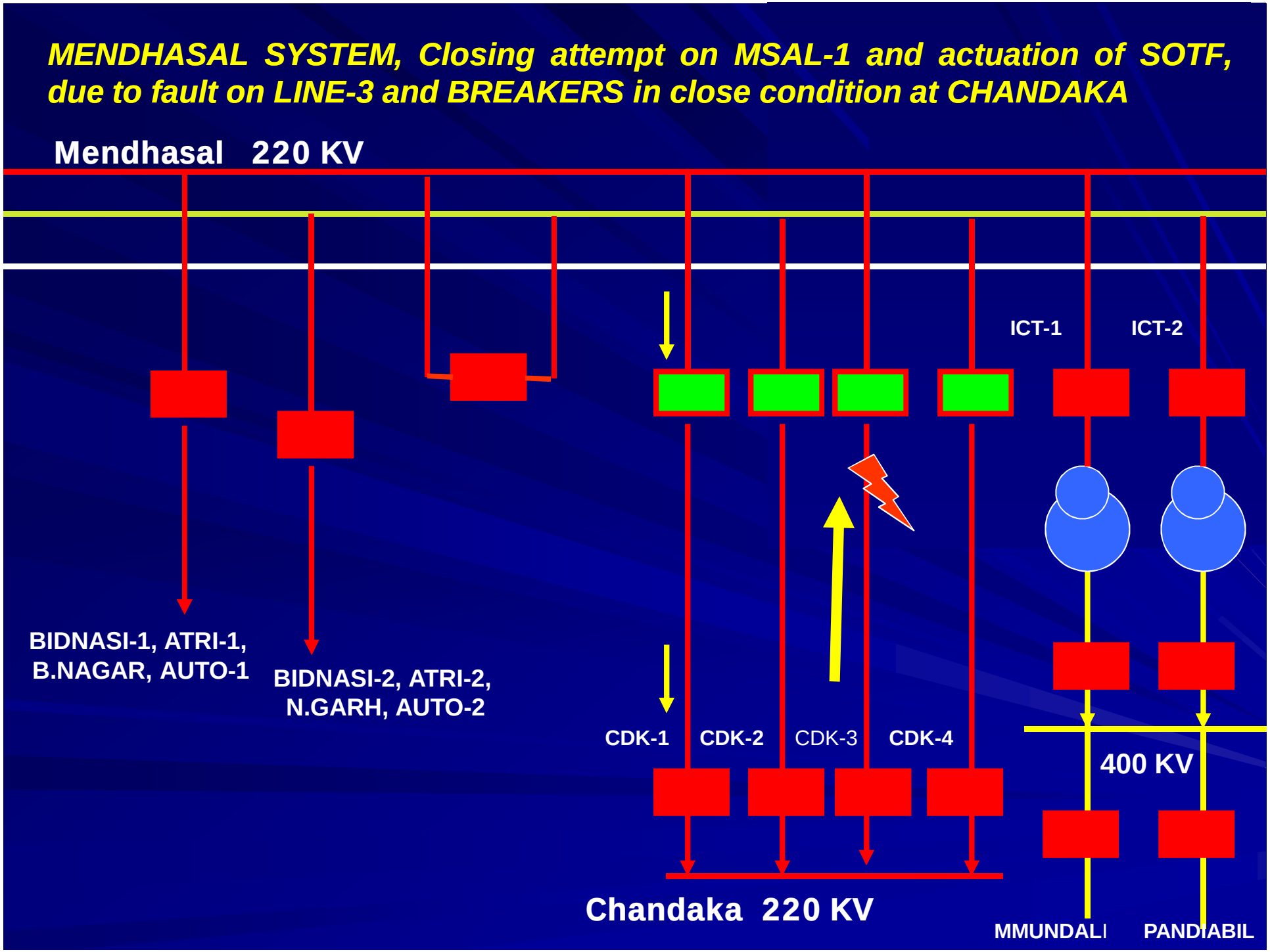
REVIVAL OF SYSTEM AND TRIPPING ON 17.10.17 at 10.28 HRS.

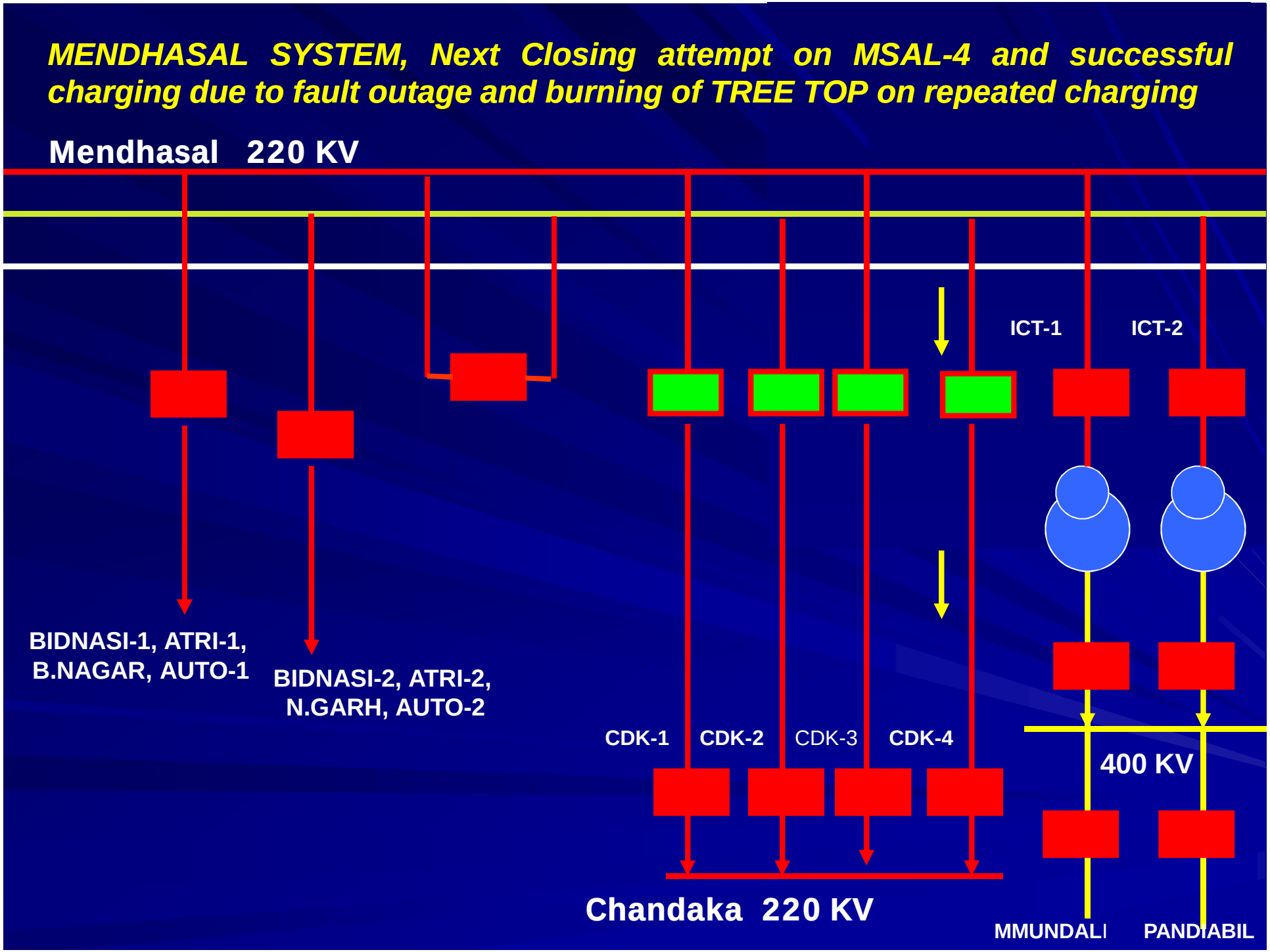
INCIDENT :- ***On dated 17th OCT-2017 , during revival of the system and charging of 220KV Mendhasal-Chandaka line No1 was attempted from Mendhasal end, tripping resulted on SOTF .***

But subsequent charging of the 220 KV Line-4 and 2 at 10.30 hours from Mendhasal end became successful and Load was availed to Chandaka System.

TRIPPING DETAILS AT MENDHASAL AT 10.28 HRS

SL	FEEDERS	RELAY	REMARKS/ INDICATIONS
1.	**220 CDK-1**	DP-2	DP1 :- No indication DP2- SOTF **IL1= 0.91KA IL2= 1.41KA, IL3=1.23KA**
NO TRIPPING AT REMOTE END (CHANDAKA)			
NO SYSTEM DISTURBANCE AT MENDHASAL			
NO SUPPLY AT CHANDAKA GRID			


MENDHASAL SYSTEM, Closing attempt on MSAL-1 and actuation of SOTF, due to fault on LINE-3 and BREAKERS in close condition at CHANDAKA
Mendhasal 220 KV
ICT-1
ICT-2
BIDNASI-1, ATRI-1, B.NAGAR, AUTO-1
BIDNASI-2, ATRI-2, N.GARH, AUTO-2
CDK-1
CDK-2
CDK-3
CDK-4
400 KV
Chandaka 220 KV
MMUNDALI
PANDIABIL


MENDHASAL SYSTEM, Next Closing attempt on MSAL-4 and successful charging due to fault outage and burning of TREE TOP on repeated charging
Mendhasal 220 KV
ICT-1
ICT-2
BIDNASI-1, ATRI-1, B.NAGAR, AUTO-1
BIDNASI-2, ATRI-2, N.GARH, AUTO-2
CDK-1
CDK-2
CDK-3
CDK-4
400 KV
Chandaka 220 KV
MMUNDALI
PANDIABIL

ANALYSIS OF THE DISTURBANCE

1. 220 KV Line-1 was charged from Mendhasal end, But tripped on SOTF.

2. During Line-1 closure at Mendhasal end all the breakers (Line-1,2,3 and 4) at remote end (Chandaka end) were in CLOSED condition with All the Auto transformers and Power Transformers also in Closed condition . Only 132 KV outgoing feeders and 33 KV loads were kept OPEN.

3. Now the fault on Line-3 and sudden charging of the ATs and Power Transformers resulted with current rise on all the phases as recorded (IL1= 0.91KA, IL2= 1.41KA, IL3=1.23KA). So the DP relay tripped on SOTF and successfully cleared the fault, without tripping of breakers at Chandaka end.

4. But subsequent charging of Line 4 and Line 2, the fault might have been cleared due to burning of TREE TOP and resulted with successful charging at 10.30 hrs and 10.33 hrs

REMEDIAL MEASURES AFTER THE DISTURBANCE

1. Planned for replacement of FAULTY DP RELAY at CHANDAKA END on MDSL- CDK Line-3. The relay was replaced on 18.10.17.

2. Instruction was issued to CHANDAKA Grid personnel for isolation of INCOMER breakers during fault occurrences.

3. Settings of HS on EF feature on BU Relay were removed.

List of important transmission lines in ER which tripped in October-2017

LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Deliberation in the meeting
Fault Clearing time violating protection standard									
400KV ALIPURDUAR-BONGAIGAON-II	07/10/2017	10:59	07/10/2017	11:30	Z-2,R-N,F/C=3.7KA,F/D=78.09 KM	R-N Fault , Z1, 37.63 Km	R-N Fault	600 msec	*Alipuruduar A/R is not operating for zone 2 faults. PG was advised check.*
400KV ALIPURDUAR-BONGAIGAON-I	28/10/2017	8:54	28/10/2017	9:13	R_N,Z-2,73.8 KM,4 KA	zone 1,R_N,39.60 km,1.39 KA , A/R successful	R-N FAULT	600 msec	*Alipuruduar A/R is not operating for zone 2 faults. PG was advised check.*
400KV ALIPURDUAR-BONGAIGAON-I	30/10/2017	14:45	30/10/2017	14:58	Y-N Fault,A/R successful		Y-N Fault	300 msec	*Fault was identified by DEF at Bongaigaon*
No Autoreclose operation observed in PMU data									
220KV MAITHON-DHANBAD-II	01/10/2017	14:47	01/10/2017	16:04		R PHASE ,ZONE 1 FAULT DISTANCE 77.24 KM FAULT CURRENT 4.45 kA	R-N Fault	< 100	*AR got initiated at Dhanbad but line tripped on 3 pole in Pole Discrepancy due to incorrect settings. Issue has been rectified.*
400KV RANCHI-ROURKELA-II	01/10/2017	16:44	01/10/2017	16:59	Y-N fault. FD= 51.6 KM, F.C.= 5.3 KA	YN,ZI, 3.548KA, 98.42KM, A/R Successful	Y-N Fault	< 100	*DT recived at Ranchi.*
400KV MEERAMUNDALI-STERLITE-II	01/10/2017	19:47	01/10/2017	20:29	R-N,2.87 KA,168 KM		R-N Fault	< 100	No Auto-reclose operation found in PMU
400KV MEERAMUNDALI-STERLITE-I	04/10/2017	16:23	04/10/2017	17:43	Ir=6.3 KA, 23.8 KM.		R-N Fault	< 100	No Auto-reclose operation found in PMU
400KV MEERAMUNDALI-STERLITE-I	06/10/2017	11:24	06/10/2017	12:54	R-N, ZONE-1,46.0 KM, IL1-7.94 KA		R-N Fault	< 100	No Auto-reclose operation found in PMU
220KV CHUKHA-BIRPARA-I	06/10/2017	16:20	06/10/2017	16:46	Y_N, Z I, F.D. 44.78 KM, F.C. 2.5 kA		Y-N Fault	< 100	*A/R is not enabled at Chuka*
400KV ROURKELA-CHAIBASA-I	07/10/2017	16:33	07/10/2017	16:52	Z-2,B-N,F/D-145.4KM, F/C-2.434KA	B_N, Zone I, F.D. 6.6 KM, F.C. 12.1 kA	B-N Fault	< 100	No Auto-reclose operation found in PMU
400KV KOLAGHAT-NEW CHANDITALA-SC	08/10/2017	8:40	08/10/2017	9:32	R-N FAULT, 248.3 km, zone 3	DT recieved	R-N FAULT	< 100	*Fault was in adjecent line*
400KV MEERAMUNDALI-MENDHASAL-I	09/10/2017	11:49	09/10/2017	12:10	B_N		B-N Fault	< 100	No Auto-reclose operation found in PMU
400KV MEERAMUNDALI-STERLITE-II	09/10/2017	20:01	09/10/2017	20:19	RN, Z_I, 168.3KM , IR: 2.88KA		R-N FAULT	< 100	No Auto-reclose operation found in PMU
132KV Khalgaon BSEB-LALMATIA-I	15/10/2017	9:28	15/10/2017	10:05		R-N Fault	R-N Fault	< 100	No Auto-reclose operation found in PMU
220KV DARBHANGA (DMTCL)-MOTIPUR-II	17/10/2017	14:19	17/10/2017	14:30	BN		B-N Fault	< 100	*No tripping at Motipur. Motipur end should clear the fault. BSPTCL was advised to check.*
400KV JEERAT-NEW CHANDITALA-SC	18/10/2017	10:47	18/10/2017	11:08	C N Z1 26KM 6.6KA, A/R not operated	C,N 52 KM 3.9KA	B-N Fault	< 100	*Tripped on pole discrepency at Jeerat*

LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Deliberation in the meeting
220KV TENUGHAT-BIHARSARIFF-I	19/10/2017	10:15	19/10/2017	10:45	R-N,Z-1	R-N,Z-1	R-N Fault	< 100	*PLCC not available.*
400KV MEERAMUNDALI-MENDHASAL-SC	21/10/2017	7:33	21/10/2017	18:34	B-N,24KM FC 8KA		B-N Fault	< 100	No Auto-reclose operation found in PMU
220KV FSTPP-LALMATIA-I	22/10/2017	12:58	22/10/2017	15:29	B_N	CB CLOSED AT LALMATIA	B-N Fault	< 100	*A/R is not enabled for this line*
220KV JAYNAGAR-JEYPORE-I	23/10/2017	18:09	23/10/2017	23:05	CB CLOSED AT JAYNAGAR	R_N,Z_1,12.32 KA,4.853	R-N Fault	< 100	*Wave trap connection opened at Jeypore*
220KV RANCHI-HATIA-II	25/10/2017	10:08	25/10/2017	10:38	Z1,B-N, F/C-3.77KA, F/D-22KM	Z1,B-N, F/D-24.18KM		< 100	*PLCC is not healthy*
400KV MEERAMUNDALI-STERLITE-I	25/10/2017	13:21	25/10/2017	15:37	B-N,197 KM,2.55 KA		B-N Fault	< 100	No Auto-reclose operation found in PMU
220KV PATNA-KHAGAUL-SC	28/10/2017	12:23	28/10/2017	13:05	7.31 KA,9.91 KM,B_N	Zone-1, 18.83km, b_n,due to interference with bamboos.	B-N Fault	< 100	*PLCC is to be checked*
220KV CHUKHA-BIRPARA-I	29/10/2017	0:03	29/10/2017	9:44		B-N, Z-1, DIST 35.31KM , FC 3.248KA	B-N fault	< 100	No Auto-reclose operation found in PMU
400KV MEERAMUNDALI-STERLITE-I	29/10/2017	11:57	29/10/2017	17:46	b-n , z-1 , f/d-190 km,f/c-2.5 ka		B-N fault	< 100	No Auto-reclose operation found in PMU

Miscellaneous: Tripping on DT, No reason furnished

400KV RANCHI-RAGHUNATHPUR-II	01/10/2017	16:44	01/10/2017	17:52	Did not tripped	DT Recieved at RTPS end	DT Recieved at RTPS end		*Both lines have received DT at the same time. DR shows Zone 3 start for both lines indicating there was some fault somewhere beyond Ranchi. PG was advised check the settings at Ranchi.*
400KV RANCHI-RAGHUNATHPUR-III	01/10/2017	16:44	01/10/2017	17:52	Did not tripped	DT Recieved at RTPS end	DT Recieved at RTPS end		
400KV BIHARSARIFF-PUSAULI-I	04/10/2017	21:37	04/10/2017	22:33	Maloperation of O/V relay		Maloperation of O/V relay at Biharshariff		*Operated on stage 1 over voltage. PG was advised check the settings.*
400KV PATNA-KISHANGANJ-II	06/10/2017	15:11	06/10/2017	16:17	DT received at Patna	O/V Relay mal-operrated at Kishanganj (Voltage around 411 KV)	O/V Relay mal-operrated at Kishanganj (Voltage around 411 KV)		*Maloperation of O/V relay. Problem rectified.*
400KV MAITHON-MAITHON RB-I	11/10/2017	11:14	11/10/2017	12:30	Maloperation of protection element at Maithon	Did not tripped	Maloperation of protection element at Maithon		*Maloperated during NTAMC work.*
400KV JEYPORE-BOLANGIR-SC	16/10/2017	13:00	16/10/2017	13:18		Opened from Bolangir end only	Opened from Bolangir end only		
400KV BIHARSARIFF-BALIA-I	17/10/2017	10:56	17/10/2017	11:27	DT received at BSF		DT received at BSF		
400KV BOLANGIR-ANGUL-SC	20/10/2017	9:28	20/10/2017	11:10	SPURIOUS DT SENT FROM BOLANGIR		SPURIOUS DT SENT FROM BOLANGIR		*ICT PRV maloperated. Contact replaced.*
1500MVA ICT-1 AT ANGUL	20/10/2017	9:28	20/10/2017	14:16	SPURIOUS PRV OPERATED		SPURIOUS PRV OPERATED		*ICT PRV maloperated. Contact replaced.*

LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Deliberation in the meeting
400KV MENDHASAL-PANDIABILI-I	21/10/2017	9:11	21/10/2017	10:43	CB opened from Mendhasal end		CB opened from Mendhasal end		
220KV NEW PURNEA-MADHEPURA-II	30/10/2017	16:04	30/10/2017	16:14	TRIPPED FROM PURNEA END		TRIPPED FROM PURNEA END		*Tripped during LBB checking*

Checklist for Submission of new transmission elements for updation in Protection Database

NAME OF ORGANISATION:
FOR THE MONTH OF:

SUBSTATION DETAIL:

Sl No	DETAILS OF ELEMENTS	DATA TYPE	Status of Submission (Y/N)	Remarks
1	TRANSMISSION LINE	LINE LENGTH, CONDUCTOR TYPE, VOLTAGE GRADE		
2	POWER TRANSFORMER	NAMEPLATE DETAILS		
3	GENERATOR	TECHNICAL PARAMETERS		
4	CURRENT TRANSFORMER	NAMEPLATE DETAILS		
5	VOLTAGE TRANSFORMER	NAMEPLATE DETAILS		
6	RELAY DATA	MAKE, MODEL and FEEDER NAME		
7	RELAY SETTINGS	NUMERICAL RELAYS: CSV or XML file extracted from Relay ELECTROMECHANICAL RELAYS: SNAPSHOT of RELAY		
8	REACTOR	NAMEPLATE DETAILS		
9	CAPACITOR	NAMEPLATE DETAILS		
9	UPDATED SLD			

SIGNATURE:
NAME OF REPRESENTATIVE:
DESIGNATION:
CONTACT:
E-MAIL ID:

PLAN FOR BIHAR

Sl no.	Planned date of Visit	STATION NAME	Owner	Station type	Voltage level	Status
1	11/12/2017	DMTCL, MOTIHARI	DMTCL	SUBSTATION	400KV	VISIT PENDING
2	12/12/2017	CHAKIA	BSPTCL	SUBSTATION	132KV	VISIT PENDING
3	13/12/2017	MAHARAJGANJ	BSPTCL	SUBSTATION	132KV	VISIT PENDING
4	15/12/2017	PUPRI, SURSAND	BSPTCL	SUBSTATION	132KV	VISIT PENDING
5	16/12/2017	ROSERA	BSPTCL	SUBSTATION	132KV	VISIT PENDING
6	18/12/2017	SIMRI BAKHTIYARPUR	BSPTCL	SUBSTATION	132KV	VISIT PENDING
7	19/12/2017	DHAMDAHA	BSPTCL	SUBSTATION	132KV	VISIT PENDING

PLAN FOR WEST BENGAL

Sl no.	Planned date of Visit	STATION NAME	Owner	Station type	Voltage level	Status
1	22/12/2017	ALIPURDUAR	WBSETCL	SUBSTATION	220kV	VISIT PENDING
2	23/12/2017	UJANU	WBSETCL	SUBSTATION	132KV	VISIT PENDING
3	25/12/2017	SADAIPUR	WBSETCL	SUBSTATION	220KV	VISIT PENDING
4	26/12/2017	NEW PPSP	WBSETCL	SUBSTATION	400KV	VISIT PENDING
5	27/12/2017	NEW CHANDITOLA	WBSETCL	SUBSTATION	400KV	VISIT PENDING

PLAN FOR ODISHA

Sl no.	Planned date of Visit	STATION NAME	Owner	Station type	Voltage level	Status
1	02/01/2018	CHANDAKA-B	OPTCL	SUBSTATION	220kV	VISIT PENDING
2	03/01/2018	MANIA	OPTCL	SUBSTATION	132KV	VISIT PENDING
3	04/01/2018	ACME	CPP	CPP	132KV	VISIT PENDING
4	04/01/2018	GRID STEEL	CPP	CPP	132KV	VISIT PENDING
5	04/01/2018	BHUBANESWAR POWER	CPP	CPP	132KV	VISIT PENDING
6	05/01/2018	KHAJURIAKATA	OPTCL	SUBSTATION	132KV	VISIT PENDING
7	06/01/2018	BANEI	OPTCL	SUBSTATION	132KV	VISIT PENDING
8	08/01/2018	TUSHURA	OPTCL	SUBSTATION	132KV	VISIT PENDING
9	10/01/2018	MALKANGIRI	OPTCL	SUBSTATION	132KV	VISIT PENDING
10	12/01/2018	OLAVAR	OPTCL	SUBSTATION	132KV	VISIT PENDING
11	13/01/2018	BHOGARAI	OPTCL	SUBSTATION	132KV	VISIT PENDING