Minutes
of
64th PCC meeting

Date: 12.03.2018
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 64TH PROTECTION SUB-COMMITTEE MEETING HELD AT ERPC, KOLKATA ON 22.02.2018 (THURSDAY) AT 11:00 HOURS

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

ERLDC has placed the status of reporting of grid disturbances occurred in December 2017 as follows:

Sr No	Date	Time	S/S involved	Reporting
1	19-01-18	12:23	Kalyaneswari	Detail report received from DVC
2	30-01-18	10:46	Koderma	Detail report along with DR received from DVC
3	10-01-18	17:34	Teesta III	Detail report along with DR, SOE received from Teesta III, Dikchu, Tashiding and POWERGRID
4	14-01-18	23:20	Purnea	Detailed report is yet to be received
5	20-01-18	13:28	Sahebgunj	Report is yet to be received

PART – A

ITEM NO. A.1: Confirmation of minutes of 63rd Protection sub-Committee Meeting held on 19th January, 2018 at ERPC, Kolkata.

The minutes of 63rd Protection Sub-Committee meeting held on 19.01.18 circulated vide letter dated 30.01.18.

Members may confirm the minutes of 63rd PCC meeting.

Deliberation in the meeting

Members confirmed the minutes of 63rd PCC meeting.

PART – B

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN JANUARY, 2018

ITEM NO. B.1: Disturbance at 220/132 kV Kalyaneswari S/S on 19-01-18 at 12:23 hrs

On 19.01.18 at around 12.25 Hrs a wide spread total power failure occurred in 132kV DVC system due to outage of 220kV Bus-1 in Kalyaneswari S/stn and subsequent outage of Three ATRs, U#4 in DTPS, Line#60 from CTPS and Line #13 from Putki end. The other affected 132kV S/Stns are Kalipahari, Kumardhubi, Burdwan Patherdih, Sindri, MHS, Ramkanali, PHS, Jamuria, Belmuri, ASP.

1. After completion of maintenance of 220 kV Main Bus-2; the Lines, ATRs and Power Transformers are distributed in both the Buses. Bus Differential Protection was put into service through switches. The sequence of putting Bus bar in service was Check zone

IN→Main zone-1 IN→Main Zone 2 IN.

2. After putting all the switches in service, it was observed that Main Zone-1 (i.e Bus-1) Busbar protection relay had operated. However, as the Check Zone did not operate, no tripping took place.
3. Thereafter, the Bus bar switches were made off again. The Busbar Relay flags were made reset and again it was tried to put the Bus Bar protection in service. As far as the operator could recall, the same sequence was followed this time also for putting Bus Bar Switches in service.

However, in this case Bus Bar protection again operated for MainBus-1, but this time tripping took place for the Bays connected to Main Bus-1.

4. In Main Bus-1, Two ATRs were connected and with the outage of these two ATRs third ATR which was connected to Main Bus-2 also tripped due to overloading.

5. With the outage of Kalyaneswari 132 kV Bus, the loading of Kalyaneswari S/S which was around 1550 A at that instant (as per last available records) was started being fed by DTPS ATRs through Line 20, L#21, L#90 and L#100 as the Howrah loops were open. The DTPS ATRs were already feeding a load of around 1400A. This additional load caused tripping of DTPS ATRs through O/C Protection (P.U value 1000A). This causes outage of auxiliary power of U#4 (running at 180 MW) which ultimately led to the tripping of U#4.

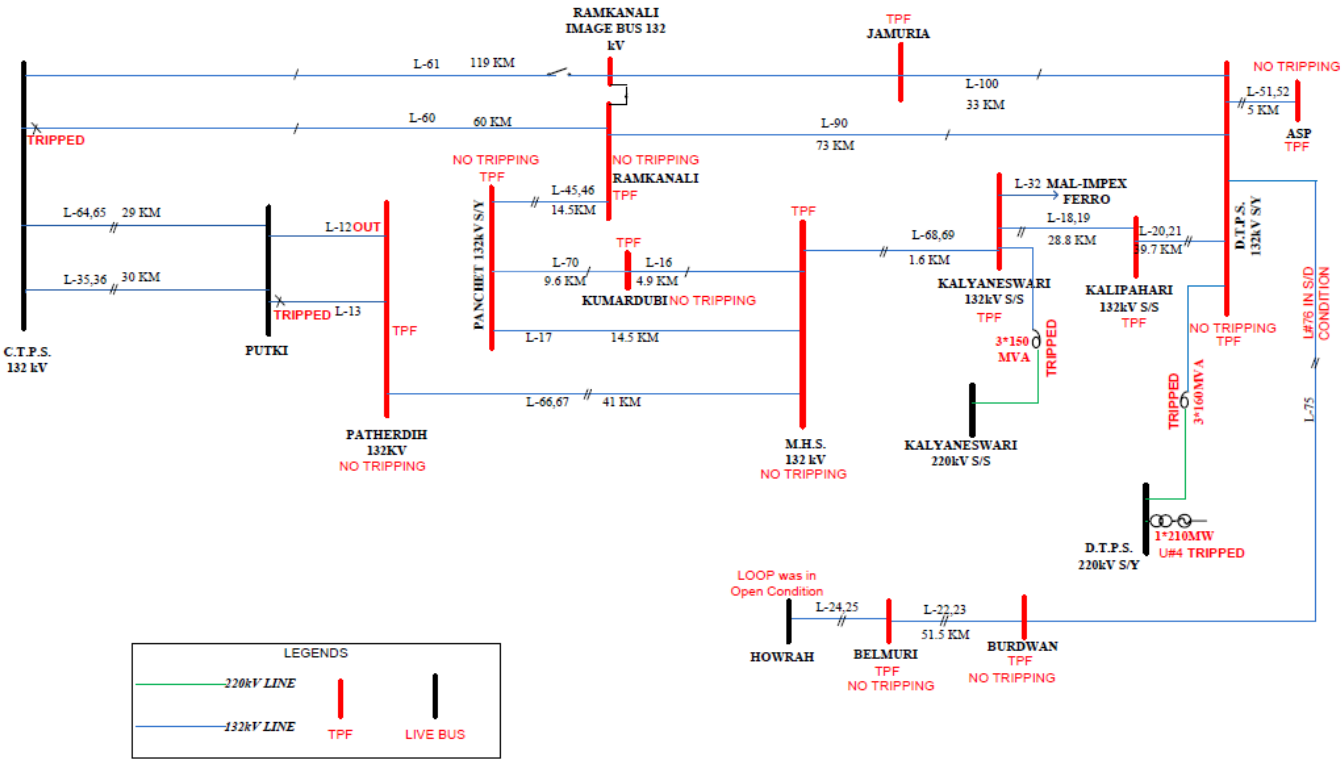
6. With outage of Kalyaneswari and DTPS 132 kV system; L#60 from CTPS end and Line #13 from Putki end also tripped through D/O/C due to overload which finally causes TPF at Kalipahari, Kumardhubi, Burdwan Patherdih, Sindri, MHS, Ramkanali, PHS, and Jamuria, Belmuri, ASP.

Load loss 558 MW

Generation loss 189 MW

No fault has been observed in PMU data.

DVC may explain.



Deliberation in the meeting

DVC explained the disturbance with a detailed presentation. Presentation is enclosed at ***Annexure-B1****.*

DVC explained that Bus Differential Protection (EE make, EM type) of Bus 1 at 220kV Kalyaneswari S/s was operated while taking the Bus Differential Protection into service. This resulted in tripping of Two ATRs which were connected to Bus-I. This led to Tripping of 3rd 220/132kV ATR at Kalyaneswari and 220/132kV ATRs at DTPS due to overloading.

PCC felt that a wide spread total power failure had occurred without any fault in the system because of inadequate transmission network at 220kV and 132kV level to meet the DVC demand. PCC advised DVC to take the following measures:

- *Old EM type bus bar protection at Kalyaneswari should be replaced with numerical busbar protection.*
- *Expedite strengthening of DVC transmission system to cater the rising demand.*
- *As a short term measure, suitable load / generation rejection schemes may be urgently implemented to automatically shed load/generation with tripping of associated line / ATR*

DVC informed that replacement of Bus bar protection at 220kV Kalyaneswari has been covered in DPR submitted for PSDF.

On enquiry, DVC informed that old EM type bus bar protection is in service at 220kV Bokaro, Kalyaneswari, Chandrapura, MTPS and Durgapur S/s.

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

ITEM NO. B.2: Disturbance at 400kV Koderma and 400kV Bokaro-A on 30-01-18 at 10:46 hrs

Due to problem in tie CB of 400 kV Koderma - Gaya - II and 400 kV Koderma - Biharshariff - II, all 400 kV lines i.e. 400 kV Koderma - Biharshariff D/C, 400 kV Koderma - Gaya D/C & 400 kV Koderma - Bokaro A D/C along with all 400/220 kV ICTs at Bokaro A & Koderma tripped resulting loss of total power supply at Koderma and Bokaro A and running units at Koderma & Bokaro A.

At 400KV Koderma, tie breaker to GAYA line-2 and BIHARSHARIF line-1 was under maintenance to attend leakage in hydraulic mechanism and to replace it's damaged Trip Coil. During normalisation of Tie breaker after maintenance work, Isolator 14-89B didn't CLOSE from REMOTE, the said isolator was checked for closing in LOCAL Mode. As the isolator got engaged, heavy flashing was observed in Y-pole of Tie breaker assembly (414), consequently both the units got tripped due to CLASS A protection along with tripping of all 400KV lines and ICT # 1 & 2 resulting in total power failure in 400KV switchyard.

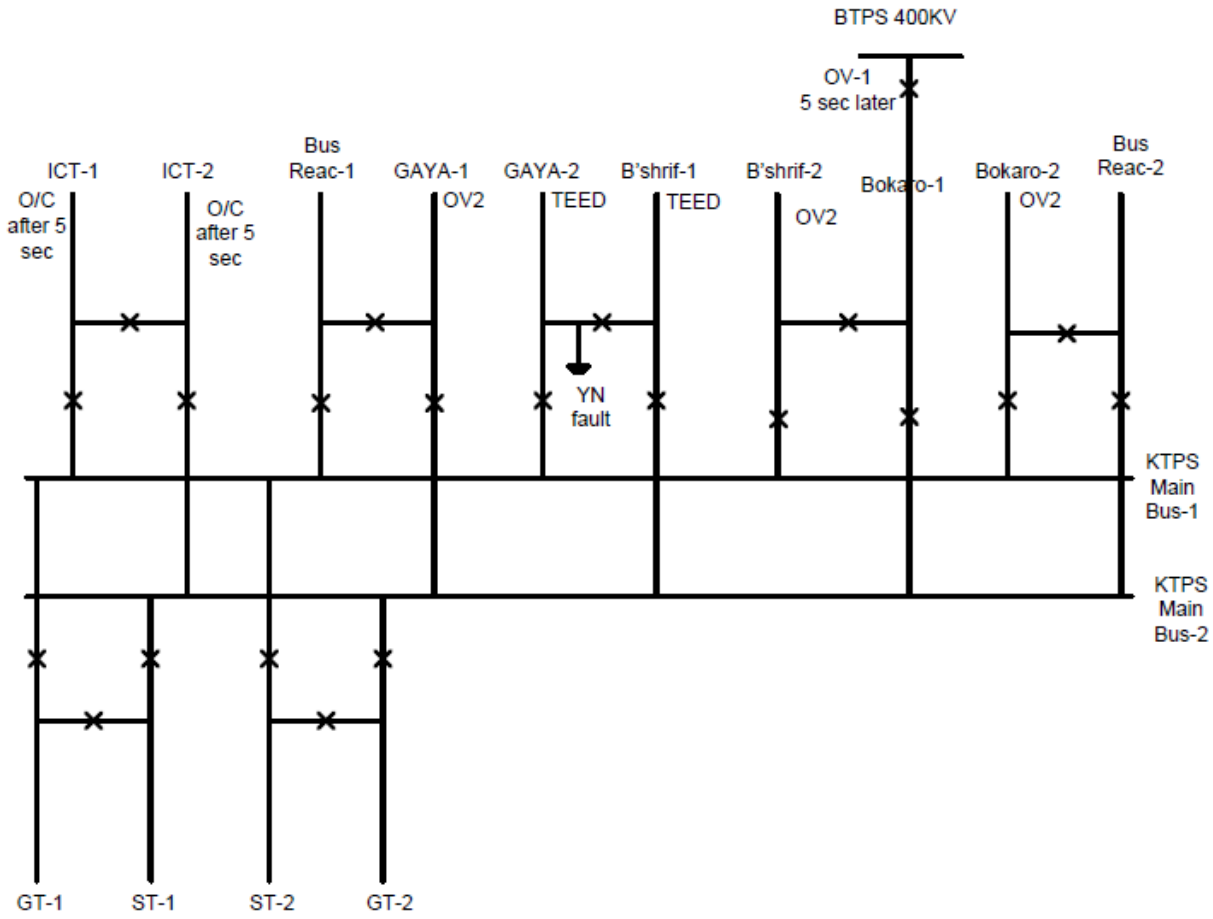
SEQUENCE OF TRIPPING:

1. GAYA-2 (413) TEED & BIHARSHARIF-1(415) TEED protection operated.
2. GAYA 1, BOKARO 2, BIHARSHARIFF 2 O/V Stage 2 operated instantaneously.
3. BOKARO-1(421): DT received due to O/V at BTPS A due to power evacuation problem.
4. ICT 1 & 2 trip through O/C.
5. ST#1 & 2: Through under voltage in LV side.

ANALYSIS:

1. Gaya 2 & BiharShariff 1 tripped through TEED Differential to clear the fault within about 80ms.
2. During appearance of the YN fault, all the DRs show temporary rise in BN and RN voltages with BN voltage rising above 140% i.e. O/V stage 2. Thus O/V stage 2 appears in all the lines causing all power to be fed through BTPS 1.

3. After BTPS 1 trips through O/V Stage 1(5 sec later) at BTPS end, ICTs of KTPS trips through O/C due to overloading.



Load loss 218MW

Generation loss 1273 MW

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

DVC may explain.

Deliberation in the meeting

*DVC explained the disturbance with a detailed presentation. Presentation is enclosed at **Annexure-B2**.*

DVC explained that heavy flashing was observed in Y-pole of Tie breaker assembly (414) during normalization of Tie breaker after maintenance work.

- *TEED protection of GAYA-2 (413) TEED & BIHARSHARIF-1(415) had operated and tripped the respective lines.*
- *Over voltage Stage 2 had operated for GAYA 1, BOKARO 2, BIHARSHARIFF 2 lines and the lines tripped instantaneously.*
- *DT received at Koderma end due to O/V stage I operation at BTPS A.*
- *As a result, ICTs of KTPS end were tripped through O/C protection due to overloading.*

ERLDC informed no over voltage was observed in PMU data.

DVC informed that over voltage was not observed in Bus CVT but the line CVTs were observed the over voltage in B and R phases during the Y-N fault as per the DR plot.

DVC informed that the following corrective actions have been taken after the disturbance:

- *All over voltage settings have been revised.*
- *All stage 1 settings revised to 110% and 5 sec. In case of Double Ckt lines the second line now has the setting 112% and 8sec.*
- *Over voltage Stage 2 is revised to 140% for both the lines with a time delay of 100ms.*

DVC enquired about the selection of Ph-N or Ph-Ph voltage in over voltage relay.

It was informed that no clear guidelines are available for selection of Ph-N or Ph-Ph voltage in over voltage relay and Ph-N may be used in over voltage relay.

PCC opined that voltage of healthy phases may rise if CVT neutral earthing is not proper and advised DVC to check the line CVTs neutral earthing.

ITEM NO. B.3: SPS operation at Sikkim due to tripping of 400kV Binaguri-Rangpo line II on 10-01-18 at 17:34 hrs

At 17:34 hrs tripping of 400 kV Binaguri - Rangpo - II on R-Y-N fault initiated of SPS - I operation which resulted in tripping of B/C at Teesta III and unit tripping at Tashiding. As only one unit was in service at Chujachen and Dikchu, no generation reduction occurred on operation of SPS - I. Though power flow through 400 kV Binaguri - Rangpo - I was more than 850 MW for less than 350 ms(as per PMU data), SPS - II operated resulting tripping of 400 kV Teesta III - Rangpo S/C and the running unit at Teesta III and Dikchu.

SOE at Rangpo

Date	Time		Remarks
10/01/18	05:34:05.515	Siliguri -2 (414) Line triipped on Z1 RY Phase	
10/01/18	05:34:05.590	SPS -1 Generated	
10/01/18	05:34:05.990	SPS-2 Genarated	After 400 ms of SPS- 1
10/01/18	05:34:06.002	Teesta -3 Tripped	Tripped on SPS operation
10/01/18	06:01:10.460	Teesta -3 charged	

SOE at Teesta 3

Date	Time		Remarks
10/01/18	05:34:05.515	Siliguri -2 (414) Line tripped on Z1 RY Phase	
10/01/18	05:34:05.619	SPS -1 Received	
10/01/18	05:34:05.644	BC open	Within 25 ms of receiving SPS-1 code
10/01/18	05:34:05.700	Unit -2 trip command	
10/01/18	05:34:05.730	Unit -4 trip command	
10/01/18	05:34:05.740	Unit -6 trip command	

- Dikchu received SPS-1 but not tripped as per the scheme as only one unit was running. But the unit tripped with tripping of 400 KV Teesta 3- Rangpo line due to loss of evacuation.
- At Tashiding only one unit was running. The unit tripped after receiving SPS-1 signal as per SPS logic.
- No tripping was initiated at Chujachen. Receipt of SPS signal is yet to be confirmed

Generation loss 1050 MW

Fault clearing time as per PMU data is 100 ms.

- From our PMU it is seen that flow was > 850 MW FROM 17:34:05:543 TO 17:34:05:855 HRS i.e 312 ms , But as per logic SPS 2 should operate, if power flow stay above 850 MW for 500 ms.
- Also from Rangpo SoE it is seen that SPS-2 transmitted within 400 ms of SPS-1.

Members may discuss.

Deliberation in the meeting

Powergrid informed that the scheme was implemented using PLC and there may be minor errors in MW transducers. This problem would be resolved when the SPS scheme implemented through BCU and SAS which is under the awarding stage. The implementation would take 3 to 4 months.

PCC felt that the time delay between SPS 1 and II may be reviewed till the SPS scheme implemented through SAS. PCC decided to review the time delay in next PCC meeting.

Powergrid informed that Tashiding end is sending DT to Rangpo end for any fault in 220kV Tashiding-New Melli line.

It was informed that the issue will be taken up with Tashiding.

ITEM NO. B.4: Tripping of 132 kV Purne(PG) – Purnea(B) D/C line on 14-01-18 at 23:20 hrs.

At 23:20 hrs 132 kV Purnea - Purnea I & II tripped from BSPTCL end only due to operation of O/C, E/F relay.

220/132 kV ICT - II at Purnea, 132 kV Purnea - Kishangunj S/C and 132 kV Purnea - Purnea III were under shut down.

Fault current details are as follows:

132 PURNEA (BSPTCL)-PGCIL CKT-1 (IA-399A, IB-207A, IC-602A, IG-1019A)

132 PURNEA (BSPTCL)-PGCIL CKT-2 (IA-388A, IB-212A, IC-604A, IG-992A)

After taking clearance line was charged at 23:29 Hrs

Load loss 124 MW

BSPTCL and Powergrid may explain.

Deliberation in the meeting

BSPTCL informed that multiple transient faults were occurred in 132 kV Purnea(PG) – Purnea(B) I & II and Bihar end over current relays tripped on high set.

BSPTCL added that high set was disabled after the disturbance.

PCC advised BSPTCL to submit the DR for the tripping.

BSPTCL informed that they can't able to download the DR because of non availability cable for SEL relay.

ITEM NO. B.5: Tripping of 132 KV KhSTPP-Lalmatia and 132 KV Kahalgaon (BSPHCL)-Lalmatia lines on 20-01-18 at 13:28 hrs

At 11:10 Hrs on 20-01-2018, NTPC took shut down for 132KV Kahalgaon (NTPC)-kahalgaon(BSPTCL) line for internal maintenance. After completion of maintenance work the 132KV kahalgaon(NTPC)-Kahalgaon(BSPTCL) line is ready for charge at 13:28 Hrs.

132KV kahalgaon(BSPTCL)-132 KV Lalmatia line was tripped manually from kahalgaon(BSPTCL) at 13:28Hrs for synchronization of 132KV kahalgaon(NTPC)-Kahalgaon(BSPTCL) line. After synchronization work the 132KV kahalgaon-132KV Lalmatia line was charged at 13:30 Hrs.

Load loss 23 MW

BSPTCL may explain.

Deliberation in the meeting

PCC felt that the information should be submitted to ERLDC in time and advised BSPTCL to take care in future.

ITEM NO. B.6: Tripping incidences in the month of January, 2018

Other tripping incidences occurred in the month of December 2017 which needs explanation from constituents of either of the end is given at **Annexure- B6**.

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-B6***.*

ITEM NO. B.7: Creation and maintaining a Web based Protection Database and Desktop based Protection setting calculation tool for Eastern Regional Grid, under PSDF Funding

The project has been declared Go Live on 30th. October 2017. Presently we are in the data maintenance and up gradation stage for the project.

As per the current payment disbursement status the partial payment is pending under following milestones:

1. Milestone 6 : Populating all ERPC constituent data along with SLD : This activity is completed on 30/10/2017 for ten percent payment is pending that amounts to Rs.13,29,915.5 (without TDS).

2. Milestone 8 : Completion of Training Program : As per tender document the project scope includes 35 days of training schedule out of which 33 days have been covered by 9th February 2018. Fifty percent payment is pending under this milestone which amounts to Rs.33,24,789 (without TDS).

Members may approve.

Deliberation in the meeting

Members agreed and referred to TCC for further approval.

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: Multiple tripping around Talcher during Pole shutdown on 09-01-2018

Pole 2 of Talcher HVDC was taken into planned shutdown at 07:36 hrs on 09/01/18. Before shutdown 600 MW generations back down SPS for JITPL, GMR and Sterlite in case of bipole tripping was bypassed and SPS 1000 was taken in to service at Talcher. At 07:51 hrs following tripping took place:

1. 400 KV Talcher-Rourkella D/C- Tripped from Talcher end only
2. A/R of 400 KV Rengali-Indravati---- Successful
3. A/R of Talcher-Meramundali ----Succcessful
4. Talcher HVDC pole 1

After tripping of above elements, high loading observed in 400 KV Talcher-Meramundali (approx. 700 MW) and 400 KV Talcher-Angul (Approx 530 MW). Further any N-1 contingency of any of the above two line would have caused blackout of south odisha system along with total generation loss of TSTPP. That in turn could have other serious security threat on the overall National Grid. Immidite action taken by system operators like manual backing down action together with tripping of TSTPP unit IV 08:05 Hrs due to furnace pressure high, bring the system out of the emergency state.

Difficulty faced in restoration:

1. Non receipt of relay indication of Rourkela substation from RTAMC ER2
2. Wrong information from NTPC Talcher(i.e tripping of line due to DT receipt , whereas originally DT was not received) and delayed Reporting of successful A/R of Talcher-Meramundali by NTPC Talcher.

Due to above reasons restoration was delayed which lead to running the system with very narrow reliability margin for longer duration of time.

After analyzing the event, following discrepancy observed in the relay indication provided by POWERGRID and Talcher NTPC:

1. Why Rourkella send Carrier in zone 2 even though their Permissive over reach scheme is now replaced with permissive under reach scheme.
2. Why Talcher end relay tripped in Zone 1 during A/R in other line.
3. Now as per information received A/R took place in both 400 KV Talcher-Meramundali and 400 KV Rengali-Indravati around that time. But in PMU at 07:51 Hrs only one Fault is seen. Is it a mere coincidence or any relation is there needs to be studied
4. Also if both the A/R is simultaneous then for which fault Rourkella Zone-2 pickup happened need to be studied. Zone 2 setting of 400 KV Talcher-Rourkella D/C at Rourkella need to be checked.

In 63rd PCC, NTPC explained that the following incidences occurred during HVDC Talcher – Kolar link pole-1 blocked at 07:51 hrs on 09/01/18

- Y-ph fault appeared in 400kV Talcher-Meramundali line at a distance of 3.7 km from Talcher end. The line was successfully autoreclosed from both the ends. But Tie CB(1752) at Talcher end got tripped on Pole Discrepancy. Severe voltage dip in Yph-E (12kV) was observed for approx 60 ms.
- Due to Y-ph fault in 400kV Talcher-Meramundali line, Talcher end Main 2 distance relay of 400kV Talcher-Rourkela-1&2 got started, all zones initiated and tripped on receipt of carrier from Rourkela end. Delayed opening of 400kV Talcher-Rourkela line-1 main B-ph CB(652) by 2.3 sec was observed at Talcher.
- Talcher Unit 4 tripped due to low voltage

Regarding sending of carrier signal from Rourkela to Talcher, Powergrid informed that they have tested the scheme on 17th January 2018 and the issue has been referred to OEM(Alstom) for rectification.

Powergrid explained that due to Fixed Series Compensation(FSC) of 400 KV Rengali-Indravati(PG) line, the distance protection at Indravati (PG) end has over reached and initiated autorecloser without any fault in the line. The autorecloser was successful at both ends. Powergrid added that 100 ms delay has been included in zone 1 to avoid such unwanted operation of distance protection.

PCC advised NTPC to take the following corrective actions:

- 400kV Talcher-Rourkela line-1 &2 main-2 distance relay(P437) settings at Talcher end needed to be checked and the reason for initiating all zones for a fault in reverse zone should be explained.
- Delayed opening of B-Ph CB(652) of 400kV Kaniha-Rourkela line-1 at Talcher should be addressed.
- Tripping of tie CB (1752) of 400kV Talcher-Meramandali line at Talcher on Pole Discrepancy should be attended.

In 141st OCC Meeting it was informed that on 08/01/18 HVDC Talcher-Kolar Pole-I was taken under shut down for maintenance activities.

To prevent any unwarranted backing down/tripping at JITPL/GMR, SPS was by-passed on a temporary basis at the respective generator ends, just prior to availing of the shutdown. However, after the shutdown was availed, the SPS could not be taken back into service as there was continuous receipt of backing down signal at the respective generator ends. Hence, the SPS had to be kept by-passed throughout the shutdown period even though Pole-II was in service. It was reported that the continuous backing down signal could not be disabled at HVDC, Talcher end.

PCC decided that 5 min timer may be incorporated at Talcher end to avoid continuous generation of SPS signal. PCC advised Powergrid to implement the timer as agreed in 110th OCC Meeting.

PCC felt that line flows should also be included in the SPS decision process for reliable operation of SPS.

Talcher, NTPC has raised several issues related to SPS at Talcher.

PCC decided to discuss the SPS related issues in a special meeting with NLDC, ERLDC, NTPC and Powergrid. PCC advised Talcher, NTPC to send the issues to ERLDC and ERPC.

Powergrid Odisha Project and NTPC, Talcher may update.

Deliberation in the meeting

NTPC updated the following:

- *400kV Talcher-Rourkela line-1 &2 main-2 distance relay(P437) settings at Talcher end have been modified.*

- *B-Ph CB(652) of 400kV Kaniha-Rourkela line-1 at Talcher has been tested and found working satisfactorily.*
- *Tripping of tie CB (1752) of 400kV Talcher-Meramandali line at Talcher on Pole Discrepancy would be attended in March 2018 during shutdown.*

Powergrid informed that since the SPS is installed at Talcher STPS, it is more feasible to do the implementation by NTPC.

PCC referred to TCC for further guidance.

ITEM NO. C.2: Disturbance at 220 kV Budhipadar S/s on 01-10-17 at 09:25 hrs

In 62nd PCC, OPTCL informed that Busbar protection maloperated and tripped all the elements connected 220kV bus 1 at Budhipadar.

OPTCL added that the issue has been referred to OEM (Siemens) for rectification.

In 63rd PCC, OPTCL informed that OEM (SIEMENS) visited the Substation on 29th December'2017 and taken the data (i.e. Trip Log, Even Log & DR) for analysis.

OPTCL may update.

Deliberation in the meeting

OPTCL informed that OEM, Siemens has recommended for updating of 7SS52_MCU device firmware version to V4.73 or higher to resolve the restart automatic problems. Accordingly, Siemens will upgrade the firmware.

ITEM NO. C.3: Disturbance at 400 kV Teesta-V S/s on 12-10-17 at 12:55 hrs

In 61st PCC, 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.

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.

In 62nd PCC, NHPC informed that 400kV bus coupler overcurrent setting has been revised. The settings of transmission line relays will be revised during line shutdown.

In 63rd PCC, Powergrid informed that the revised settings of 400 kV Teesta - Rangpo D/C line at Teesta have been forwarded to their corporate office. The settings will be incorporated after approval from their corporate office.

NHPC may update.

Deliberation in the meeting

Powergrid informed that the revised settings of 400 kV Teesta - Rangpo D/C line at Teesta have been forwarded to their corporate office. The settings will be incorporated after approval from their corporate office.

ITEM NO. C.4: Disturbance at 220 kV Chandaka(OPTCL) on 17-10-17 at 10:23 hrs

In 61st PCC, 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

In 63rd PCC, OPTCL updated the status as follows:

i) The defective relay of 220 kV Mendasal - Chandaka – III at Chandaka has been replaced.
ii) The High set feature in O/C Back up relays of for 220kV feeders has been disabled, only directional IDMT feature with relay coordination has been adopted.

OPTCL may update.

Deliberation in the meeting

OPTCL informed that the PCC recommendations were complied.

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

1. Tripping of 220 KV Darbhanga-Motipur D/C and 220 KV Muzaffarpur (MTPS)-Motipur D/C on 02-11-17 at 13:18 hrs

In 62nd PCC, it was opined that the busbar protection should not operate in this case.

BSPTCL informed that the issue of maloperation of busbar protection at 220kV Motipur has been communicated to OEM (GE) for rectification.

BSPTCL may update.

Deliberation in the meeting

BSPTCL informed that the issue is still pending with OEM.

2. Total power failure at 220/132 kV Bodhgaya S/S on 22-12-17 at 17:10 hrs

In 63rd PCC, it was felt that 220 kV Biharshariff - Khijasarai – I and 220/132 kV ATR - II at Biharshariff should not be tripped in this case as the fault was already cleared from both ends of the line.

PCC advised BSPTCL to check the relay settings of 220 kV Biharshariff - Khijasarai - I at Biharshariff end. PCC advised to verify the stabilizing resistor of the 220/132 kV ATR - II REF protection and to test the REF protection.

PCC advised BSPTCL to submit the report to ERPC and ERLDC after the testing.

BSPTCL may update.

Deliberation in the meeting

BSPTCL informed that REF relay settings have been revised in consultation with OEM.

ITEM NO. C.6: 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	42	71.19
JUSNL	34	25	73.53
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.

ITEM NO. C.7: 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	14-01-17	08:57	3:54:00

			failure alarm			
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 61st PCC, Powergrid informed that M/s Alstom has inspected the site and collected all the details. They will submit the report.

In 62nd PCC, Powergrid informed that M/s Alstom has submitted the report.

PCC advised Powergrid to send the report to ERPC and ERLDC.

In 63rd PCC, Powergrid submitted the report which is enclosed at **Annexure-C7**.

Powergrid may update.

Deliberation in the meeting

Powergrid informed that they are implementing the observations. PCC advised Powergrid update the status in monthly PCC Meetings.

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**
13	220KV BUDIPADAR-KORBA-II	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC available	will be activated in consultation with Korba
17	220 KV TSTPP-RENGALI	17.07.16	EARTH FAULT	NTPC	OPTCL		by March 2018
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		1 ckt resolved
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.
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
27	220 KV BIHARSARIF-TENUGHAT	07.09.16	B-N FAULT	BSPTCL	TVNL		
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. 132kV Baripada(PG)-Baripada (Tendering in Progress for OPGW): *Contract awarded*
4. 132kV 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
4. 220kV MTPS-Motiari line

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

5. 220KV Madhepura-New Purnea D/C — 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

Members noted for compliance.

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

As decided in Item B1, PCC advised DVC to install numerical bus bar protection at 220kV Bokaro, Kalyaneswari, Chandrapura, MTPS and Durgapur S/s to improve the reliability.

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.

In 61st PCC, 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.

In 62nd PCC, Powergrid informed that they are implementing recommendations of Earthing Audit Team. The issue would be resolved after implementation of the recommendations.

POWERGRID may update.

Deliberation in the meeting

PCC enquired about issues found in Earthing Audit Team.

Powergrid replied that the Audit Team had recommended improving the Reactor earthing pit resistance and they implementing the recommendations.

ITEM NO. C.11: 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-C11**.

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

Constituents may update.

Deliberation in the meeting

PCC advised all constituents to submit the checklist on monthly bases in every OCC/PCC meetings.

ITEM NO. C.12: Any other issues.

****