



Agenda for 69th PCC meeting

Date: 19.07.2018
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 69TH PROTECTION SUB-COMMITTEE MEETING TO BE HELD AT ERPC, KOLKATA ON 19.07.2018 (THURSDAY) AT 10:30 HOURS

PART – A

ITEM NO. A.1: Confirmation of minutes of 68th Protection sub-Committee Meeting held on 18th June, 2018 at ERPC, Kolkata.

The minutes of 68th Protection Sub-Committee meeting held on 18.06.18 circulated vide letter dated 05.07.18.

Members may confirm the minutes of 68th PCC meeting.

PART – B

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN JUNE, 2018

ITEM NO. B.1: Disturbance at 400kV Bakreswar S/s on 19.06.2018 at 10:10 hrs.

At the time of connecting the Bakreswar unit#2 to transfer bus via bus coupler CB during taking shutdown of main CB connected to GT of the said unit, all elements connected to bus I tripped on LBB operation. It is suspected that NIT (Normal Intermediate Switch) remained in the intermediate position in the case of bus coupler CB between 400 kV main and transfer bus, which led to LBB initiation.

Generation Loss: 210 MW

No fault has been observed in PMU data during that instant.

WBSETCL may explain.

ITEM NO. B.2: Tripping of 400kV HEL-Subhasgram D/C on 10.06.2018 at 21:52 hrs.

At 21:52 hrs 400 kV HEL Subhasgram D/C tripped on B-N fault resulting tripping of both units at HEL due to loss of evacuation path.

Relay indications are as follows:

Name of the elements	Relay Indication at end 1	Relay Indication at end 2
400 kV HEL – Subhasgram - I	B-N, Z-II, A/R unsuccessful, 2 kA	B-N, Z-I, 10 kA, A/R unsuccessful
400 kV HEL – Subhasgram - II	B-N, Z-II, A/R unsuccessful, 2.6 kA 67.71 km distance	B-N, Z-I, 8.6 kA, All three phases breaker opened in same time without A/R opened

Generation Loss: 550 MW

Discrepancies Observed during the event:

1. Reason for tripping of all three phase breakers at Subhasgram end of 400 kV Subhasgram – HEL D/C may be explained
2. As per DR at Subhasgram end of 400 kV Subhasgram – HEL Ckt-II all tie breakers were in opened condition prior to the disturbance.

Powergrid and CESC may explain.

ITEM NO. B.3: Repeated Grid Disturbances at Madhepura S/s.**1. Grid disturbance on 05.06.2018 at 10:20 hrs and 16:32 hrs.**

At 10:20 hrs, 220 kV New Purnea – Madhepura D/C tripped on R-N fault causing load loss at Madhepura Supaul and Lahan (Nepal). 220 kV Purnea Madhepura – II was charged at 10:57 hrs and Circuit I was declared under breakdown.

Later at 16:32 hrs, 220 kV Purnea Madhepura II tripped again in O/C resulting total power failure at nearby area.

Relay indications:

Time	Name of the elements	End 1 Relay Indication	End 2 Relay Indication
10:20 Hrs	220 kV New Purnea - Madhepura - I	B-N	B-N
10:20 Hrs	220 kV New Purnea - Madhepura - II	B-N	B-N
16:32 Hrs	220 kV New Purnea - Madhepura - II	O/C	O/C

As per PMU data, fault clearance time is 300 ms for the event at 10:20 hrs. In case of second event at 16:32 hrs fault clearing time is less than 100 ms.

Load Loss: 133 MW(1st incidence at 10:20 hrs)
160 MW(2nd incident at 16:32 hrs)

2. Grid disturbance on 26.06.2018 at 04:39 hrs.

At 04:39 hrs, 220 kV New Purnea – Madhepura D/C tripped on R-N fault causing load loss at Madhepura Supaul and Lahan (Nepal).

Load loss: 150 MW

BSPTCL and Powergrid may explain.

ITEM NO. B.4: Total power failure at 220/132 kV Sipara S/s (BSPTCL) on 15.06.2018 at 10:58 hrs.

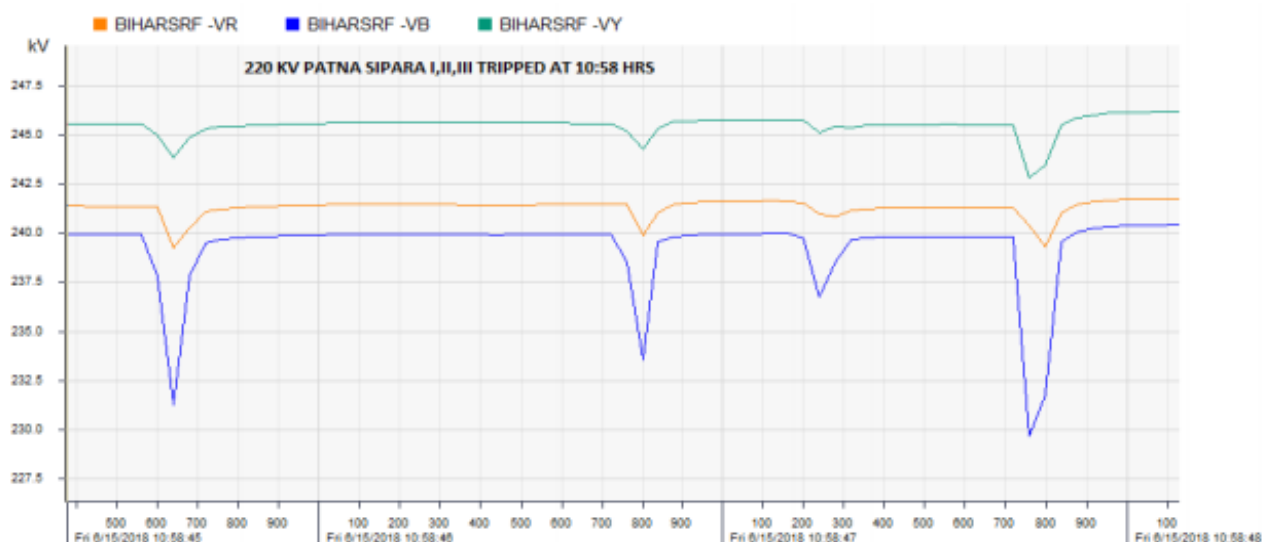
At 10:58 hrs, due to bus bar relay operation at Sipara S/s the following elements tripped.

- 220 kV Patna – Sipara T/C
- 220 kV Sipara – Khagul S/C
- 220 kV Sipara- Fatuah S/C
- 220/132 kV ICT – I, II & III at Sipara

Relay Indication:

Name of the elements	Relay Indication at End 1	Relay Indication at End 2
220 kV Sipara –Khagul - I	21(D/P), B-N, F/C 7.34 kA, 11.2 km from Sipara	B-N, 12.85 km from Khagul, Z-I

Analysis of PMU plot:



As per PMU data, multiple faults have been seen in B phase around 10:58 hrs which got cleared within 100 ms.

BSPTCL and Powergrid may explain.

ITEM NO. B.5: Repeated interruption of power supply

A. At Lalmatia and Sahebgunj area

Repeated interruption of power supply occurred at Lalmatia and Sahebgunj area in the month of June 2018. Summary of the events are given in the following table. JUSNL may share their remedial actions regarding frequent interruption of power supply to these areas due to N-1 Non-Compliance during Grid Operation which is a violation of clause 3.1.e of CEA Grid standard and clause 6.2.1 of CEA planning Criteria 6.2.1.

Date	Event Time	Event Summary	Load loss	generation loss	Restoration time
07-06-18	13:32Hrs	Tripping of 132 kV Kahalgaon (BSPTCL) - Lalmatia S/C resulted load loss at Sahebgunj	30 MW	0 MW	13:52 Hrs
07-06-18	12:15hrs	220 kV Farakka – Lalmatia S/C tripped from Farakka end on B-N fault at 11:35 hrs. At 12:15 hrs 132 kV KhSTPP – Lalmatia (on E/F) and 132 kV Kahalgaon (BSPTCL) – Lalmatia S/C tripped resulting total power failure at surrounding areas.	85 MW	0 MW	Sahebgunj and Lalmatia load restored at 12:58 and 13:07hrs respectively
21-06-18	15:50Hrs	132 kV Kahalgaon (BSPTCL) – Lalmatia S/C tripped on E/F resulting load loss at Sahebgunj which was radially connected through Kahalgaon – Lalmatia –	36 MW	0 MW	16:40 Hrs

		Sahebgunj section.			
30-06-18	09:45Hrs	132 kV KhSTPP (NTPC) – Lalmatia S/C and 132 kV Kahalgaon (BSPTCL) – Lalmatia S/C tripped at 09:45 hrs on E/F. Tripping of 132 kV Kahalgaon (BSPTCL) – Lalmatia S/C caused load loss of 35 MW at Sahebgunj as it is being fed directly from Kahalgaon (BSPTCL) through transfer bus at Lalmatia. Local load at Lalmatia was supplied from 220 kV Farakka – Lalmatia through main bus at Lalmatia.	35 MW	0 MW	10:20 Hrs

JUSNL may explain.

B. At Banka, Sultanganj and Sabour

Repeated interruption of power supply occurred at Banka, Sultanganj and Sabour area in the month of June 2018. Summary of the events are given in the following table. BSPTCL may share their remedial actions regarding frequent interruption of power supply to these areas due to N-1 Non-Compliance during Grid Operation which is a violation of clause 3.1.e of CEA Grid standard and clause 6.2.1 of CEA planning Criteria 6.2.1.

Date	Event Time	Event Summary	Load loss	generation loss	Restoration time
01-06-18	22:07Hrs	Tripping of 132 kV Banka – Sultanganj D/C on E/F resulted loss of power supply to Sultanganj	34 MW	0 MW	22:23 Hrs
06-06-18	12:49hrs	Tripping of 132 kV Banka – Sultanganj D/C on R-Y fault resulted loss of power supply to Sultanganj	33 MW	0 MW	13:26 Hrs
14-06-18	06:28hrs	132 kV Banka Sabour – I tripped on Z-II end from Banka end and 132 kV Banka Sabour – II tripped on overcurrent protection from Sabour due to R phase CT bursting of 132 kV Sabour Sultanganj II at Sabour. Delayed fault clearance has been observed in PMU data. PMU observation is attached in annexure. ER-I may share the reason for non-tripping of 132 kV Banka Sultanganj II from Banka end.	71 MW	0 MW	07:00 Hrs
19-06-18	16:44Hrs	At 16:44 Hrs, 132 kv Banka-Banka I tripped on Y-B-N fault and circuit II tripped only from BSPTCL end resulting total power failure at Banka.	65 MW	0 MW	17:34 Hrs
20-	05:55Hrs	At 05:55 Hrs, 132 kv Banka-	15 MW	0 MW	07:05 Hrs

06-18		Banka I tripped on Y-B fault and circuit II tripped only from BSPTCL end resulting total power failure at Banka.			
27-06-18	02:05Hrs	At 02:05 hrs, 132 kV Banka – Banka D/C tripped on Y-B-N fault. Relay indication at PG end for circuit I is Y-B, Z-III, 12.5 KM, 4.6 kA, Z-III. Circuit II did not trip at PG end. Circuit II was charged at 02:22 Hrs. Fault clearing time 1000 ms. While charging circuit I at 02:25 hrs it tripped again in Z-I from BSPTCL end. Fault clearing time <100 ms.	45 MW	0 MW	03:25 Hrs

BSPTCL may explain.

ITEM NO. B.6: Tripping Incidences in the month of June,2018.

Other tripping incidences occurred in the month of June 2018 which needs explanation from constituents of either of the end is given in **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.

ITEM No. B.7: Presentation on station battery E/F monitoring System.

As per the discussion in previous PCC meetings, CESC was agreed to arrange a presentation on DC E/F monitoring system by their vendor in order to share & discuss the topic in PCC forum.

CESC vide mail dated 11.07.18 confirmed that M/s Bender India will provide a short presentation on the above topic during 69th PCC meeting.

M/S Bender may present.

ITEM NO. B.8: Schedule for third party protection Audit.

The details of Substation and tentative dates for third party protection audit planned to be carried out during the months of July-18 & August-18 are given below:

STATE	Name of the Substations	Tentative Dates
West Bengal	132kV Joka 132 kV Falta 132kV Sonarpur	23 rd July 2018
	132kV Liluah 132kV Adisaptagram	24 th July 2018
	132kV Titagarh 132kV Dharampur 132kV Kalyani	25 th July 2018
	132kV Barasat 132kV Ashoknagar 132kV Ranaghat	26 th July 2018
	132kV Kolaghat 132kV Haldia 132kV CK Road 132kV Hijili	27 th July 2018
	132kV Malda 132kV Raigunj	30 th & 31 st July 2018
	132kV NBU 132kV Moinaguri 132kV Birpara 132kV Alipurduar	2 nd week of Aug 2018.
Odisha	132kV Balasore 132kV Bidanasi 132kV Paradeep 132kV Narendrapur	3 rd week of Aug 2018
	132kV New Bolangir 132kV Budhipadar 132kV Katapalli	4 th week of Aug 2018

Members may note.

PART- C:: OTHER ITEMS

ITEM NO. C.1: Implementation of new islanding schemes in ER

1. Islanding scheme at IbTPS- OPGC

OPTCL has submitted the detail plan of IbTPS islanding scheme. Details are enclosed at **Annexure-C1.1**.

68th PCC opined that the draft scheme submitted by Odisha was three years old and the draft scheme is needed to be reviewed with existing network configuration.

PCC decided to discuss the islanding scheme in next PCC Meeting and advised OPTCL to submit all the relevant details to ERPC and ERLDC.

OPTCL and OPGC may update.

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.2: Disturbance at Hatia at 18:22 hrs on 30-05-2018

Regarding tripping of 220kV Hatia-Patratu lines, JUSNL informed that from Patratu end there was no relay indication as well as no tripping.

As there was no overvoltage indication at Patratu end, PCC felt that such high voltage was unlikely possible in the given scenario of the fault. PCC opined that It should be a measurement error and advised JUSNL to check double grounding/earthing in CVT circuits as double grounding leads to high voltage during fault.

From one of the DR of Hatia-Patratu line it also came to known that one of the polarity of CVT was in reverse. It was concluded that this reverse connection was the cause of enabling VT fuse failure alarm in the relay.

PCC advised JUSNL to rectify the CVT polarity connection as well as to test the CVT in normal condition and submit a report on this tripping within seven days.

JUSNL may update.

ITEM NO. C.3: Disturbance at 220kV Lalmatia S/s at 03:25 hrs on 14-05-2018

JUSNL informed that the fault was due to bursting of R-phase busing on 132 kV side of 132/33 kV transformer.

PCC opined the fault was not cleared from 132kV Lalmatia S/s as a result the lines which were connected to sources got tripped:

PCC advised JUSNL to check the protection system at 132kV Lalmtia S/s including 220/132kV ATRs.

JUSNL may update.

ITEM NO. C.4: Issues related with Generation Backing down during Talcher-Kolar SPS operation on 16th May 2018.

NTPC explained that Talcher units were given the generation relief as per the SPS logic. Since Pole block with ground return mode is not configured in the SPS logic, sufficient generation reduction is being provided in this case.

PCC advised Powergrid to explore for inclusion of pole block with ground return mode signal in the SPS logic.

PCC advised NTPC, GMR and JITPL to ensure the generation reduction as per the SPS logic.

Powergrid informed that OEM is visiting the site in this month for detail investigation on frequent pole trippings.

Powergrid may update.

ITEM NO. C.5: Total power failure at 400/132 kV Motihari substation on 07-04-2018 at 09:56 hrs

In 67th PCC, it was decided to form a Committee with members from NTPC, Powergrid, ERLDC and ERPC. The Committee would visit 400kV Motihari S/s during 11th June 2018 to 13th June 2018 and will do on-site inspection along with Third Party Protection Audit and place the report in next PCC Meeting.

Accordingly, Third Party Protection Audit was done on 11th June 2018.

*In 68th PCC, Detailed report was placed in the meeting which is enclosed at **Annexure-C5**.*

PCC advised DMTCL to comply the observations at the earliest.

DMTCL may update.

ITEM NO. C.6: Tripping of 132 kV KhSTPP - Lalmatia S/C and 132 kV Kahalgaon (BSPTCL) - Lalmatia S/C tripped from Lalmatia on 20-04-2018 at 10:35 hrs

At 10:35 hrs 132 kV KhSTPP - Lalmatia S/C and 132 kV Kahalgaon (BSPTCL) - Lalmatia S/C tripped from Lalmatia resulting load loss at Sahebgunj

In 67th PCC, JUSNL informed that there was a B-N fault in 132 kV Kahalgaon (BSPTCL) - Lalmatia S/C line and the fault was successfully cleared from both ends on over current protection. But 132 kV KhSTPP - Lalmatia S/C was also tripped from Lalmatia end on overcurrent protection.

NTPC informed no tripping signal was initiated from their end and the line was manually tripped from their end.

PCC opined that similar incidents were occurred in March 2018 and in 66th PCC JUSNL was advised to check the relay settings and resolve the issue.

PCC once again advised JUSNL to check the reasons for maloperation of the relay of 132 kV KhSTPP (NTPC) - Lalmatia S/C at Lalmatia end within 10 days and submit a report to ERPC and ERLDC.

In 69th PCC, JUSNL was once again advised to comply the observations & submit the report.

JUSNL may update.

ITEM NO. C.7: Zone 3 settings of ISTS lines

Based on the data available in PDMS, the zone 3 settings of all ISTS lines in Eastern Region were verified and compared with the corresponding resistive reach of the line thermal loading. Zone 3 settings were also checked with the agreed protection philosophy of ER. The discrepancies observed in the settings will be presented in the meeting.

In 67th PCC, PRDC presented the list of ISTS lines where they observed the discrepancy in zone-3 setting.

PCC advised all the concern utilities to verify the zone 3 settings and review the settings with an intimation to ERPC Secretariat.

Members may update.

ITEM NO. C.8: Schedule of training program to be conducted by PRDC

As per AMC, PRDC will conduct training on PDMS and PSCT in state utility premises of Eastern Region. Tentative schedule is given below:

Training in Month	State	Date
June'2018	Bihar	11/06/18 To 15/06/18
July'2018	West Bengal	09/07/18 To 13/07/18
August'2018	Odisha	20/08/18 To 24/08/18
September'2018	Jharkhand	17/09/18 To 21/09/18
October'2018	Sikkim	08/10/18 To 12/10/18

Accordingly, training was conducted at Patna from 11th June 2018 to 15th June 2018 and in West Bengal from 09th July 2018 to 13th July 2018.

Members may update.

ITEM NO. C.9: Non-Operation of 400 kV Binaguri-Rangpo D/C SPS on 9th May 2018

In 67th PCC, it was opined that as per the designed logic, SPS should operate in this case. PCC observed that the CB status of Binaguri end of 400kV Rangpo-Binagruri D/C line was not included to the SPS logic.

PCC advised Powergrid to incorporate the status of CBs of Binaguri along with the Rangpo status in SPS logic at the earliest.

PCC advised Powergrid to check the healthiness of the SPS scheme immediately.

PCC advised ERLDC to fix a date for SPS testing and coordinate with all the concern utilities for SPS testing.

Regarding implementation of SPS through SAS, Powergrid informed that the implementation would complete by July 2018.

PCC advised Powergrid to ensure the relevant data availability of SPS operation to ERLDC through SCADA.

In 69th PCC, Powergrid informed that the work is in progress.

Powergrid may update.

ITEM NO. C.10: Disturbance at 400/220 kV Biharshariff S/s on 28-03-2018 at 18:43 hrs and 19-03-2018 at 02:02 hrs.

In 66th PCC, BSPTCL was advised to compute the fault level at Biharshariff (BSPTCL) substation and review the over current settings accordingly.

PCC advised BSPTCL and Powergrid to coordinate back up IDMT the over current settings at 220/132 kV ICTs with 440/220kV ICTs so that 220/132 kV ICTs would trip first for any downstream faults.

In 67th PCC, BSPTCL informed that they have computed the revised relay settings for Biharshariff S/s as per the fault level of the substation. They would incorporate the new settings by 24th May 2018.

PCC advised BSPTCL and Powergrid to ensure proper relay coordination between 400kV and 220 kV system including ICTs at Biharshariff S/s.

In 68th PCC BSPTCL informed that they have finalized the relay settings in coordination with Powergrid.

BSPTCL and Powergrid may update.

ITEM NO. C.11: Disturbance at 220/132 kV Patraru S/S on 09-02-2018 at 15:00 hrs

In 65th PCC, JUSNL was advised to take the following measures:

- Check the healthiness of the DC system including end to end cables at 220/132kV Patraru S/s
- Check the healthiness of all Circuit Breakers at 220/132kV Patraru S/s
- Check the healthiness of all the relays installed at 220/132kV Patraru S/s including 220/132kV ATRs
- Check Kanke end relay and CB of 132kV Patraru-Kanke line
- Check the Directional feature of 132 kV Hatia I – Sikidri and 132 kV Namkum - Hatia I line relays at Hatia-I

PCC advised TVNL to verify the zone 1 reach of 220kV Patraru-TVNL line as TVNL end should trip on zone 2 in this case.

In 66th PCC, JUSNL informed that they had visited 220/132kV Patraru S/s on 23rd April 2018 for physical inspection of protection system.

JUSNL added that the primary injection kit was defective hence they could not test the healthiness of the relays. They are planning to engage an agency for checking healthiness of the relays.

In 68th PCC, JUSNL was advised to comply the observations at the earliest.

JUSNL and TVNL may update.

ITEM NO. C.12: 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.

In 64th PCC, 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.

In 68th PCC, *OPTCL informed that the rectification work is going on.*

OPTCL may update.

ITEM NO. C.13: Repeated station black out in Sikkim

Repeated power failure at Gangtok and Melli in the month of May 2018 resulted interruption of power supply in the nearby region. Summary of major events are given in Table II. Sikkim may share corrective actions taken after these events.

Date	Time	Affected area	Antecedent condition	Summary	Load loss	Fault clearing time
10-05-18	17:05	Gangtok	132 kV Rangpo - Gangtok was under shutdown	132 kV Chujachen Gangtok S/C tripped in R-Y-N fault. Inclement weather was reported at the time of the incident	19	<100 ms
11-05-18	17:14	Gangtok	132 kV Rangpo - Gangtok was under shutdown	132 kV Chujachen Gangtok S/C tripped in Y-N fault due to Y phase LA failure at Gangtok end. Inclement weather was reported at the time of the incident	33	<100 ms
10-05-18	16:58	Melli, Kalimpong	132 kV Melli - Sagbari S/C is out since long due to problem at Sagbari end.	132 kV Melli Siliguri S/C and 132 kV Melli - Rangpo S/C tripped in R-Y-N fault. Inclement weather was reported at the time of the incident	32	700 ms
28-05-18	16:08	Melli, Kalimpong	132 kV Melli - Sagbari S/C is out since long due to problem at Sagbari end.	132 kV Melli Siliguri S/C and 132 kV Melli - Rangpo S/C tripped in R-Y-N fault. Inclement weather was reported at the time of the incident	25	600 ms

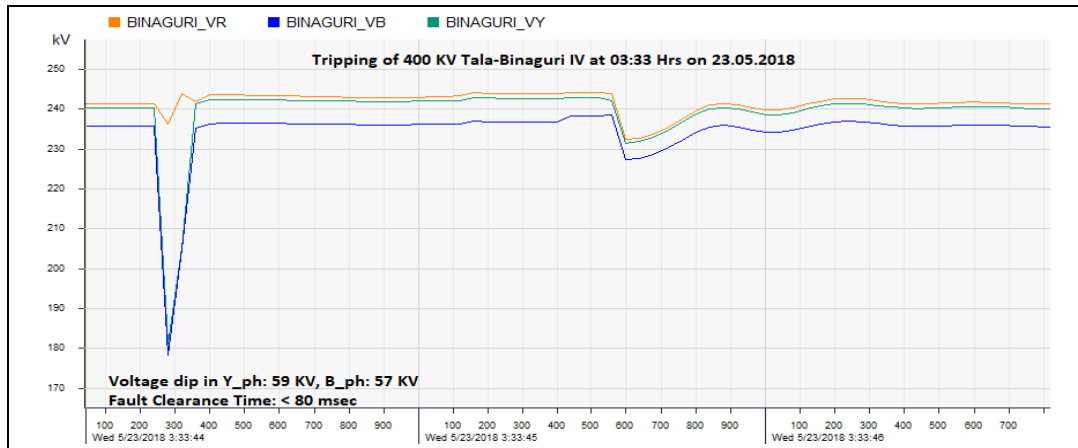
Table I: Summary of the major grid events occurred in Sikkim in the month of May 2018.

In 68th PCC meeting the agenda could not be discussed in detail as Sikkim representative was not present.

Sikkim may update.

ITEM NO. C.14: Issue of Protection Coordination Observed during Blackout of Tala on 23rd May 2018.

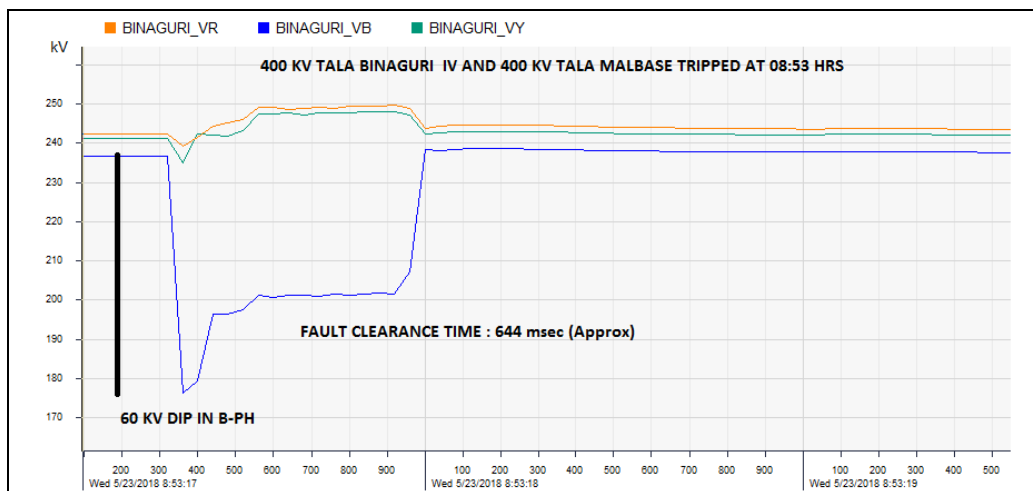
On 23rd May At 03:33 Hrs: 400 kV Binaguri-Talack 4 tripped on Y-B phase to earth fault (Fault distance was 147.10 km from Binaguri end). At the same time 400 kV, Binaguri-Malbase ckt also tripped on B phase to earth fault however, it got successfully reclosed from Binaguri end. The circuit seems to have tripped from Malbase end. It can be seen that fault were located in the Bhutan side however details are not shared with ERLDC. The associated PMU plot is given.



At 04:57 Hrs, 400 kV Binaguri-Tala 2 tripped on B phase to E/F (fault distance was 105.3 km from Binaguri). The circuit was kept idle charge from 0607 Hrs from Binaguri till the line isolator at Tala. In the meantime, 400 kV Binaguri-Tala circuit 1 was made out for planned shutdown by Bhutan.

At 08:53 Hrs:

- 400 kV Binaguri-Talack 4 tripped from Binaguri end on B phase to E/F in zone 2 (location of fault was 124.5 km from Binaguri end). Initially carrier signal was received due to which only B phase opened and A/R function and timer has started. However, within the next 133 ms direct trip was received at Binaguri from Tala causing three-phase tripping at Binaguri end.
- It was observed that the 400 kV Binaguri-tala 4 circuit did not trip from Tala end resulting in fault feeding on this circuit from 400 kV Binaguri-Malbase circuit. 400 kV Binaguri-Malbase circuit has first fed the fault in zone 3 from Binaguri end however, with tripping of 400 kV Binaguri-Tala 4 from Binaguri end, sensed the same in zone 2 and tripped in next 500 ms. The fault location observed for this circuit from Binaguri end was 145 km indicating the fault of 400 kV Binaguri-Tala 4 ckt.



This led to blackout of 400 kV Tala substation causing loss of 447 MW generation. The tripping of 400 kV Malbase-Tala circuit is not shared with ERLDC as this circuit might also have tripped during the blackout of Tala generation.

The tripping at 0333 Hrs and 0853 Hrs, indicate several issues observed during the event in Bhutan side of the transmission line:

1. What was the nature of the fault on these transmission lines?
2. Whether 400 kV Binaguri-Malbase A/R operated at Malbase end at 03:33 Hrs?
3. Why the A/R has not occurred on 400 kV Binaguri-Talack 2?
4. Why the 400 kV Tala did not clear the fault on 400 kV Binaguri-Tala circuit 4 ?
5. Why the Tala end has send the direct trip command for 400 kV Binaguri-Tala circuit 4 ?
6. On what protection the 400 kV Malbase-Tala circuit ha stripped at 0853 Hrs.

In 68th PCC meeting, the disturbances could not be discussed in detail as Bhutan representative was not present in the meeting.

Bhutan may update.

ITEM NO. C.15: Interim Arrangement for substations that are not having bus bar protection In Eastern region

There may be 400 kV or 220 kV substations where either the bus bar is kept out of service for planned shutdown or bus bar protection is not available due to various reasons. Further, the older substations having static busbar scheme would also undergo replacement activity with a numerical scheme for which the bus bar protection will again be required to be withdrawn for a considerable time. Under such scenario, there is need of a mechanism to reduce the bus fault clearance time as the non-availability of bus bar protection can result in delayed fault clearance. In case of any issue of the protection system at remote substations, there may be a widespread outage.

In view of this, it is proposed to adhere to the following philosophy whenever the bus bar protection is kept out or is not available for a considerable amount of time at any 765/400/220 kV substation:

1. Zone 4 (Reverse Zone) timing of all the Lines to be reduced to 300 ms. The LBB should have a high priority or the reverse zone time should be set at least equal to LBB time setting.
2. Healthiness of the carrier protection of all lines is to be ensured.
3. Zone 4 timer reset should be checked in all the relays, as its function needs to be flawless.
4. DMT high set available in the numerical backup Overcurrent (O/C) relays of all the ICTs be properly set to clear the bus fault immediately. The backup O/C protection is coordinated with the upstream and downstream elements; therefore, it would not be possible to make it sensitive as suggested.
5. Bus Coupler overcurrent protection setting to be made lower. Whenever the Bus Bar protection is out the Buses should be operated in split bus mode, to have isolation of the elements on other Buses from feeding the Bus fault.
6. Re-trip feature if available in LBB should also be enabled to take one more attempt of breaker opening.
7. Healthiness of all Protection i.e. both Main and Backup shall be ensured.
8. All the Other Utilities at the remote ends be informed about the Bus Bar protection outage through ERLDC/respective SLDCs

In the case where two separate bus bar protection schemes are available at the substation as Main 1 and Main 2, then the above will not be applicable in the case of the outage of any one of the bus bar protection scheme.

In 65th PCC, all the constituents were advised to send their comments to ERPC and ERLDC.

PCC may discuss.

ITEM NO. C.16: 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	49	72.06
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 note.

ITEM NO. C.17: 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	<u>220KV BUDIPADAR-KORBA-II</u>	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC available	will be activated in consultation with Korba
17	<u>220 KV TSTPP-RENGALI</u>	17.07.16	EARTH FAULT	NTPC	OPTCL		by March 2018
18	<u>220KV BUDIPADAR-RAIGARH</u>	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective	
19	400 KV KOLAGHAT-KHARAGPUR-II	03.08.16	Y-N FAULT	WBPDC L	WBSET CL		
20	<u>220 KV FARAKKA-LALMATIA</u>	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	<u>220 KV MUZAFFARPUR - HAZIPUR - II</u>	10.08.16	B-N FAULT	PGCIL	BSPTCL		Voice established. For carrier required shutdown

24	<u>220 KV ROURKELA - TARKERA-II</u>	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	Expected to install protection coupler by Jan 17
27	<u>220 KV BIHARSARIF-TENUGHAT</u>	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 | } <i>Work is in progress expected to be commissioned by December 2017.</i> |
| 2. 220 kV Biharshariff- Begusarai line | |
| 3. 220 kV Biharshariff- Bodhgaya line | |
| 4. 220kV MTPS-Motiari line | |
| 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 Khagaul |

In 65th PCC, Powergrid informed that they will replace the Autorecloser relay of 400 kV Rourkela-Chaibasa 1 and 400 kV Meramundali-Sterlite 1 & 2 by April 2018.

In 67th PCC, BSPTCL informed that they are planning to hire an agency for implementing PLCC system in all the lines in their network.

Members may update the status.

ITEM NO. C.18: Sequence of operation of HVDC Talcher-Kolar D/C line - ERLDC

ERLDC requested Powergrid and NTPC to submit the details of sequence operation of HVDC Talcher-Kolar D/C for a fault in the line along with the sequence of SPS operation.

In 67th PCC, Powergrid and NTPC agreed to submit the details.

In 68th PCC, Powergrid and NTPC were advised to submit the relevant details to ERLDC.

ERLDC, Powergrid and NTPC may update.

ITEM NO. C.19: 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-C24**.

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

Constituents may note.

ITEM NO. C.20: Any other Issues.

List of line tripping in the month of June 2018 where violation of protection standard has been observed

LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Auto Recloser status	Remarks
Multiple tripping at the same time										
220KV BUDHIPADAR-RAIGARH-I	10-06-2018	2:40	10-06-2018	4:01	Z1, BN, 9.8 KM, 5.39 KA	Did not trip	B-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV BUDHIPADAR-KORBA-II	10-06-2018	2:40	10-06-2018	4:02	Z1, BN, 9.3 KM, 5.27 KA		B-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV MAITHON-DUMKA-I	14-06-2018	17:31	14-06-2018	18:38	R-N, 3.6 km, 21.09 kA	Tripped from Dumka end	R-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV MAITHON-DUMKA-II	14-06-2018	17:31	15-06-2018	9:41	Y-N, 1.9 km, 21.44 kA	Tripped from Maithon end	Y-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV RAURKELLA-TARKERA-I	15-06-2018	12:54	15-06-2018	13:50	R-Y-N, 15.3 KM,R=5.855 KA, Y=8.519 KA		R-Y-N Fault	500 msec		
220KV RAURKELLA-TARKERA-II	15-06-2018	12:54	15-06-2018	13:37	Did not trip	TRIPPED FROM TARKERA END	TRIPPED FROM TARKERA END Only	500 msec		
400KV MENDHASAL-PANDIABILI-II	20-06-2018	16:12	20-06-2018	16:50	TRIPPED FROM MENDHASAL END ONLY	Did not trip	TRIPPED FROM MENDHASAL END ONLY	< 100 msec	No A/R operation found in PMU	
400KV MENDHASAL-PANDIABILI-I	20-06-2018	16:12	20-06-2018	16:50	TRIPPED FROM MENDHASAL END ONLY	Did not trip	TRIPPED FROM MENDHASAL END ONLY	< 100 msec	No A/R operation found in PMU	
Miscellaneous: Tripping on DT, No Fault observed in PMU										
220KV ATRI-PANDIABILI-II	04-06-2018	18:24	04-06-2018	18:48	DT RECEIVED AT PANDIABILI		DT RECEIVED AT PANDIABILI		No fault observed in PMU	
400KV MENDHASAL-PANDIABILI-II	05-06-2018	13:52	05-06-2018	14:50	MASTER TRIP RELAY	Did not trip			No Fault observed in PMU	
400KV TSTPP-RENGALI-I	09-06-2018	9:46	09-06-2018	13:20	DT RECEIPT AT TALCHER		DT RECEIVED AT TALCHER		No fault observed in PMU	
400KV NEW PPSP-NEW RANCHI-I	20-06-2018	9:39	20-06-2018	9:58	DT RECEIPT AT PPSP		DT RECEIVED AT PPSP		No fault observed in PMU	
Autoreclose related issues										
400KV KHARAGPUR-CHAIBASA-II	19-06-2018	13:10	19-06-2018	13:20	B_N,z1,38.7 km ,5.53 ka a/r successful	2.2 KA ,B-N,152 km ,ZOne 2	B-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV KHARAGPUR-CHAIBASA-I	20-06-2018	14:38	20-06-2018	14:59	A/R success, Z1, R-N,4.53KA,59Km	R-N,108KM, 3.19KA	R-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV KHARAGPUR-CHAIBASA-I	20-06-2018	15:37	20-06-2018	17:35	B_N Fault		B-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV KHARAGPUR-CHAIBASA-I	24-06-2018	12:15	24-06-2018	12:34	R_N,Z1, A/R Successful FC : 3 KA FD : 126 KM	R_N,Z1, FC : 5.47 KA FD : 58.9 KM	R-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV RANCHI-RAGHUNATHPUR-II	07-06-2018	12:37	07-06-2018	13:13	RN, 3.3 KM, 16.45 KA	RN, 1.859 KA	R-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV RANCHI-RAGHUNATHPUR-II	08-06-2018	12:08	08-06-2018	13:28	RN, 85.7 KM, 3.75 KA	RN, 24.71 KM, 8.47 KA	R-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV MAITHON-DHANBAD-II	07-06-2018	11:58	07-06-2018	12:14	BN, 47.23 KM, 1.154 KA	A/R SUCCESSFUL	B-N FAULT	400 msec	No A/R operation found in PMU	
220KV MAITHON-DHANBAD-II	07-06-2018	13:40	07-06-2018	13:59	B-N, 43.46 KM, 1.616 KA	A/R SUCCESSFUL	B-N FAULT	400 msec	No A/R operation found in PMU	
220KV MAITHON-DHANBAD-I	20-06-2018	15:58	20-06-2018	16:05	R_N, F.D. 40 KM, F.C. 3.02 kA, A/r successful		R-N FAULT		No A/R operation	
765KV FATEHPUR-PUSAULI-I	17-06-2018	17:37	17-06-2018	19:15	R-N fault. FD: 254.5km FC: 2.7kA	67.96 km,2.306 KA,R_N	R-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV MEERAMUNDALI-STERLITE-II	01-06-2018	12:21	01-06-2018	13:08		Z-1 , B-N, F.C-1.875 KA , F.D -163.1 km.	B-N FAULT	< 100 msec	No A/R operation found in PMU	

LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Auto Recloser status	Remarks
400KV BIHARSARIFF(PG)-MUZAFFARPUR(PG)-II	12-06-2018	15:33	12-06-2018	16:18	B_N, 21.36 KM, 12.14 kA	B_N, 8.43 KM, 4.028 kA	B-N FAULT	< 100 msec	No A/R operation found in PMU	
400KV PATNA-KISHANGANJ-I	12-06-2018	15:59	12-06-2018	16:32	Y_N, 83.6 KM, 4.5 kA	Y_N, 237.6 KM, 1.1 kA	Y-N FAULT	< 100 msec	A/R unsuccessful, but timing issue	
400KV KOLAGHAT-ARAMBAGH-SC	19-06-2018	13:25	19-06-2018	13:47	B-N,ZONE-1,DISTANCE 63.03KM, F/C- 3.92KA		B-N FAULT	< 100 msec	A/R unsuccessful, but timing issue	
400KV MAITHON-KhSTPP-II	22-06-2018	16:21	22-06-2018	23:57	BN, 22,2.164 KA	BN, 9.4 KM, 26 KA	B-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV TTPS-TSTPP-SC	07-06-2018	15:10	07-06-2018	16:36		ZI, B-N, 12.9KA, 4.8KM	B-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV BARIKADA-BALASORE-I	08-06-2018	15:44	08-06-2018	16:14	R-N ,53 KM ,2.5KA		R-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV STPS(WBSEB)-CHANDIL-SC	20-06-2018	16:42	27-06-2018	17:04	Y-N FAULT		Y-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV KATAPALLI-BOLANGIR(PG)-SC	21-06-2018	19:35	21-06-2018	19:59	R-N, Z1, FD 50.59KM	R-N, FC 1.42 KA, Z1, FD 41.4 KM	R-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV DALKHOLA-SILIGURI-II	21-06-2018	23:06	21-06-2018	23:22	B-N,Z1,FD=44.5 KM,FC 2.33KA	B-N,Z1,FD=32.19KM,FC=4.266KA.A/R SUCCESSFUL	B-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV DALKHOLA-SILIGURI-I	21-06-2018	23:06	21-06-2018	23:25	R-N,Z1,FD=54.71KM,FC=2.34 4KA, A/R successful	R-N,FD=42.271KM,FC=3.925KA	R-N FAULT	< 100 msec	No A/R operation found in PMU	
220KV DARBHANGA(DMTCL)-LAUKAHI-II	26-06-2018	3:55	26-06-2018	6:17	RN, 2.4 KA, 32 KM		R-N FAULT	< 100 msec	No A/R operation found in PMU	

**MINUTES OF MEETING HELD AT THE OFFICE OF CHIEF GENERAL
MANAGER (O & M) OPTCL, BHUBANESWAR ON 29TH DECEMBER 2014.**

Meeting attended by: The list of participants is annexed.

Topic: The Special Protection Scheme for Islanding of IB Thermal Generating Units on system disturbance.

The Chief General Manager (O&M), OPTCL welcomed the participants and opined that the present form of islanding scheme need relook for effective islanding of IB TPS Units. The present islanding scheme at 220/132/33kV Grid Substation Budhipadar was discussed by the participants. The present islanding scheme is adopted as per discussion held on 11th April 2014 at Aditya Aluminum Training Centre, Lapanga, Jharsuguda. As per the arrangement, the Islanding relay is installed in 220kV Bus Coupler Panel. The load & IB TPS lines are distributed evenly so that on bus fault on one bus the Islanding relay will decouple the buses & the IB generation will be diverted to healthy bus.

The representative of IB TPS taking part in the discussion said that in the present scheme, as the IB Units are still connected to the main system, may not survive due to gap in the load & generation in the loop. They suggested arrangement of 220kV Buses is to be made such that on the event of system disturbance, the load in one 220kV Bus becomes radial with IB generation. Hence, on system disturbance the IB Unit can be islanded with the radial loads and synchronized with main system after clearance of disturbance.

After detail deliberations, the Special Protection Scheme for IB TPS islanding at Budhipadar Bus, following decisions were taken.

1. Arrangement of Load in 220kV Bus of Budhipadar:

BUS-1: KORBA 1 & 2, IBTPS 1 & 3, BHUSAN 1 & 2, RAIGARH, KATAPALLI 1 & 2, TARKERA 1 & 2, VAL 1 & 2.

BUS-2: IBTPS 2 & 4, AT 1 & 2, SPS, AAL 1 & 2.

2. Arrangement of Radial Load.

- i. BUS-2 (220kV): IBTPS 2 & 4, AT 1 & 2, SPS, AAL 1 & 2.
- ii. 132kV Bus: Station Load (20MW)+Rajgangpur (80MW)+Brajrajnagar (50MW)+Jharsuguda (35MW)+Sundergarh+MCL+MSP; Total: 235MW

Aunabapali

3. In the event of system disturbance and Islanding relay operation, command from Islanding relay will trip the following breakers to achieve islanding of IB TPS Units with radial load.

Budhipadar 220kV Bus: Bus Coupler & IBTPS 1 & 3 connected to Non-islanded Bus.

Budhipadar 132kV Bus : Tarkera & Burla 1 & 2.

Tarkera 132kV Grid Sub-station: Rajgangpur 1 & 2.

4. Provision for disconnection of 132kV Tarkera-Rajgangpur ckts from Tarkera end to make Budhipadar-Rajgangpur 132kV line to feed Rajgangpur load radially is required. The following arrangement need to be made for above. The command from Islanding relay is to be transmitted through carrier channel to Tarkera Grid S/S to trip Rajgangpur 1 & 2 Circuit Breaker at Tarkera Grid S/S.
5. GM (Telecom), OPTCL informed that the carrier protection provision between 132kV Budhipadar & Tarkera is to be provided on priority basis.
6. The facility of transmitting signal through OPGW/Carrier link to IB TPS from Islanding relay to ramp the generation to match the load is to be provided.
7. Further, provision of the carrier protection (Permissive & Direct Trip) to all four number 220kV lines between Budhipadar & IB TPS needs to be made for selective tripping of the lines.
8. GM (Telecom) informed that the above provision (Sl. 6 & 7) can be made after laying of OPGW cables between Budhipadar Grid & IBTPS and installation & commissioning of end equipment thereof. OPGC is to ensure necessary co-operation in this regard.

The above scheme can be adopted after installation of Carrier protection Scheme between 132kV Tarkera & Budhipadar, OPGW link & carrier protection (Permissive & DTT) for four number 220kV lines from IBTPS to Budhipadar Substation.

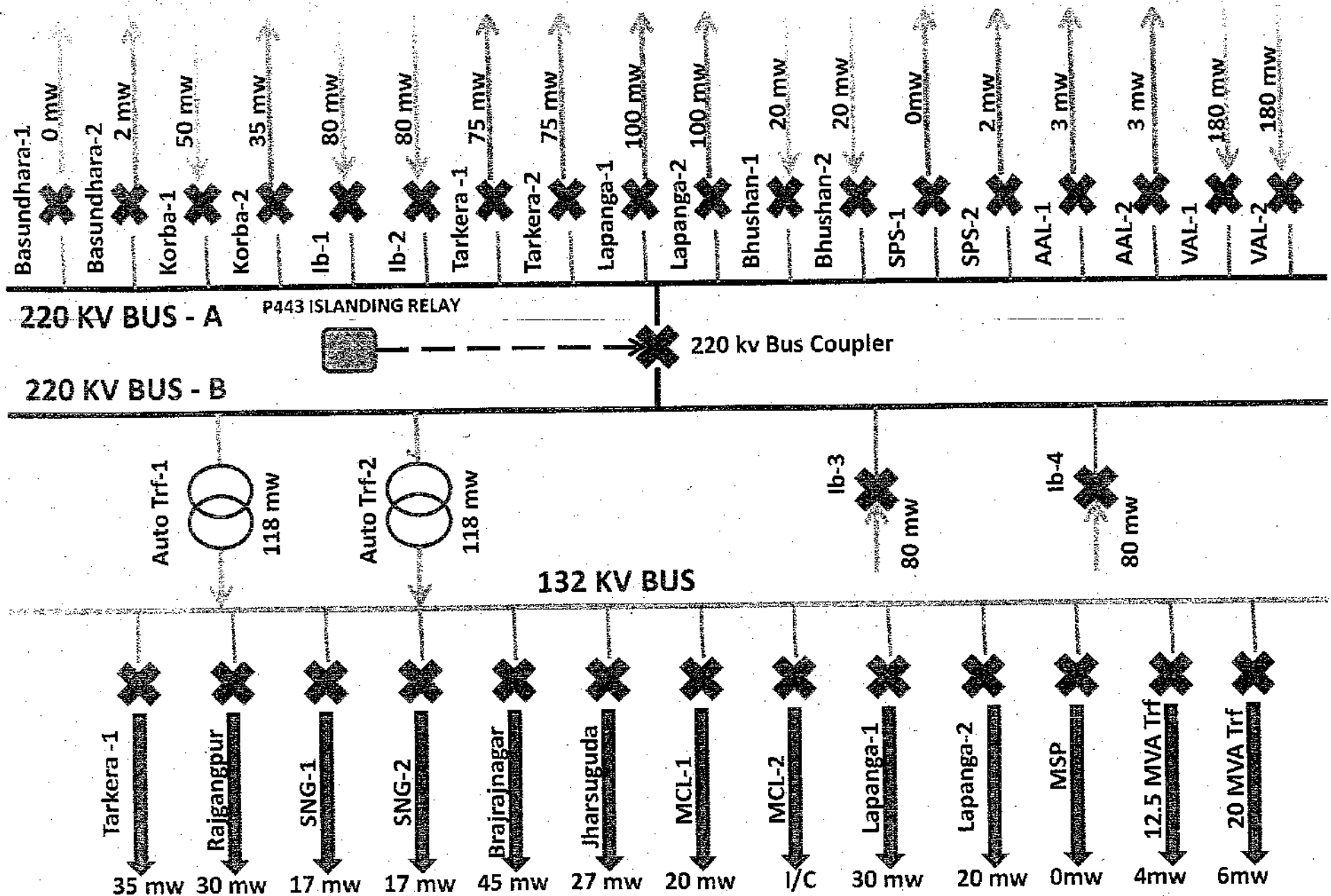
OPTCL/GRIDCO

OPGC

Mahapatra
(P K MAHAPATRA)

CHK. Samantary

Recd. (PS)



NORMAL LOAD ARRANGEMENT AT 220/132/33 Kv BUDHIPADAR GRID SUB-STATION

CONDITIONS FOR ISLANDING RELAY

1. DF/DT.
2. >HZ (Over Frequency).
3. <HZ (Under Frequency).
4. Over Voltage.
5. Under Voltage.

Note- 132 /33 Kv Kuchinda Grid S/s will get power from either Rajgangpur or sambalpur

220 KV BUS - A

220 KV BUS - B

220 kv Bus Coupler

NORMAL LOAD FLOW AT 132 KV SIDE OF BUDHIPADAR GRID SUB STATION

Auto Trf-1
160 MVA

107 mw

Auto Trf-2
160 MVA

107 mw

lb-3
80 mw

lb-4
80 mw

132 KV BUS

Tarkera -1

35 mw

Rajgangpur

30 mw

SNG-1

17 mw

SNG-2

17 mw

Brajrajnagar

45 mw

MCL-2

I/C

MCL-1

20 mw

Jharsuguda

5 mw

Lapanga-1

22mw

Lapanga-2

MSP

0 mw

12.5 MVA Trf

4 mw

20 MVA Trf

6 mw

132 KV KULUNGA
GRID S/S(LILO)

132 KV
RAJGANGPUR
GRID S/S

132 KV S/Y OF
TARKERA GRID S/S

132 KV Switch Yard at
LAPANGA GRID S/S

T-CIRCUIT CONNECTING LAPANGA
WITH JHARSUGUDA

10mw

10mw

220 KV BUS - A

BUS BAR MCU

SELECTOR SWITCH

P443 ISLANDING RELAY

Tripping Command to B/C

220 kv Bus Coupler

Carrier Signal to Tarkera

Auto Trf-1
160 MVA

Auto Trf-2
160 MVA

Ramping signal sent to
IB Thermal(Carrier)

Ib-3

220 KV BUS - B

Ib-4

132 KV BUS

Carrier Signal to Lapanga 1 & 2

Tarkera -1

Rajgangpur

132 KV KULUNGA
GRID S/S(LILO)

132 KV
RAJANGPUR
GRID S/S

Lapanga-1

Lapanga-2

MSP

12.5 MVA Trf

20 MVA Trf

132 KV S/Y OF
TARKERA GRID S/S

132 KV Switch Yard at
LAPANGA GRID S/S

132 KV RJP -1

132 KV RJP -2

400/132 kV Motihari(DMTCL) and 400/220 kV Darbhanga(DMTCL) Substation Audit Findings and Recommendations

In view of repeated tripping of various lines from Motihari 400/132KV(DMTCL) substation and unreliable operation of the protection system, an audit team was formed by MS, ERPC during the 67th PCC meeting for auditing the protection system of 400/ 132 KV Motihari and 400/220 KV Darbhanga substation of DMTCL. Members of the above Protection Audit team were:

- 1) Sh. J. Ganeswara Rao, EE, ERPC
- 2) P.P. Jena, AEE, ERPC
- 3) Sh. Chandan Kumar, Sr. Engineer, ERLDC
- 4) Sh. Saibal Ghosh, Engineer, ERLDC
- 5) Sh. Vivek Pushphakar, Manager, NTPC Barh
- 6) Sh. Mohsin Raza, Manager, POWERGRID

Protection Audit team visited the 400/132 KV Motihari Substation on 11/06/18 and inspected all the settings and relay test reports in presence of DMTCL executives and matter of concerns and protection standard violation along with operational issues were flagged to them for taking the corrective action. A brief summary of findings of the audit team at 400/132 KV Motihari S/S is as below:

- 1) **Wiring issues:** In Disturbance Recorder, the wrong status of CB opening was noticed which was also highlighted during the tripping report by ERLDC. Along with this for Zone 1 fault, the pickup for zone 2 and zone 3 is not being observed. The above indicates wrong connection and the same was informed to DMTCL protection team for a thorough check for all the disturbance reorders available in the substation.
- 2) **Non-operation of Pole Discrepancy relay:** Pole Discrepancy relay for Gorakhpur -2 line has not operated properly, so its time setting and wiring need to be checked. Similar activity has to be done for all the 400 kV as well as 132 kV lines.
- 3) **Distance protection issue:**
 - a. For some line, distance setting for all the zones was found to be incorrect and further, the Main 1 and Main 2 relays were found to having different settings for the same line. In one of the Main protection, (7SA522) for 400 kV lines, the carrier receipt is not configured in distance protection logic.
 - b. Zone 2, Zone 3 and zone 4 time delay settings are to be reviewed as per the ERPC protection philosophy.
 - c. **P.O.P Z2 scheme Usage:** P.O.P Z2 scheme has been used instead of Under reach scheme for the 400 kV lines.
 - d. Reversal guard timer has been used which is not required.
 - e. **Power swing block:** Blocking is used for all zones, but for the zone -1 it should be unblocked.
 - f. **SOTF:** This was inactive in 7SA522 relay and DMTCL was asked to activate it.

400/132 kV Motihari(DMTCL) and 400/220 kV Darbhanga(DMTCL) Substation Audit Findings and Recommendations

- 4) **Directional Earth Fault:** DT send for DEF protection have been activated however in practice utilities do not use a direct trip in case of DEF
- 5) **Disturbance Recorder timing:** DR timing was found to be 1.5 sec, which is quite less and does not capture the entire event in one DR file. DMTCL was intimated to make it 5 sec (0.5 s pre and 2.5 post-fault) or higher as per the capability of Disturbance recorder file.
- 6) **Coordination of Overcurrent Protection of 400/132 kV ICTs:** The 400/132 kV ICT overcurrent protection need proper coordination with respect to the downstream 132 kV network in order to avoid any unwanted tripping due to a downstream network fault. Presently 400/132 kV ICTs are set to trip at 110% of rated current. However, the overcurrent tripping of the ICT needs to be set as per the overload alarm and overcurrent tripping also need to be reviewed with respect to the capacity of the ICTs.
- 7) **Station Operating Procedure during Blackout:** The details of action required to be done during any substation level blackout were found to be not available in the Control Room to assist the operator under emergency. This document is quite necessary in order to help and guide operator under such situation.
- 8) **Spares Management for GIS Substation:** As the 400 kV Gorakhpur-Motihari 2 Inter-regional circuit is on prolonged outage due to the issue of unavailability of spare at the Motihari substation. The Audit team is of the view that adequate spare need to be maintained at GIS substation to meet such contingency.
- 9) **Training of the Manpower:** It was observed that the shift personnel need adequate training for real-time operation of the GIS substation and the same has been informed to the DMTCL.
- 10) **Switchyard maintenance:** Lot of vegetation in the yard was found. So proper anti-weed treatment in regular interval need to be carried out.

The Audit team has also visited the 400/220 kV Darbhanga substation on 12/06/18 and the issues observed in the Motihari Substation were also found in Darbhanga substation.

Recommendations of Protection Audit Team for 400/132 kV Motihari and 400/220 kV Darbhanga Substation:

In view of the above issues, the Protection Audit Team informed DMTCL operation and protection team to for the smooth operation of both the 400 kV substations

1. Thoroughly check all the soft logic, setting and wiring connection for ensuring protection reliability of this important inter-regional corridor.
2. Adequate spare management to meet contingency
3. Training of control room operator for GIS substation operation
4. System Operating procedure availability in control room
5. Ensuring the protection coordination with the downstream network

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

NAME OF ORGANISATION:
FOR THE MONTH OF:

SUBSTATION DETAIL:

SI 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: