

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 25th PROTECTION SUB-COMMITTEE MEETING HELD AT ERPC, KOLKATA ON 24.11.2014 (MONDAY) AT 11:00 HOURS

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

PART – A

ITEM NO. A.1: Confirmation of minutes of 24th Protection sub-Committee Meeting held on 20th October, 2014 at ERPC, Kolkata

The minutes of 24th Protection Sub-Committee meeting held on 20.10.14 circulated vide letter dated 07.11.14.

No comments have been received from any constituent.

The minutes of the above meetings may be confirmed.

Deliberation in the meeting

Members confirmed the minutes of 24th Protection sub-Committee meeting.

PART – B

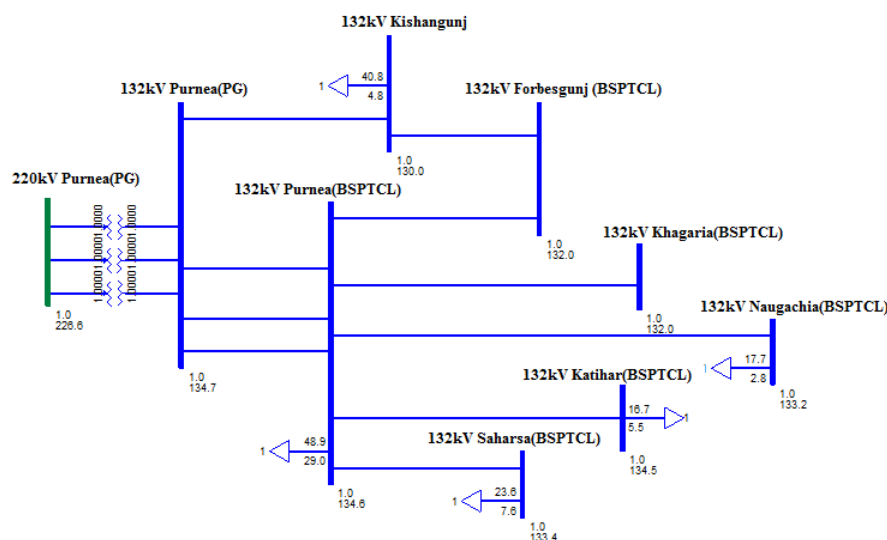
ANALYSIS & DISCUSSION ON GRID INCIDENCES WHICH OCCURRED IN CTU/STU SYSTEMS DURING OCTOBER, 2014.

(The detailed report was highlighted by ERLDC/respective constituents)

ITEM NO. B.1: Repeated trippings at 132 kV Purnea (BSPTCL) S/s

1. Disturbance at 132 kV Purnea (BSPTCL) on 26.10.14

At 02:02hrs on 26.10.14, all 132kV lines from 132kV Purnea (BSPTCL) s/s were tripped due to fault in 132 KV Purnea-Khagaria line.



Following lines tripped:

- 132kV Purnea (PG)-Purnea (BSPTCL)-I, II & III---- with relay indication overcurrent E/F
- 132 KV Purnea-Khagaria line tripped--- on R-ph at a distance of 49.29km

BSPTCL may explain.

Deliberation in the meeting

BSPTCL informed that there was a permanent fault in 132 KV Purnea-Khagaria radial line and it was not cleared from their 132kV Purnea end and finally tripped from Purnea(PGCIL) end on O/C & E/F. BSPTCL also reported that distance relay at Purnea(B) has detected the R-ph/G fault however concerned CB did not operate. So, the tripping of the said line from Purnea (B) end was ruled out.

BSPTCL informed that similar incident was happened on 28.10.14. The reported disturbance on 28.10.14 at Purnea S/s was similar in nature, but the tripping of 132 KV Madhepura-Supaul line as reported in the agenda was not correct.

Thereafter, inspection was carried out and it was found that control cable between CB trip coil & Master trip relay (86) was disconnected.

Subsequently, the same has been rectified.

PCC felt that single stranded control cable was being used at 132kV Purnea S/s which might led such disconnection. BSPTCL was advised to replace all the single stranded cables with multi stranded as it was recommended by the committee visited to the substation during Aug/Sep, 2014.

PCC also advised BSPTCL to give the monthly update on implementation status of Committee recommendations.

BSPTCL agreed.

2. Disturbance at 132 kV Purnea (BSPHCL) on 28.10.14

At 04:55hrs on 28.10.14, all 132kV lines from 132kV Purnea (BSPHCL) s/s were tripped due to fault in 132 KV Madhepura-Supaul line.

Following lines tripped:

- 132kV Purnea (PG)-Purnea (BSPHCL)-I, II & III---- with relay indication overcurrent E/F
- 132 KV Madhepura-Supaul line ckt I & II --- from Madhepura end on overcurrent.

BSPTCL may explain.

Deliberation in the meeting

As deliberated in previous Agenda Item.

ITEM NO. B.2: OPTCL System

1. Disturbance in OPTCL system due to Hud Hud cyclone on 12.10.14

At 10.47 hrs on 12.10.2014, very severe cyclone Hud Hud had hit the land at Visakhapatnam with a wind speed of 195kmph causing damage to the power disruption in DISCOMs as well as transmission network of OPTCL in the southern part of the state.

OPTCL may elaborate.

Deliberation in the meeting

OPTCL informed that no significant damage took place to the OPTCL transmission networks. However, some of the important lines were either opened on load thrown off or hand tripped during the Cyclone. All the lines are presently in service. Only few lines in SOUTHCO, DISCOM got affected which are being restored.

2. Disturbance at 220 kV Rengali S/S on 07.10.14.

At 13:01hrs all the 220kV feeders emanating from 220kV Rengali S/Y were tripped.

Details are given as follows:

- 220kV Rengali S/Y-Barkote line tripped from Rengali S/Y on D/P but did not trip from Barkote end.
- 220kV Rengali S/Y- Rengali PH line-II tripped from both ends with relay indication Overcurrent E/F at 220kV Rengali S/Y and E/F at 220kV Rengali PH
- 220kV Rengali S/Y- Rengali PH line-I tripped from both ends with relay indication Overcurrent E/F at 220kV Rengali S/Y and E/F at 220kV Rengali PH
- 220kV Rengali S/Y- Rengali PG line-I tripped from Rengali S/Y on pilot wire protection.

OPTCL may explain.

Deliberation in the meeting

OPTCL informed that, they suspected the fault in 220kV Barkote line. However, no fault was detected during line patrolling. It may be of transient nature. The delayed fault clearance by DP relay EPAC 3000 at Barkote end caused feeder tripping from remote end. The delayed tripping of EPAC 3000 DP relay is attributed to defective neutral wire of the relay.

Tripping of Pilot wire protection on through fault at Rengali-OPTCL end may be due to defective pilot wire.

OPTCL reported that, EPAC 3000 DP relay at Barkote and Pilot wire protection HORM -4 for PGCIL-1 & 2 feeder will be tested in the first week of December'14

All electromagnetic Over Current & Earth fault Relays will be replaced by January'16.

ITEM NO. B.3: Repeated tripping of 400 kV GMR-Meeramundali line from GMR end

It has been observed that 400kV GMR-Meeramundali line is getting tripped from GMR end only on several occasions. PCC advised both GMR and OPTCL to review the protection settings at GMR.

The existing and revised protection settings of both the ends are circulated in the meeting.

Members may decide.

Deliberation in the meeting

GMR informed that revised settings have been implemented on 8th November, 2014 in coordination with OPTCL and no tripping were reported thereafter.

PCC advised GMR to examine the relay settings of 400kV GMR-TSTPP line in coordination with NTPC and report.

Further, PCC advised GMR to review the distance protection settings after commissioning their dedicated ATS and submit to ERPC/ERLDC.

GMR agreed.

ITEM NO. B.4: Tripping of 132 kV Kahalgaon-Sabour line on 23.10.14

At 01:10hrs Tripping of 132KV Kahalgaon -Sabour line on E/F protection at NTPC Kahalgaon end. (Dist. Prot. Start, Y phase E/F).

NTPC and BSPTCL may explain.

Deliberation in the meeting

NTPC and BSPTCL informed that tripping of the above line from Kahalgaon end was found to be in order.

ITEM NO. B.5: Tripping of 132 kV Kahalgaon-Lalmatia line on 01.10.14 & 11.10.14

- 1. At 10:40hrs on 01.10.2014, 132KV Kahalgaon-Lalmatia line on distance protection at NTPC Kahalgaon end with relay indication Y&B phase, distance 70 km.*
- 2. At 13:00hrs on 11.10.2014, 132KV Kahalgaon-Lalmatia line on distance protection at NTPC Kahalgaon end with relay indication Y&B phase, distance 36.5 km.*

NTPC and JSEB may explain.

Deliberation in the meeting

It was informed that,

- 1. At 10:40hrs on 01.10.2014, fault was initiated in 220KV Farakka-Lalmatia line and Lalmatia end failed to isolate the fault. Hence, the fault was cleared from 132kV Kahalgaon end on backup O/C protection.*

PCC advised NTPC to send a report stating the details thereof. NTPC agreed.

- 2. At 13:00hrs on 11.10.2014, 132KV Kahalgaon-Lalmatia line on distance protection at NTPC Kahalgaon end with relay indication Y&B phase, distance 36.5 km.*

JSEB and NTPC informed that tripping was in order.

ITEM NO. B.6: Tripping incidences in the month of October, 2014

Other tripping incidences occurred in the month of October, 2014 which needs explanation from either of the end are circulated in the meeting.

Members may discuss.

Deliberation in the meeting

*Updated tripping incidences as explained by the members is enclosed at **Annexure-I**.*

During deliberation, it was informed that a T-connection was made in 132kV Lalmatia-Kahalgaon line at Tower no. 9 from Lalmatia end and drawing the power from 3rd May, 2014.

PCC advised JSEB to check and remove the T-connection immediately in order to maintain protection coordination of the important line like 132kV Lalmatia-Khahalgaon S/C.

JSEB agreed.

PART- C

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

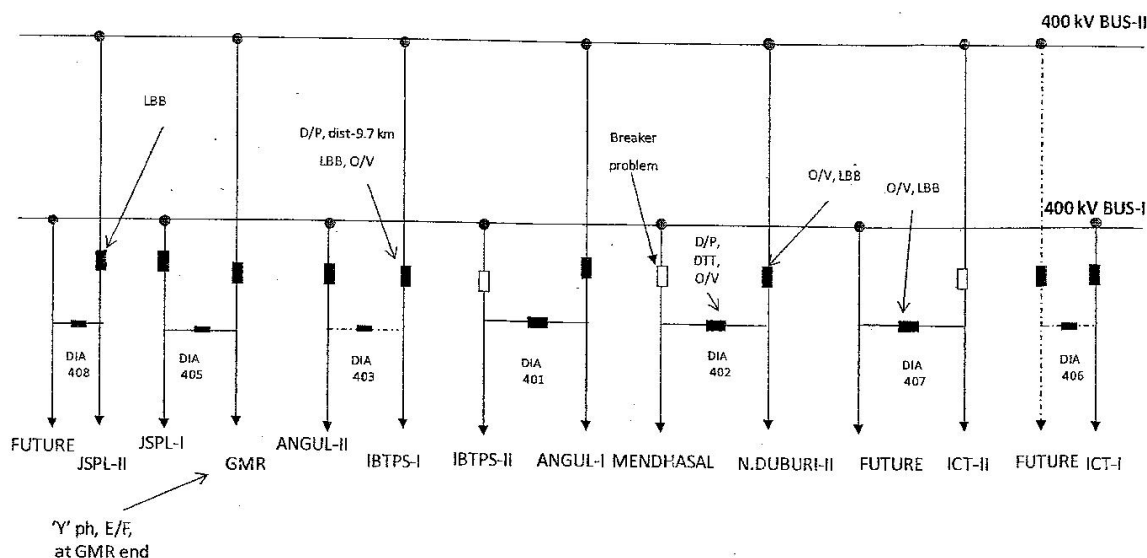
(The status on the follow up actions is to be furnished by respective constituents)

ITEM NO. C.1: OPTCL System

1. Disturbance at 400 kV Angul S/s & 400/220 kV Meramundali S/S on 14.09.14.

At 18:41hrs, 400kV Angul-TSTPP tripped due to a transient fault wherein Autoreclose did not successfully operate at Anugul end. Subsequently, at 18:55hrs, due to suspected fault in 400kV Meramundali-IBTPS-I which was idle charged from Meramundali end which was not timely cleared at Meramundali end, LBB operated at Meramundali and Bus-II at Meramundali became dead. 400kV Angul-Bolangir also tripped and 400kV Bus at Angul became dead.

MERAMUNDALI S/S 14.09.2014 AT 18:55 Hrs



Following elements tripped:

- 400kV Angul-TSTPP (Tripped at Angul end)
- 400kV Angul-Bolangir (Tripped at Bolangir end)
- 400kV Meramundali-IBTPS-I (idle charged) (Tripped at Meramundali end)
- 400 kV Meramundali-Duburi Ckt-II (idle charged from Meramundali end) (Tripped at Meramundali end)
- 400kV Meramundali-Mendhasal (Tripped at Meramundali end)
- 400 kV Meramundali-GMR (Tripped at GMR end)
- 400 kV ICT-II at Meramundali (Tripped at Meramundali end)
- 400 kV Meramundali-JSPL Ckt-II (Tripped at Meramundali end)
- 400 kV Meramundali-Angul Ckt-I (Tripped at both ends)

Analysis of events:

It appears that, there were two separate events occurring at 18:41hrs and at 18:55hrs. At 18:41hrs 400kV Angul-TSTPP tripped from Angul end on R-N fault. At TSTPP end Auto reclosure operated successfully indicating that the fault was transient in nature, but at Angul end Auto reclosure got blocked which needs to be investigated.

Subsequently, at 18:55hrs, 400kV Meeramundali-IBTPS-I (idle charged from Meramundali end) tripped on Y-N fault. However as reported by OPTCL, due to suspected delayed tripping of 400kV Meeramundali-IBTPS-I from Meeramundali end, LBB got actuated at Meramundali end. Hence, all the elements connected to 400kV Bus-II of Meramundali tripped. However, the breaker connected to Bus-II of 400kV Meramundali-GMR at Meramundali end tripped from remote end only which needs to be investigated. Also, presently the main CB of 400kV Meeramundali-Mendhasal was not in service and said line was charged through the tie CB of 400 kV Meeramundali-Duburi Ckt-II which was connected to Main Bus-II. Hence, though the line tripped on operation of LBB, the tie breaker observed the fault and tripped on DP. Thus, tripping of 400 kV Meeramundali-Duburi Ckt-II (idle charged from Meramundali end) on LBB, led to outage of 400kV Meeramundali-Mendhasal also. Relays at Angul end of 400kV Anugul-Meramundali-I had also picked up detecting Y-N fault beyond Z-3 due to delayed opening of breaker of 400kV Meramundali-IBTPS-I at Meeramundali end but the relays did not trip. This is suspected to be a maloperation at Anugul end. Hence, finally the fault was cleared from Bolangir end with DT was sent to Angul. It is suspected that JSPL units might have tripped due to the above incident. Hence, now, only two lines and one ICT viz. 400 kV Meeramundali-JSPL Ckt-I, 400 kV Meeramundali-Angul Ckt-II and 400/220kV ICT-I remained connected with Bus-I at Meeramundali. It is suspected that ICT-I had also tripped and with JSPL-Meramundali-I tripping, there was no source/evacuation path from Meramundali Bus-I and 400kV Anugul-Meramundali-II went under floating condition. Subsequently, the line tripped on receipt of DT at 19:05Hrs from Meramundali end on suspected hand tripping of the idle line from Meramundali end.

Remedial Measures/Suggestions:

- The fault persistence time of 280ms is a violation of CEA (Grid Standards) Regulations, 2010. As per Cl.3 (e) regarding 'Standards for Operation and Maintenance of Transmission Lines', the maximum fault clearance time for 400kV Transmission system is 100ms.
- Failure in tripping of 400kV Meeramundali-GMR from Meramundali end on operation of LBB (though other lines connected to Bus-II tripped) needs to be checked. The line tripped from GMR end only even after LBB actuation and the same needs to be investigated.
- Failure in tripping of 400kV Meramundali-Anugul-I from Meramundali end on operation of LBB (though other lines connected to Bus-II tripped) needs to be checked. Also failure in clearing the fault from Anugul end also needs to be investigated (relays at Anugul end had only picked up).
- OPTCL is requested to expedite commissioning of the pending main/tie breakers presently not in service at Meramundali to enable stronger coupling of Bus-I & II at Meramundali.
- Blocking of Auto reclose at Angul end though the same was successful at TSTPP end needs to be investigated.
- Tripping of 400/220kV ICT-I and 400kV JSPL-Meramundali-I needs to be confirmed and corroborated.

In 24th PCC, OPTCL informed that due to some problem in trip circuit there was delayed clearance of fault in the idle charged 400kV Meramundali-IBTPS-I line which activated the LBB at Meramundali S/s and all the elements connected to Bus-II tripped.

PCC advised OPTCL to review the zone settings time to time for under construction lines which were idle charged and the entire line should be covered in zone-1.

PCC advised OPTCL to submit the complete plan of CB replacing and bus-bar protection installation at Meramundali S/s. OPTCL agreed.

The tripping at Angul S/s cannot be analyzed due to non-representation of Odisha-Powergrid.

Powergrid-Odisha may explain.

Deliberation in the meeting

Powergrid ER-II (Odisha Projects) representative was not available for discussion.

2. Disturbance at OPTCL on 26th August 2014

At 23:08hrs of 26th August 2014, 400kV Indravati(PG)-Indravati(O) tripped on overvoltage (Stg-1) from PGCIL end and 400/220kV ICT –I &II at Indravati PH tripped with over flux relay indication (as per information received from OPTCL). Further, 400kV Indravati(PG)-Jeypur(PG) S/C line tripped on inst. Over-current protection from Jeypur(PG) end only. Subsequently 220kV Jayanagar –Jeypore D/C tripped at Jayanagar on actuation of over current relay indication and 220kV Theruvali-Bhanjanagar D/C tripped due to R-ph fault. Indravati, U. Kolab and Balimela hydro stations got islanded with loads of Theruvali and Jeypur complexes. All the running units of Balimela (except #4,#7 and #8), Indravati and U.Kolab tripped . Thus 220kV bus at Jayanagar became dead. And also due to tripping of 220kV Theruvali-Bhanjanagar D/c from both end Theruvali S/S became dead.

Following lines/elements tripped:

1. 400/220kV ICT –I &II at Indravati PH tripped
2. 400kV Jeypore-Indravati 220kV Jayanagar-Jeypore D/C
3. 220kV Theruvali-Bhanjanagar D/C
4. 220kV Jayanagar-U.Kolab D/C
5. 220kV Theruvali-U.Kolab
6. U.Kolab U# I,II,III & IV
7. Balimela U# III, V,VI

Due to this disturbance around 800 MW of load loss and 1200 MW of generation loss occurred in Odisha system.

Subsequently, a special meeting was convened on 4th September, 2014 to analyze the incident.

OPTCL explained that at 23:08 hrs, 400kV Indravati(PG)-Indravati(OHPC) S/C line was tripped from Indravati(PG) end on over-voltage (Stg-1) protection, followed by 400kV Jeypur(PG)-Indravati(PG) S/C line from Jeypur end on earth fault. At 23.09 Hrs. ICT 1 & 2 of Indravati Power House tripped on over fluxing relay operation. Thereafter 220kV Jeypur(PG)-Jayanagar(OPTCL) D/C line tripped from OPTCL end. The load flow in each of above circuits to Jeypore PG was 200MW prior to disturbance. As 400kV link to Jeypore PG from Indravati Power house had tripped earlier, heavy load demand in the area caused tripping of 220kV lines on over current.

The 220kV Therubali – Bhanjanagar ckt.1 & 2 tripped on DP relay operation at both end. The relay indication was Zone-1, 3 phase fault. The cause of above tripping may be attributed to heavy power swing due to high imbalance in load and generation in the loop. The 220kV Narendrapur - Mendhasal circuit tripped at Narendrapur on operation of directional over current. Due to heavy load throw on isolation of PGCIL system and Therubali– Bhanjanagar link, over voltage condition may have experienced.

The 220kV lines from Upper Kolab tripped on over voltage, and all the Generator of the power house tripped on over speed. All the Generator of Indravati power house tripped. The units 3,5 & 6 of Balimela Power house isolated from the Grid and #4,7 & 8 were tripped.

After detailed deliberation, PCC advised Powergrid, OPTCL and OHPC to clarify the following points:

1. Tripping of 400kV Indravati(PG) – Indravati(OHPC) on O/V Stg-I (112%, 5 sec delay) –

- a) Reason for sudden rise of Indravati(PG) voltage by 25 kV (407 kV to 432kV) not understood. DR may be installed at the earliest at Indravati(PG) to analyse voltage, current, CB opening time etc. (Action : Powergrid)
 - b) Instances of O/V tripping also observed on 2nd and 3rd September, 2014. Therefore, Powergrid advised to check the electromagnetic O/V relay and CVT output for proper functioning. (Action : Powergrid)
2. Reason for operation of Instantaneous O/C & E/F relay at Jeypur(PG) end of 400kV Indravati(PG)-Jeypur(PG) line not clear, when there was actually no fault in the line (maximum line current in R-ph recorded by PMU was only 400A). Also reason for 50A rise in R-ph current and 200A fall in Y and B-ph currents of Indravati-Jeypur line, just before tripping. (Action : Powergrid)
 3. After tripping from Jeypur(PG) end reasons for not sending DT signal to Indravati(PG) end. (Action : Powergrid)
 4. When export through HVDC Gajuwaka was reduced from 500MW to 300MW, one ckt of Jeypur-Gajuwaka 400kV line shared 200MW while the other ckt shared 100MW. Earlier, each ckt was carrying 250 MW. Reasons may be explained. (Action : Powergrid)
 5. Reason for tripping of both circuits of 220kV Theruvali-Bhanjanagar on DP, Zone-I, 3-ph from Bhanjanagar end, when there was actually no fault in the line (could be charged successfully shortly after tripping). OPTCL advised to send the related DR files of 220kV Theruvali S/s. (Action : OPTCL)
 6. After tripping of 400kV Indravati(PG) – Indravati(OHPC) on O/V Stg-I, entire generation (600MW) of Indravati HPS got forced through 220kV Indravati-Theruvali 1 & 2, which did not trip, although their O/C protection is set to operate at 600A. (Action : OPTCL)
 7. Tripping of 220kV Narenadrapur-Mendhasal on O/C from Narendrapur can be justified only if it occurs prior to loss of major part of S. Odisha generation (Indravati, Balimela and U. Kolab). (Action : OPTCL)
 8. Voltage recorded by station DCS of U. Kolab HPS prior to tripping of its outgoing lines is required to justify tripping of these lines on overvoltage protection. U. Kolab-Jeynagar is only a 6km line whereas Jeynagar-Theruvali is a 123km line. Therefore, tripping of U. Kolab – Jeynagar line instead of Jeynagar-Theruvali appears to be unjustified. It may further be confirmed whether the lines tripped before or after tripping of the U. Kolab units. (Action : OHPC)
 9. Reasons for tripping of 220kV Balimela-Jeynagar T/C, Balimela-U. Sileru S/C and station transformer-1 from Balimela HPS at 23:09:57 and reclosing of these CBs at 23:09:58 is also not understood. (Action : OHPC/OPTCL)
 10. SOE has not been generated in SCADA system for tripping of 220kV Jeynagar-Jeypur-1, Theruvali-Bhanjanagar D/C from Bhanjanagar, Narendrapur-Mendhasal line from Narendrapur, overflux tripping of 400/220kV ICTs at Indravati HPS. These SOEs may therefore be immediately wired properly into their respective RTUs. (Action : OPTCL)

The issue was placed in 28th TCC meeting.

In 28th TCC, OPTCL, OHPC and Powergrid informed that detail analysis of this type of disturbances need some more time. TCC advised OPTCL, OHPC and Powergrid to place the details in next PCC Meeting for further detail deliberation.

In 23rd PCC, during deliberation the reason behind sudden rise of voltage at 400kV Indravati (PG) S/s could not be ascertained.

After detailed deliberation, PCC felt a committee should be formed for detail analysis of this incidence. Accordingly, a committee of comprising of the following members was constituted:

1. Shri M. R. Mohanthy, Sr. GM, SLDC, OPTCL
2. Shri S. Nayak, AGM, NTPC
3. Shri S. Roy, SE (Testing) , WBSETCL, Kolkata
4. Shri J. Dutta, SE, CTC, DVC, Maithon

5. Shri S. Banerjee, CM, ERLDC, Kolkata
6. Shri A. Sen Sarma, DGM, CC, Powergrid
7. Shri B. Sarkhel, SE(PS), ERPC, Kolkata - Convenor

PCC advised OPTCL, OHPC & Powergrid to send reports on the disturbance from their respective ends along with DR, EL, relay flags and SLD to ERPC Secretariat. PCC also suggested to include recommendations in the report. Accordingly, the committee will study and decide the further course of action.

OPTCL, OHPC, NTPC & Powergrid agreed.

In 24th PCC, ERLDC informed that they have shared the available information with committee members. However, PCC felt that Powergrid and OHPC should send point wise details along with DR and EL flags.

Powergrid and OHPC agreed.

Thereafter, a special meeting was held at ERPC, Kolkata on 30th October, 2014 for detail analysis of the incidence. Minutes of the meeting are circulated in the meeting.

OPTCL, OHPC & Powergrid may explain.

Deliberation in the meeting

- Testing of CVTs of 400kV Indravati(PG) – Indravati(OHPC) S/C line installed at both ends, for proper output and satisfactory performance. If required, erroneous CVT to be replaced with a new one -----*Committee submitted the line CVT output results in the meeting. PCC opined that the CVT output of each phase results not in order and felt the CVT needed to be changed. OHPC expressed the reservation to change the CVT based on one such test result.*
- Making numerical over-voltage protection to ensure desired drop-off to pick-up ratio (above 0.95) be available at PGCIL and OHPC 400kV S/Stns, in place of existing VTU-31 (EE make) electromechanical relay and reviewing their setting based on observed CVT outputs ----- *OHPC agreed to implement the O/V settings in numerical relays (Micom-P442 relay).*
- Ensuring that DR is triggered whenever any protection operates and corresponding event log is telemetered to ERLDC with GPS synchronized time stamping.-----*PCC felt Disturbance Recorder is essential for 400kV system and advised concern utilities (OHPC & Powergrid) to implement the same.*
- Exploring possibility of incorporating Transient Fault Recorders for the FSCs at Jeypur, for analysis of incidents. ----- *Powergrid ER-II (Odisha Projects) representative was not available for discussion.*
- The two 400/220kV ICTs at UIHEP are owned and maintained by different utilities viz. OHPC and PGCIL. For proper maintenance coordination and ease of access it is suggested that O&M of both the ICTs should be done by a single utility.-----*PCC advised OHPC and Powergrid to resolve the issue bilaterally. If not resolved PCC may recommend to bring the issue in TCC forum.*
- Reviewing over-current protection settings in 220kV lines of OPTCL—*OPTCL confirmed submission of such relay settings. It was decided that ERPC and ERLDC will examine the settings and report in next PCC.*

PCC felt Powergrid ER-II (Odisha Projects) was not responding to meetings of various forum and requested Member Secretary, ERPC to write a letter to ED, Powergrid ER-II (Odisha Projects) citing difficulties for the implementation of various decisions.

3. Disturbance in OPTCL and DVC system at 17:15 hrs on 12th July, 2014.

As per report from OPTCL, due to staggered tripping of lines from TTPS end (initiated at 16:52Hrs) including both 220/132kV ICTs at TTPS, all the running units of TTPS (viz. Units #1, 2, 3, 4 running on 132kV side) tripped ultimately at 17:04Hrs. Weather was reported to be of inclement condition at the time of trippings. The Units #5 & 6 connected to 220kV Bus at TTPS were out of bar prior to the incident. Consequent to the trippings, Joda remained connected to two sources only, viz. 220kV Joda-Ramchandrapur and 220kV Joda-Jindal-Jamshedpur. 220kV Joda-Ramchandrapur tripped at 17:15hrs on O/C which appears to be a relay mal-operation and needs to be investigated. Due to the above trippings, direction of power flow through 220kV Joda-Jindal-Jamshedpur reversed as Joda S/S became radial on DVC system resulting in heavy drawal from DVC system. Due to such heavy drawal by Joda, 132kV Barhi-Koderma D/c tripped on O/C resulting in islanding of Bokaro-B TPS. The island formed being heavily deficit in generation vis-a-vis load, suffered low voltage and collapsed on Load generation imbalance. Thus 2x210MW units at Bokaro'B' tripped consequent to tripping of 132kV Barhi-Koderma D/C. The Following elements tripped:

- i. 220kV Meramundali-TTPS-II (Tripped from Meramundali end)
- ii. 220kV Meramundali-Bhanjanagar-I (Tripped from Meramundali end)
- iii. 132kV TTPS-Duburi-I (Tripped from both ends)
- iv. 160 MVA, 220/132kV ATR-II at TTPS
- v. 160 MVA, 220/132kV ATR-I at TTPS
- vi. 220kV Meramundali-TTPS-I (Tripped from Meramundali end)
- vii. 60 MW TTPS Units-1, 2, 3 and 4
- viii. 220kV Joda-Ramchandrapur (Tripped from Ramchandrapur end)
- ix. 132kV Barhi-Koderma-D/C (Tripped from Koderma end)
- x. 2*210 MW Unit-2 and 3 at BTPS

After detailed deliberation 22nd PCC felt that the incidence could not be analyzed unless the detailed tripping reports are received from all the substations involved. PCC took serious note of non-submission of detailed tripping report by NTPC, TTPS end and advised NTPC to place the details in 100th OCC meeting scheduled to be held on 22nd August, 2014 for detailed deliberations. OPTCL was also advised to inquire about any tripping report from 220 kV TTPS-NALCO-Rengali line or 220 kV TTPS for further investigation. The tripping incident will be again discussed after compiling reports received from all concerned.

Subsequently, a special meeting was convened on 4th September, 2014 to analyze the incident.

TTPS (NTPC) explained that, at 16:50hrs there was a R phase to ground fault in 132kV Duburi-TTPS line-1 and the fault has been cleared from both ends. Simultaneously 132kV Duburi-TTPS line-2 tripped from Duburi end and autoreclosure of TTPS end was successfully operated load flow is zero. But at the same time ICT-2 at TTPS was tripped on Neutral Directional O/C and 220kV TTPS-Meramundali-2 was tripped from Meramundali end.

Thereafter, at 16:58hrs 220kV Meramundali-TTPS-1 was tripped from Meramundali end on O/C and ICT-1 at TTPS tripped because of OLTC diverter switch Explosion vent R-ph rapture. Therefore, TTPS completely got isolated from the grid, at 17:01 hrs TTPS units 2, 3, 4 got tripped on over speed and unit 1 got tripped on Drum Level Hi protection.

After detailed deliberation, PCC advised TTPS (NTPC) and OPTCL to clarify the following points:

- Full relay indications from OPTCL/TTPS (NTPC) not yet obtained. Specifically tripping of 220kV TTPS-Meramundali-II and 220kV Meramundali-Bhanjanagar-I from one end only, needs to be explained.
- O/C operation of 220kV Ramchandrapur-Joda needs to be checked.
- Over-current settings of 132kV Barhi-Koderma D/c need to be checked.
- Tripping of 132kV Barhi-Biharshariff needs to be corroborated.

- Tripping of 220kv TTPS-TSTPP, TTPS-Rengali to be cross-checked for occurrence and relay indications.
- Relays at TTPS/Meramundali need to be checked/audited.
- W.r.t the fault at 17:01hrs, the fault persistence time of 560ms is a violation of CEA (Grid Standards) Regulations, 2010. As per Cl.3 e) regarding 'Standards for Operation and Maintenance of Transmission Lines', maximum fault clearance time for 220/132kV Transmission system is 160ms.

In 23rd PCC, NTPC has given the following clarification:

- Regarding tripping of 220kV TSTPP-TTPS line from TSTPP end, the circuit breaker was in closed condition but TTPS end breaker got opened without any relay indication.
- Testing of Protection relay of Auto Transformer 1 & 2 will be done on available opportunity.
- Line breaker of 220kV TTPS-Rengali line was tripped from Rengali end on O/C. TTPS end breaker was in closed condition.

OPTCL was advised to give their clarification in written communication.

OPTCL agreed.

In 24th PCC, NTPC informed that, protection relay of Auto Transformer 1 has been tested and found satisfactory. & Protection relay of Auto Transformer 2 will be tested on available opportunity.

PCC advised OPTCL to give their clarifications in written communication. OPTCL agreed.

OPTCL & NTPC may update.

Deliberation in the meeting

NTPC informed that testing of CBs have been done and found OK.

Regarding tripping of 220kV TTPS-Rengali line CB at Rengali end on O/C, PCC advised OPTCL to submit the details of tripping details along with O/C relay settings and MW flow.

OPTCL agreed.

ITEM NO. C.2: Bihar System

1. Total power failure at 132 kV Purnea (BSPHCL) on 03.09.14

At 12:20hrs, total power failure occurred at 132kV Purnea (BSPHCL) s/s due to R-Ø LA of 132kV Purnea (PG)-Purnea (BSPHCL)-II burst at Purnea (PG) end. Following lines tripped.

- 132kV Purnea (PG)-Purnea (BSPHCL)-I, II & III
- 132kV Purnea (BSPHCL) - Forbisgunj tripped on O/C

Analysis of events:

It appears that the sequence of events was initiated due to bursting of R-Ø of in132kV Purnea (PG)-Purnea (BSPHCL)-II line at PG end. 132kV Purnea (PG)-Purnea (BSPHCL)-I & II tripped from Purnea (PG) instantaneously. However breakers at BSPHCL end did not open properly due to which in132kV Purnea (PG)-Purnea (BSPHCL)-III tripped from BSPHCL end. With the above trippings, entire downstream load of Purnea (BSPHCL) started getting power through 132kV Purnea (BSPHCL) – Forbisgunj-Kishanganj- Purnea (PG) link and thus 132kV Purnea (BSPHCL) – Forbisgunj line tripped on O/C protection.

Remedial Measures/Suggestions:

- i) The reasons for relays at Purnea (BSPHCL) end failing to clear the fault need to be investigated
- ii) In the 20th PCC meeting Dtd.19/06/14, the following were agreed upon:

- Proper co-ordination & grading of over current relays for 33 kV feeders
- Co-ordination of over current relays timings of 132/33 kV ICTs with 33 kV feeders
- Checking of operating time of all CBs at Purnea & its downstream systems and rectifying/replacing the faulty CBs, if any. Also, protection audit was again recommended for Purnea S/s of BSPHCL.

In 24th PCC, ERLDC explained that PMU plot shows the fault was persisted for 600ms.

BSPTCL informed that Purnea (BSPTCL-Purnea (PG) line- II and III are tripped from their end. CT polarity of line III was in reverse direction hence the relay has been operated for the fault in line-II.

BSPTCL informed the CT polarity has been corrected.

PGCIL informed that all the three lines were tripped from their end on directional over current relays.

PCC felt there has been delay in CB operation on either side of the circuit-II.

Accordingly, PCC advised both BSPTCL and PGCIL to check the CB timing and report in next PCC meeting.

Moreover, PCC felt it is difficult to provide relay coordination for such short lines using over current protection and suggested to implement pilot wire protection as early as possible.

PGCIL informed that pilot wire protection will be implemented under GSS up gradation of 400kV/220kV/132kV Purnea S/s.

BSPTCL and Powergrid may update the status.

Deliberation in the meeting

BSPTCL and PGCIL informed that CB have been checked and found OK.

2. Tripping at 220 kV Biharshariff (BSPTCL) S/S at 12:26 hrs on 20/08/14.

At 12:26hrs, 220kV Tenughat-Biharsariff line tripped on earth fault from both the ends. At the same time all the three 400/220kV, 315MVA ICTs at Biharsariff (PG) tripped on back up O/C protection leading to total power failure at 220kV Biharsariff (BSEB) S/s. 220kV Biharsariff-Bodhgaya-D/C also tipped.

It appears that sequences of events were initiated due to Y-Ø earth fault occurred in 220kV Tenughat-Biharsariff line. However there was a delayed clearance of the said fault from Biharsariff (BSPHCL) end (PMU plot of Sasaram shows that the fault was getting cleared in 1400ms) due to which all the three 400/220kV, 315MVA ICTs tripped from Biharsariff(PG) end on backup O/C protection from HV side. 220kV Biharshariff-Bodhgaya-D/C (idle charged from Biharshariff) also tipped at the same time as reported by BSPHCL. As the Biharsariff (BSPHCL) had no other source to feed the downstream load, total power failure occurred at Biharsariff (BSPHCL) end.

Remedial Measures/Suggestions:

Delayed clearance of faults from Biharshariff (BSPHCL) end for 220kV Tenughat-Biharshariff line needs to be checked.

BSPTCL explained that the fault was detected in zone 1 of 220 kV Tenughat- Biharsharif line from Minutes of 25th PCC meeting

Biharsharif end but CB operation might have delayed the fault clearance. BSPTCL informed that they are facing DC supply problem, which may cause delayed CB operation. They reported that DC cable flashing was also observed behind the control panels and same was rectified.

PCC advised BSPTCL for thorough checking of DC supply system and submit the status report to ERLDC/ERPC Secretariat within ten (10) days. BSPTCL agreed.

In 23rd PCC, while enquiring about simultaneous 3x315 MVA ICT tripping at Biharsharif S/s, Powergrid informed that the DR plots indicated the fault was isolated by ICTs in 600 msec. However, ERLDC mentioned that PMU plots obtained from Sasaram S/s showed the total fault duration of 1.4sec.

It could not be concluded the reason behind such long duration of fault isolation. It was opined that DR plots at TVNL end may highlight additional information in this respect. Accordingly, PCC advised JSEB to collect the DR files on 20.08.2014 from TVNL and submit soon to ERLDC/ERPC. JSEB agreed.

In 24th PCC, BSPTCL informed that they have tested the DC supply output and reported that 5V negative voltage was observed. They are planning to shift the Panels to new control room which is at higher level from the ground.

On submitting the DR files from TVNL end, JSEB agreed to send within a week.

ERLDC may update.

Deliberation in the meeting

JSEB has submitted the DR files of TVNL end.

PCC decided to study the report and report the outcome in next PCC.

3. ERPC recommendations on repeated trippings at 132 kV Purnea (BSPTCL) S/S

In 21st PCC, in view of repeated uncoordinated tripping from 220 kV Purnea S/s (PGCIL) due to various line faults in BSPTCL downstream system, it was decided that ERPC team comprises of ERPC, ERLDC, Powergrid, WBSETCL, DVC and BSPTCL members will visit for Audit/testing of relays in neighboring substations in around 220 kV Purnea S/s to review the protection philosophy in 1st week of August, 2014.

Accordingly, ERPC team members visited the 132kV Purnea(PG), 132kV Purnea(BSPTCL) and 132kV Forbesganj S/s from 11-08-2014 to 13-08-2014.

In 22nd PCC, ERPC team presented the audit report of the 132 kV Purnea & adjoining sub-stations and highlighted the list of deficiencies in the protective system installed at there. The recommendation for remedial measures for those sub-stations is also presented.

After detailed deliberations PCC advised BSPTCL to comply all the recommendations at the earliest. BSPTCL agreed to comply the recommendations as pointed by the ERPC team within a month.

BSPTCL was also advised to carry out Tan-Delta ($\tan\delta$) and thermo vision tests for all CTs.

Further, PCC referred the issue to TCC for further guidance and advised the team to present the report in the 28th TCC/ERPC meeting scheduled on 12/13.09.2014.

In 28th TCC, Audit team has presented their observations and recommendations of 132kV Purnea and Forbesgunj (BSPTCL). During presentation three types of recommendations (short term, medium term and long term) were given.

TCC advised BSPTCL to implement the short term and medium term recommendations within 2/3 months time and to place the roadmap for implementation of all the recommendations to ERPC Secretariat at the earliest.

23rd PCC advised BSPTCL to submit the action plan at the earliest. BSPTCL agreed.

In 24th PCC, BSPTCL has submitted the action plan. PCC advised BSPTCL to give the details of last month trippings in around Purnea BSPTCL system along with details to assess the improvement after incorporating ERPC recommendations.

BSPTCL agreed.

BSPTCL may update.

Deliberation in the meeting

BSPTCL has submitted the details of tripping incidences happened in the last few month, which was circulated in the meeting.

PCC advised BSPTCL to submit the latest implementation status on ERPC recommendations on monthly basis.

BSPTCL agreed.

ITEM NO. C.3: Disturbance at FSTPP on 28th August 2014.

On 28th August, 2014 at around 11:13hrs, earth fault was suspected to have occurred in B-Ø of 400 kV FSTPP-Malda-II due to which all the running units of FSTPP along with all incoming/outgoing feeders tripped. Power supply to Bangladesh at HVDC Bheramara also got affected.

After detailed deliberation, PCC in its special meeting on 4th September, 2014 advised Powergrid and NTPC Farakka to give the action plan.

Accordingly, observations, NTPC & Powergrid have given the following action plan in 24th PCC meeting:

NTPC & Powergrid updated the status as follows:

1. Non-clearance of fault at FSTPP end for 400kV FSTPP-Malda-II. (Action : NTPC & Powergrid) --- Tie CB -3252 (BHEL make) has been tested and found in order but it was suspected the CB operation was sluggish. The existing CB will be replaced.
2. DR plots of 400kV FSTPP-Malda-II at FSTPP end (not GPS synchronized) (triggered at 11:06:28:291) depict that opening of 3-ph Tie breakers started at 11:06:28:332 and Main breakers at 11:06:28:333. However opening of the breakers are not confirmed in the DR channels and fault current through B-phase persists even after around 1000ms. It appears that FSTPP end breaker did not open. Powergrid may give a detailed report regarding testing carried out, problems detected and the rectification activities carried out for the main/tie breakers and the associated relays. (Action : Powergrid) --- The relays LZ and REL relays have been replaced with new Micom and Siprotec relays.
3. LBB for 400kV FSTPP-Malda-II connected to Bus-I did not operate. (Action : Powergrid)— Current elements were not functional the same have been replaced. Duplication of LBB scheme is also in progress.
4. Non-opening of Behrampore end breakers due to which Directional E/F was triggered at Jeerat end. (Action : Powergrid)--- Investigation is in progress.

5. The tripping of 315MVA ICT-III at Malda on backup O/C and that of 132kV Malda(PG)-Malda from Malda(WB) end. (Action : Powergrid)----
6. Occurrence of Over-voltage Stage-I subsequently. (Action : Powergrid)

NTPC and Powergrid may update the status.

Deliberation in the meeting

Powergrid ER-II representative was not available for discussion.

ITEM NO. C.4: Efficient Evacuation of Power from 2x210 MW Tenughat TPS, Lalpania—TVNL

Arrangement for evacuation of power from Tenughat TPC is through the following two transmission lines:

- 1) Tenughat TPS to Bihar Sharif(BSEB) S/S through 400 KV Single Circuit line.
- 2) Tenughat TPS to Patraru TPS through 400 KV Single Circuit line.

Both lines are operating at 220 kV due to non readiness of 400 K V S/S at terminating ends.

In 27th TCC, TVNL informed that, at TVNL end the up gradation to 400 kV level is in process. Accordingly, TCC also advised JSEB to deposit the requisite amount to Powergrid for up gradation/termination work entrusted to Powergrid for operation of the line at rated voltage. This will facilitate Tenughat-Biharshariff line to be operated at 400 kV and stability of the TVNL units.

In 21st PCC, TVNL informed that 2x250 MVA ICT is already available at TVNL and the erection work is in progress. TVNL reported that work will be completed by December, 2014 at TVNL end.

Powergrid informed that, up gradation related works at 400 kV Biharshariff S/s has now stalled due to some payment issues with JSEB. However, it is expected to complete the work by December, 2014, if in the mean time payment issues get settled at earliest.

In 28th TCC Powergrid informed that payment of around 4.58 cr. is pending from JSEB and the completion of the work would take 3 months from date of payment.

JSEB informed that the payment has been delayed due to some fund constraints and it would be released shortly in 2-3 instalments starting from November, 2014.

During deliberation ERLDC expressed that conversion of 220kV Tenughat-Biharshariff line to 400kV level may not bring the total stability of Tenughat Power Station. Status of construction for 400kV Tenughat-New Ranchi D/C line and 220kV Tenughat-Govindpur-Dumka line under Powergrid consultancy were enquired. It was informed that 400kV line is under scope of Powergrid under deposit work of Jharkhand strengthening scheme for which around 450 Cr. Jharkhand has to deposit. Representative from Jharkhand informed that 220kV line is not under scope of Powergrid consultancy. TCC however advised Jharkhand and CTU to deliberate on this in lower forum of ERPC.

In 23rd PCC, it was informed that JUVNL agreed to start installment payments to Powergrid from November, 2014 onwards.

TVNL, JSEB, Powergrid may update.

Deliberation in the meeting

JSEB informed that JUSNL has already given the requisition to Energy Department (GoJ), expected to divert the fund by 15th December, 2014 for conversion of 220kV Tenughat-Biharshariff line to 400kV level.

ITEM NO. C.5: Disturbance at 220 kV Patratu (JSEB) S/S at 13:10 hrs on 21/07/14.

At 13:09hrs, due to bursting of R-Ø LA of 150MVA Auto transformer-1 burst in switchyard of Patratu S/s, the following lines tripped:

- i. 220kV Patratu-Tenughat (tripped at Patratu end)
- ii. 220kV Ranchi-Hatia (New) (tripped at Ranchi end)
- iii. 132kV Hatia-Patratu-D/C(tripped at Patratu end)
- iv. 132kV Hatia-Chandil(tripped at Chandil end)
- v. 132kV Hatia- Sikidari(tripped at Hatia end)

Analysis:

It was telephonically reported that the sequence of events were initiated due to bursting of R-Ø HV side LA of 150MVA Auto transformer-1 in switchyard of Patratu S/s. However, the report received from JSEB does not corroborate the same. It appears that there was a delay in clearance of the said fault from Patratu end. As a result, 132kV Hatia-Patratu-D/C tripped from Patratu end on O/C & E/F protection. As per the report, 220kV PTPS-Hatia D/c did not trip from either ends. Due to nonopening of breakers of 220kV Patratu-Hatia-D/C from both the ends, all other lines from Hatia and Hatia (new) tripped. 220kV Ranchi-Hatia (new) tripped from Ranchi end only and cleared the fault.

Discrepancies observed and Remedial Measures/Suggestions:

- Delay in fault clearance at Patratu end needs to be investigated. Non-opening of breakers of 220kV PTPS-Hatia at either ends also needs to be checked.
- Protection system at Patratu, Hatia, and Tenughat needs to be audited/tested thoroughly.

In 22nd PCC, JUSNL representative informed that the tripping details at Patratu end are available with newly constituted Jharkhand Urja Utpadan Nigam Ltd (JUUNL). Further, he informed that testing of protective relays by M/s Areva is in progress at all Substations in around 220 kV Chandil S/s. The relay settings wherever it is necessary would be changed.

PCC advised JUSNL to submit the detailed report after collection of tripping information from Patratu TPS and Hatia S/s at the earliest.

In 23rd PCC, SLDC, Jharkhand informed that they have already communicated the issue to JUSNL but reply was not yet received from them.

PCC advised to give a copy of correspondence to ERPC Secretariat for further necessary action.

In 24th PCC, SLDC, Jharkhand informed that they have not received any reply from JUUNL.

JSEB may update.

Deliberation in the meeting

JSEB informed that report has been received from JUUNL, disturbance was initiated due to LA burst at 220/132kV ICT of Patratu S/s. 132kV side was isolated by transformer protection however 220kV side failed to isolate the fault. As a result, the fault was cleared from remote ends (220kV Tenughat and Ranchi).

JSEB informed that breakers have been tested and found OK.

ITEM NO. C.6: Members may update the following:

1. In 24th PCC, WBSETCL informed that 220 kV two main bus system will be made operational at Bidhannagar S/s by Feb, 2015.

WBSETCL may update the present status.

Deliberation in the meeting

WBSETCL informed that the scheme would be implemented in schedule.

2. In 19th PCC after deliberation on Trippings of 220 kV lines from Hatia S/s on 24.03.14 & Disturbance in Adityapur area of JSEB on 17/03/14, JSEB was advised to thoroughly check the relay settings and coordination of relays at 132kV and 220kV S/s for satisfactory performance and report the findings to ERPC Secretariat within 15 days.

In 22nd PCC, JSEB informed that replacement of electromechanical relays of 33 kV lines is in progress and it will be completed by August, 2014.

In 23rd PCC, JUSNL stated that the replacement of relays is nearly completed, which is under the scope of JBVNL and status will be submitted in the next meeting.

In 24th PCC, JSEB informed that replacement of electromechanical relays of 33 kV lines is in progress and it will be completed by November, 2014.

JSEB may update.

Deliberation in the meeting

At 132kV Hatia S/s, all relays of 220kV and 132kV have been tested and reviewed by M/S Areva in the month of July, 2014.

Replacement of old EM relays with Micom P442 in 132kV Hatia-I to Chandil line is in progress by M/s Areva and it would complete by 15th December, 2014.

At 132/33kV Adityapur GSS, all 132kV line relays are retrofitted with Micom P441 relays and commissioned by M/s Areva on 31st March, 2014.

JSEB informed that work has been awarded to M/S Areva for supply, retrofitting, testing and commissioning of Micom relays in 33kV feeders. The work will be completed by 15th December, 2014.

3. In 23rd PCC, JSEB informed that the relays at 220kV Chandil S/s have been tested and agreed to give the report to ERPC Secretariat.

JSEB may update the status.

Deliberation in the meeting

JSEB informed that they will submit the report in next PCC meeting.

4. In 24th PCC during deliberation on tripping of all lines at 220 kV Chandil S/s (JSEB) on 21.09.14, JUSNL informed that all the lines from 220kV Chandil were tripped on LBB operation. LBB operated instantaneously due to malfunction of LBB timer and tripped all the lines. The issue has been taken up with OEM and the same will be rectified by 30th October, 2014.

JSEB may please update.

Deliberation in the meeting

JSEB informed that the problem has been rectified and LBB is working satisfactorily.

5. In 24th PCC, OPTCL informed that

- They are replacing the old O/C EM relays with numerical relays at 220kV Meramundali S/s.
- Some relays at 220 kV Theruvali S/s were already replaced and rest will also be replaced by December, 2014.
- The new 220 kV bus bar protection at Meramundali, Theruvali and Budhipadar S/s will be put in service by December, 2014.
- During deliberation on tripping of all lines at 400/220 kV Mendhasal S/s on 10.09.14, 24th PCC advised OPTCL to carry out testing of all the relays at Mendhasal S/s and also to review the resistive reach settings.
- During deliberation on disturbance at 400/220 kV Meramundali S/S on 13.09.14, OPTCL informed that 400kV Meramundali-Mendhasal line was on tie-breaker and the main breaker is under replacement.

OPTCL may please update.

Deliberation in the meeting

OPTCL informed that

- *The old O/C EM relays have been replaced with numerical relays at 220kV Meramundali S/s.*
- *Some relays at 220 kV Theruvali S/s were already replaced and rest will also be replaced by December, 2014.*
- *The new 220 kV bus bar protection at Meramundali, Theruvali, Budhipadar and Jeynagar S/s will be put in service by December, 2014.*
- *During deliberation on tripping of all lines at 400/220 kV Mendhasal S/s on 10.09.14, 24th PCC advised OPTCL to carry out testing of all the relays at Mendhasal S/s and also to review the resistive reach settings.---In progress and will be completed by Mar, 2015.*
- *During deliberation on disturbance at 400/220 kV Meramundali S/S on 13.09.14, OPTCL informed that 400kV Meramundali-Mendhasal line was on tie-breaker and the main breaker is under replacement.---which will be completed by 30th November, 2014.*

ITEM NO. C.7: PROTECTION PHILOSOPHY OF EASTERN REGION

In the Special meetings on “Protection Co-ordination of JSEB System and its neighbouring utilities” held on 12.11.13, 05.12.13 & 28.01.14 the protection philosophy for Eastern Region was agreed as given below:

Sl. No.	Zone	Direction	Protected Line Reach Settings	Time Settings
1	Zone-1	Forward	80%	Instantaneous
2	Zone-2	Forward	120%	300 milliseconds
	Zone-2 (for 220kV and below)	Forward	120 % of the protected line or 100% of the protected line + 50% of the adjacent shortest line (whichever is less)	300 milliseconds
3	Zone-3	Forward	100 % of the protected line + Za	1.0 Sec
4	Zone-4	Reverse	20%	1.2 Sec

Where, Za = Impedance of 100% of the adjacent longest line or 90 % of the Transformer impedance (whichever is less).

In 19th PCC, all the constituents were requested to adopt the same philosophy for their inter as well as intra state lines for better protection co-ordination of their systems and Eastern Regional system as a whole. Implementation of this philosophy may also be extended for BSPTCL, DVC and West Bengal systems.

A special meeting was convened to review the zone settings of BSPTCL, DVC and West Bengal systems on 06.08.14. The zone settings as updated by the constituents (till date) are circulated in the meeting. Concerned members are requested to confirm the given settings and also update the bold and blank fields.

The updated zone settings of the various lines are available at ERPC website.

PCC advised all constituents to update the settings at their end. Thereafter, a separate meeting will be convened to discuss the implementation of zone settings recommended by the Special Task Force.

Members may update.

Deliberation in the meeting

PCC requested all constituents to update the settings. Constituents agreed.

ITEM NO. C.8: Availability of single phase auto-reclosure facility for 220KV and above lines

Single phase Auto-reclosure scheme helps to ensure Grid security by preventing unwarranted tripping of lines on short duration transient faults. However, operation of Auto-reclosure has not been in order in several cases.

In 21st PCC, PCC reiterated that as per CEA(Technical Standards for construction of Electric Plants and Electric Lines) Regulations 2010, single reclose auto-reclosure facility is to be kept in service for all lines 220kV and above.

Accordingly, PCC advised all constituents to forward the list of transmission lines for which single-phase auto-reclosure is not in service, stating the reason for the same to ERLDC with a copy to ERPC Secretariat.

PCC also advised to inform the failure of successful auto-reclosure operation to ERLDC stating the detailed relay indications along with DR/EL outputs.

23rd PCC advised all the constituents to send the requisite information to ERLDC before 7th October, 2014.

Constituents agreed.

ERLDC may update the status.

Deliberation in the meeting

JSEB informed that Auto reclosure is not in service in their Substations due to problem in PLCC system. The same will be enabled as soon as PLCC system is established.

PCC requested all other constituents to send the requisite information to ERLDC.

Constituents agreed.

ITEM NO. C.9: ANY OTHER ITEM.

1. Oscillations in and around Talcher STPS, NTPC

ERLDC informed that recently oscillations observed in and around Talcher STPS with a frequency of 0.2 Hz. Since the control systems of generator AVR, Governor, HVDC converter etc. have the potential to trigger the oscillations it was requested to submit the following:

- Whether any functional abnormality was observed or set point re-tuning done for the AVR/PSS or governor control loop of Talcher or GMR units.*
- Whether any abnormal performance was observed or control loop re-tuning done for HVDC system at Talcher.*

PCC advised concern constituents to submit the information immediately.

Constituents agreed.

Meeting ended with vote of thanks to the chair.

Participants in 25th PCC Meeting

Venue: ERPC Conference Room

Time: 11:00 hrs

Date: 24.11.14 (Monday)

Sl No	Name	Designation	Organization	Contact Number	Email	Signature
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20	Sanjeeb Bag	Engineer (E)	NHPC	9300038555	sanjeeb.bag@nhpc.co.in	Sanjeeb Bag

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

Participants in 25th PCC Meeting

Venue: ERPC Conference Room

Time: 11:00 hrs

Date: 24.11.14 (Monday)

Sl No	Name	Designation	Organization	Contact Number	Email	Signature
21	Niraj Kumar Singh	Dy. Manager	NHPC	9800213924	rksmi195@gmail.com	
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26	S.P. Panda	DGM(SI)	OHPC	9437055097	sgmel_vahp@ohpc.com	
27	M.R. Mahapatra	Sr. AM(B)	SLDC, OPTCL	9435917310	mrmahapatra11@gmail.com	
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29	Rambabu Singh	EEE	BSPTCL	7763817723	eeecritl@gmail.com	
30	A. Binwas	C.E.(SLDC)	WBSETCL	9434910030	amitava.binwas22@gmail.com	
31	P. Ray	A.C.E	NRSETCL	9434908943	prabhu.60@gmail.com	
32	A. Samadder	ACE(SLDC)	WBSETCL	9434910030	aprabha.samadder53@gmail.com	
33	Vidya Sagar Singh	ESE/CRITL	JUSNL	9934169984	sagarjsab@gmail.com	
34	S.S. Mishra	ESE/SLDC	JUSNL	9771904825	mishra.jusnl@gmail.com	
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36	D. R. Bauri	EE	ERPC	9882617236	eeep.erp@gmail.com	
37	B. SARKHEL	FE(BI)	ERPC	9433065724		
38	JOYDEB BANDYOPADHYAY	SC(C)	"			
39	V. Kalyan	EE	ERPC	2423215		
40	S. KESRIWAL	SE	"			


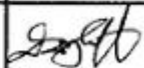
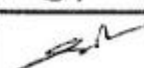
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Sl No	Name	Designation	Organization	Contact Number	Email	Signature
41	RAHUL SHUKLA	Engineer (SO)	NLDC-POSOCO (POWERGRID)	9650555388	rahulshukla-nlde@gmail.com	Rahul Shukla
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44	BHASWATI NATH	Sy. Mgr	WBPDCL	8336903703	b.nath@wbpdcl.co.in	Bhaskar
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Annexure-I

Trippings-Oct-2014							
S.NO	LINE NAME	TRIP DATE	TRIP TIME	LOCAL END	REMOTE END	DISCREPENCY	Deliberation in meeting
1	400 KV GAYA-MAITHON-2	01/10/2014	14:53	B-N FAULT	NOT AVAILABLE	FAULT CLEARANCE TIME IS 420 MS, AR STATUS UNAVAILABLE	
2	400KV TSTPP-ROURKELA-I	06/10/2014	14:56	DT RECIVED	DID NOT TRIP	TRIPPED FROM TSTPP END ONLY.DURING SUCCESFUL A/R OPERATION OF 400KV TSTPP-RENGALI-I AND II ,INTITIATION OF TRIP COMMAND FOR MAIN AND TIE CB AT TALCHER END LEADS TO TRIPPING OF 400KV TSTPP-ROURKELA-I	<i>The fault was in Talcher-Rengali -II, close to Talcher. Because of close in fault line-1 also tripped from Talcher.</i>
3	400 KV JEYPORE-BOALNGIR	06/10/2014	15:02	Y-N FAULT,Z2,242.45KM	NOT AVAILABLE	REMOTE END DATAAND AR STATUS NOT FURNISHED	<i>ERLDC informed that, no DR report recieved from Bolangir</i>
4	400 KV GAYA- KODARMA-II	07/10/2014	12:52	R-N FAULT	NOT AVAILABLE	FAULT CLEARANCE TIME IS 520 MS,AR STATUS UNAVAILABLE	<i>Tripping was in order.</i>
5	400 KV JEYPORE-BOALNGIR	07/10/2014	15:02	Y-N FAULT	NOT AVAILABLE	REMOTE END DATA AND AR STATUS NOT FURNISHED	<i>ERLDC informed that, no DR report recieved from Bolangir</i>
6	400 KV JEYPORE-BOLANGIR	11/10/2014	13:37	R PH TO GROUND FAULT AT LOC 222.8 KM FROM JEYPORE	NOT AVAILABLE	REMOTE END DATA AND AR STATUS NOT FURNISHED	<i>ERLDC informed that, no DR report recieved from Bolangir</i>
7	400 KV ANGUL - MERAMANDLI - I	13/10/2014	02:06	DT RECIVED	NOT AVAILABLE	REMOTE END DATA AND AR STATUS NOT FURNISHED	<i>Tripped on O/V, PCC advised OPTCL to send the DR report</i>
8	400 KV JEYPORE - INDRAVATI	13/10/2014	02:06	O/V	NOT AVAILABLE	O/V VALUE AND REMOTE END DATA IS NOT FURNISHED	
9	400 KV JEYPORE - BOLANGIR	13/10/2014	02:06	O/V	NOT AVAILABLE	O/V VALUE AND REMOTE END DATA IS NOT FURNISHED	<i>ERLDC informed that, no DR report recieved from Bolangir</i>
10	400 KV ANGUL-MERAMUNDALI-I	13/10/2014	11:09	DT RECIVED	NOT AVAILABLE	REMOTE END DATA AND AR STATUS NOT FURNISHED	<i>Tripped on O/V, PCC advised OPTCL to send the DR report</i>
11	400 KV MERAMUNDALI-GMR	14/10/2014	20:56	DID NOT TRIP	TRIPPED DURING BURSTING OF 220 KV Y PHASE BUS-I PT	TRIPPED AT GMR END ONLY	
12	400 KV ARAMBAG - BIDHANNAGAR	22/10/2014	06:19	NOT AVAILABLE	PLCC PROBLEM AT BIDHANNAGAR	LOCAL END DATA AND AR STATUS NOT FURNISHED.RECTIFICATION STATUS ALSO UNAVAILABLE	<i>PLCC problem at BIDHANNAGAR and it has been rectified.</i>
13	400 KV KAHALGAON-BANKA-2	22/10/2014	08:09	NOT AVAILABLE	B-N FAULT	LOCAL END DATA AND AR STATUS NOT FURNISHED	<i>Transient fault</i>
14	400 KV MAITHON-GAYA	23/10/2014	14:56	NOT AVAILABLE	B-N FAULT	LOCAL END DATA AND AR STATUS NOT FURNISHED	<i>High resistive fault similar incident as in SI no. 1.</i>
15	400 KV FARAKKA - MALDA-I	23/10/2014	23:57	R-PHASE LINE CVT AT FARAKKA END FOUND DEFECTIVE,REPLACEMENT UNDER PROGRESS.	NOT AVAILABLE	REMOTE END DATA AND AR STATUS NOT FURNISHED	<i>Y-phase CVT was defective which has been replaced on 24th October, 14</i>

16	400 KV ROURKELA-STERLITE	24/10/2014	16:13	NOT AVAILABLE	Y-N FAULT,FD-14 KM FROM SEL,FC-8.86 KA,LINE IS BEING PATROLLED.	LOCAL END DATA AND AR STATUS NOT FURNISHED	
17	400 KV TEESTA-RANGPO-I	29/10/2014	12:13	TRIPPED	DID NOT TRIP	TRIPPED AT TEEST END ONLY	<i>Recieved DT from Rangpo due PLCC problem. It has been rectified by PGCIL.</i>
IMPORTANT 220 KV LINES							
1	220 KV BUDIPADAR-RAIGARH-1	30/10/2014	13:47	DC FAILED IN BREAKER @BUDIPADAR	NOT AVAILABLE	RECTIFICATION STATUS ALSO UNAVAILABLE	<i>Tripped on O/C</i>
2	220 KV BUDHIPADAR-RAIGARH	31/10/2014	12:36	Tripped on O/C BUDHIPADAR	NOT AVAILABLE	REMOTE END DATA AND AR STATUS NOT FURNISHED.RECTIFICATION STATUS ALSO UNAVAILABLE	<i>Tripped on O/C</i>
3	220 KV CHUKHA-BIRPARA-I	20/10/2014	12:26	NOT AVAILABLE	R-N FAULT	LOCAL END DATA NOT AVAILABLE	