

EASTERN REGIONAL POWER COMMITTEE
14, GOLF CLUB ROAD, TOLLYGUNGE
KOLKATA-700033

**MINUTES OF THE 15th PROTECTION SUB-COMMITTEE MEETING HELD AT ERPC,
KOLKATA ON 09.04.2013 (TUESDAY) AT 11:00 HOURS**

List of participants are enclosed at Annexure-I.

All other related Annexure are included in Agenda (Refer - 15th Protection Agenda)

Member Secretary I/C welcomed the participants. He mentioned that there were a number of un-coordinated tripping incidences occurred in Orissa & JSEB systems since December, 2012, causing total power supply failure particularly at Meramundali, Mendhasal & Chandil sub-stations. Yesterday (08.04.2013), there was also a disturbance related with Jeerat & Subhasgram sub-station in West Bengal system which drew considerable attention to the highest authority. For such level of disturbance in ER system he requested all the constituents to keep him informed immediately for necessary restoration / coordination.

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

PART - A

ITEM NO.:1 CONFIRMATION OF THE MINUTES OF THE 14th PROTECTION SUB-COMMITTEE MEETING OF ERPC HELD AT ERPC, KOLKATA ON 21.11.2012

The minutes of the above meetings were circulated vide letter no. ERPC/SE (PS)/ PROTECTION/ 2012/ dated 27.11.2012.

No comments have been received from any constituent.

The minutes of the meeting may be confirmed.

The minutes of the 14th Protection sub-committee was confirmed without any modification.

PART - B NEW ITEMS

ITEM NO.1 DISTURBANCE IN CESC SYSTEMS :

- i) On 02/04/13 at 12:31 Hrs
- ii) On 03/04/13 at 12:38 Hrs

The report received from ERLDC is enclosed at Annexure-I.

CEsc may please deliberate on the above incidences.

Deliberation in the meeting

It was reported that CESC system got isolated from West Bengal (ER system) both on 2nd and 3rd April 2013 respectively at 132 kV Kasba point.

The system split took place on sensing faults in West Bengal system with directional Earth fault relay operated, which in turn opened the bus sectionaliser at 220/132 kV EM bypass S/s as per the scheme. As the detailed reports on both the occasion were under preparation, CESC representative informed that the same would be furnished shortly.

CESC was requested to present the detailed report in the forthcoming (84th) OCC meeting to be held on 16.04.2013

ITEM NO. 2 IMPLEMENTED SPS OF CESC SYSTEM

The different SPSs presently implemented in CESC system, may please be elaborated by CESC representative, as requested in the last special protection committee meeting.

CESC may please elaborate.

Deliberation in the meeting

It was opined by the members that the existing system split scheme of CESC under various exigencies is of general interest and Protection engineers would be benefited to understand various SPS implemented in CESC. On the request from members, CESC representative informed that 4 nos. SPSs were implemented in their system, namely UFLS scheme, Budge Budge Generating Station (BBGS) lockout scheme, Titagarh generating station lockout scheme and LBB scheme.

Finally, it was agreed that CESC would give a presentation in the 84th OCC detailing the above four mechanism of splitting of CESC system from West Bengal in case of disturbance/emergency.

ITEM NO. 3 FREQUENT POWER SUPPLY FAILURE AT CHANDIL SUB-STATION OF JSEB

There had been frequent power supply failure reported at 220kV Chandil sub-station of JSEB resulting in interruption of power supply at Ranchi city, traction loads of S.E.Railway, etc. GM, ERLDC vide its communication dated 12.03.2013 highlighted the uncoordinated tripping at Chandil sub-station in recent times (refer Annexure-II) to their highest authority and the matter was deliberated previously in various ERPC fora also. The detailed tripping reports are also sometimes not available from JSEB for analysis. In the 83rd OCC meeting the point was also discussed and on the request of JSEB, it was proposed to examine / testing the protection coordination of 220kV ties as well as ICTs by a team of officers from Powergrid, ERLDC & ERPC.

JSEB may please intimate the remedial actions taken.

Suggest nomination of team members to examine the Protection Coordination at Chandil 220kV sub-station.

Deliberation in the meeting

While discussing the total power failure at Chandil S/s on 12.03.13 JSEB representative stated that tree cutting and falling down in 220 kV Chandil-Ranchi line led to tripping of all the 220 kV lines from Chandil S/s

including ATRs on O/C & E/F. The frequent uncoordinated trippings of lines from Chandil S/s was repeatedly discussed in various ERPC fora since long and action from JSEB did not yield any result. On enquiry, JSEB representative stated that the auxiliary supply (DC battery etc...) is available to relay and numerical relays for 220 kV lines are also installed at Chandil, but only proper relay co-ordination is required. The Bus bar Differential relay installation work is also awarded.

After detailed deliberation and considering the 83rd OCC decision, it was decided that a team comprising members from ERPC, PowerGrid & DVC of Jamshedpur S/S would visit Chandil and Ramchandrapur substations of JSEB on 16,17,18th April 2013 to assess the present status of healthiness of the various protection schemes towards requirement for further coordination at there. On receipt of the report the higher authority would be informed accordingly.

ITEM NO.4

Analysis & discussion on various grid incidences which occurred in CTU / STU systems during the period between February & March,2013 (particularly for frequent power supply failure / trippings at Chandil 220kV S/stn. of JSEB and Meramundali & Mendhasal 400kV S/stn. of OPTCL during the period)

- Reports for discussion to be submitted by ERLDC / CTU / STU

Deliberation in the meeting

- a) The disturbances in Orissa system involving Meramundali and Mendasal 400 kV S/s, it was informed that there was circuit breaker problems due to reportedly low pressure and many a tie CBs are yet to commission (out of seven no. Dia, only 4 nos. Dia is in place) at Meramundali S/s. Further, there was high voltage problem (operating mostly above 426 kV) for which bus reactor would be installed within two months time. Installation of CB for Dia no. 405 (Areva make) is in progress and other CBs installation would be completed soon. Regarding Budhipadar S/s tripping on Y-jumper snapped on 10.12.2012, the Distance relay did not operate due to DC supply failure, but earth fault tripped and Zone-II tripping reported from remote (IB TPS) end.
- b) NTPC reported that due to CT failure the bus bar protection at Barh s/s operated and all the lines connected to Bus-I at Barh TPS tripped. The other end of Barh-Patna III also tripped on Distance protection.

The detailed discussion of the tripping incidence are depicted in Annexure-II

PART - C

FOLLOW UP OF DECISIONS OF THE PREVIOUS PROTECTION SUB-COMMITTEE MEETINGS

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

ITEM NO.1

Zone-3 settings of Distance Protection Relays of Transmission Lines - Views / Comments on Existing practices / Philosophy for CTU & STU systems

Till now, the Zone-3 settings provided by utilities have only considered the Zone reach based on measured impedance. However, to avoid the tripping on load encroachment Zone-3 shall have to be set so as not to pick up upto the

line loadability limit. It is to mention that subsequent to tripping of 400 kV Bina-Gwalior line in WR on load encroachment (operation of Zone-3 Distance protection) which led to the grid collapse on 31-07-12, the high level Enquiry Committee constituted by MoP, GOI to investigate the underlying factors and suggest preventive measures, inter-alia recommended under 9.1.2

“ Till protection audit is taken up, there is need to take immediate review of zone-3 philosophy in particular. Techniques are available to modify characteristics of the relay so that it can distinguish between load encroachment and faults. These techniques and other alternatives should be explored immediately.”

Action: RPCs, CTU, STUs
Time Frame: Immediate

In compliance to the above recommendation, the respective Zone-3 settings for 400 kV line data have been collected by ERPC from CTUs as well as STUs of ER for analysis and comparison (Refer Annexure-IV (A)). The objective is to review the settings philosophy adopted in various ISGS, CTU, STUs in conjunction with line loadability to arrive at uniform approach for ER.

It is now observed from the collected data that for Zone-3 Distance protection, the reach (impedance) setting, operating time as well as power swing settings varies widely from utility to utility.

Zone-3 Reach:- As per classical protection philosophy, transmission lines are usually protected by step distance protection using the mho or quadrilateral relay characteristic with three zones of protection. Each zone of protection is based on a percentage of the line impedance, which varies depending on the philosophy and criteria of each utility. Zone 1 is usually 80%, Zone 2 is 120% and Zone 3 is 150% or above of the protected line impedance.

To take care of maloperation of Zone 3 protection during over load condition, line loadability should be < load corresponding to Zone 3 reach.

Time of operation in Z-3:- It is observed from data collected that time of operation in Zone 3 is set to 1500ms by CTU and NHPC, 1000ms by NTPC & OPTCL, while some STUs (WBSETCL, WBPDCCL etc.) set it to even smaller values.

Power Swing blocking / tripping:- In case of CTU lines, Power Swing if detected in Zone 1, is supposed to trip the line while the tripping is blocked for 2 seconds if detected in other Zones.

In reference to ERPC letter dated 16.01.2013, NTPC viewed that it adopted selection of Zone-3 setting to provide backup to longest line emanating from remote station. However, Zone-3 reach is restricted so as not to reach the next voltage level. Typical Zone-3 time delay is 1 Sec. In addition to this, the following protections are also enabled:

- i) Directional E/F (PU 300 A, time delay 1.5 Sec.)
- ii) Back up O/C (PU 3000A, time delay 1.8 Sec.), which gets enabled during VT fuse failure

In this connection, the following references have also been drawn:

- i) In a meeting taken by Member (PS), CEA with CTU and POSOCO on 26th September 2012 regarding transmission line loadability, loading limits of transmission lines on all India basis were finalized and circulated vide letter dated 3rd October 2012. This part corresponding to Eastern Region is enclosed in Annexure- IV (B) .
- ii) Guidelines given in CEA's Manual on Transmission Planning Criteria for consideration:

20.1 Zone - 3 settings in manual on Transmission Planning Criteria- January, 2013

“In some transmission lines, the Zone-3 relay setting may be such that it may trip under extreme loading condition. The transmission utilities should identify such relay settings and reset it at a value so that they do not trip at extreme loading of the line. For this purpose, the extreme loading may be taken as 120% of thermal current loading limit and assuming 0.9 per unit voltage (i.e. 360 kV for 400kV system, 689 kV for 765kV system). In case it is not practical to set the Zone-3 in the relay to take care of above, the transmission licensee/owner shall inform CEA, CTU/STU and RLDC/SLDC along with setting (primary impedance) value of the relay. Mitigating measures shall be taken at the earliest and till such time the permissible line loading for such lines would be the limit as calculated from relay impedance assuming 0.95 pu voltage, provided it is permitted by stability and voltage limit considerations as assessed through appropriate system studies”

- iii) In Northern Region, a decision on harmonizing protection settings across the region was taken in the 7th PCC meeting of NRPC held on 19-09-08. Extracts from the same is enclosed herewith.

In view of the above, it is proposed that

- i) “Uniform approach” may be adopted for setting the Zone-3 protection of 400 kV lines and ensuring that the Zone-3 reach (both ends) shall not exceed the line loadability as calculated by NLDC while at the same time, following the philosophy considered by NRPC (Annexure-IV (C)),
- ii) if the above criteria is not satisfied for any line, then its Zone-3 setting may be revised.

Members may please deliberate to arrive at a consensus for adopting uniform philosophy of Zone-3 setting protections of all important 400kV lines of the region, ensuring in particular that the allowable loading of the line is well below the load corresponding to operation of distance protection Zone-3 operation.

Deliberation in the meeting

On comparison of Zone-3 settings of various utilities and in view of the diversity of the principles followed by utilities including ISGS, members

generally felt that uniform approach for setting Zone-3 distance protection relays is very much needed. ERPC informed that the meeting taken by Member(PS) CEA on 26.09.2012 indicated Zone-3 settings need to be reviewed by Powergrid in coordination with STU,s Generators & POSOCO so as to avoid load encroachment.

Accordingly, it was decided that the Zone-3 setting philosophy followed by POWERGRID for their transmission lines in Eastern Region would be circulated among all other utilities, who in turn should furnish their respective comments / views within a month for deliberation in the next PCC meeting or any Special meeting to be held in the 1st week of May,2013. Members further felt that the resistive reach setting in Zone-3 needs special attention as the same decides the maximum allowable line loading, beyond which the relay characteristic may be encroached.

ITEM NO. 2 PROCUREMENT AND INSTALLATION OF NUMERICAL RELAYS BY JSEB FOR IMPORTANT SUBSTATIONS

- The need to install numerical relays, in place of the existing one was felt for various S/stns., which JSEB agreed to expedite its procurement and its installation during 20th TCC meeting.
- ERPC vide its letter dated 06.03.2012 impressed upon Member (Tr.) of JSEB for early procurement and installation of numerical relays at the above sub-stations as per the decision of 20th TCC meeting. The information is awaited.
- Inspite of reported persuasion, no tangible result forthcoming and a number tripping incidences took place during this period.

JSEB may intimate the present status.

Deliberation in meeting

JSEB representative stated that the numerical relays have already been procured and will be installed by 30th April 2013.

ITEM NO. 3 COMMISSIONING OF BUS BAR PROTECTION AT RAMCHANDRAPUR AND CHANDIL 220 KV SUB-STATION OF JSEB

- JSEB agreed to expedite the installation of bus bar protection at both the above sub-stations in the 20th TCC meeting.

JSEB may please intimate the present status.

Deliberation in meeting

JSEB representative stated that the work order for Bus Bar Protection at Ramchandrapur and Chandil 220kV Sub-Station was awarded and will be commissioned by May 2013.

- ITEM NO. 4 FREQUENT TRIPPING OF TENUGHAT-BIHARSHRIFF AND TENUGHAT -PATRATU 220 KV TRANSMISSION LINES**
- The feedback for remedial measures has been received from TVNL on 21.03.2013. It informed that Micom-P442, Areva numerical relay installed for TTPS-BSF line on 19.07.12 and further testing carried out on 24.01.13. However, Bus bar differential protection, Auto reclose and Sequence Event Logger/ recoder are yet to commission for which offer is invited from M/s. Alsthom.
- TVNL may please intimate present status.
- Deliberation in meeting**
- Representative from JSEB informed that they are in the process of commissioning numerical relays for these lines.
- ITEM NO. 5 STATUS OF PLCC EQUIPMENT OWNERSHIP AND HEALTHINESS OF DR AND EL**
- Most of the utilities submitted the status of PLCC ownership as per decision of 23rd ERPC meeting. Thereafter, a meeting was held on 11.02.13 at ERPC Secretariat to assess the present ownership and maintenance status of PLCC equipment and DRs and ELs status for 400 kV level (refer Annexure- V) and inform to ERPC Secretariat with their comments by end of February, 2013.
- Members may please deliberate on the issues related to their O & M, replacement rectification for smooth functioning of the equipment.
- Deliberation in meeting**
- The issue is being monitored in monthly OCC meeting.
- ITEM NO.6 FAILURE OF PLCC (BPL MAKE) FOR 400KV SAGARDIGHI TPS-SUBHASGRAM S/C LINE - WBPDC** AGENDA
- BPL make PLCC of SgTPS-Subhasgram S/C line remained out of service since long time
 - Earlier WBPDC informed that they were in the process of finalizing contract for award of PLCC for Sagardighi
- WBPDC & POWERGRID may intimate present status.
- Deliberation in meeting**
- The issue is being monitored in monthly OCC meeting.
- ITEM NO. 7 INTERMITTENT FAILURE OF MAIN-I-CARRIER PROTECTION CHANNEL IN RESPECT OF 400KV FARAKKA-JEERAT CIRCUIT AT JEERAT END**
- The protection channel of Main-II of 400 kV Farakka-Jeerat line is under outage since 01.09.2010.

- POWERGRID earlier informed that *LOA for material was placed and work would be completed within 2 months.*

POWERGRID may please intimate the present status.

Deliberation in meeting

PowerGrid representative informed that the Panel for Main-II Carrier has been already replaced at Jeerat, by March, 2013 end.

ITEM NO.8

REPLACEMENT OF PLCC SYSTEM OF 400 kV TSTPS (NTPC) -ROURKELA AND TSTPS (NTPC) - RENGALI D/C

- PLCC system and protection coupler (BPL-make) of the aforesaid lines has become obsolete and non-availability of spare support has made difficult to maintain the healthiness of the PLCC system. The replacement of the PLCC system at the remote ends (Rourkela & Rengali S/S of POWERGRID) is also involved for matching PLCC
- The replacement of PLCC was taken up by Powergrid and work order was to place to M/s. ABB in August, 2012. The delivery schedule of equipment is about 4 to 5 months. The new PLCC is expected to be in place by 31st March, 2013.

POWERGRID & NTPC may please intimate the present status.

Deliberation in meeting

Apprising present status of above work, PowerGrid representative informed that material has already reached at Rourkela and Rengali ends and it will be commissioned soon.

ITEM NO. 9 IMPLEMENTATION OF ISLANDING SCHEME FOR THERMAL POWER PLANTS

- In the last special protection committee meeting DVC representative had informed that they are in the process of finalizing an islanding scheme of CTPS units (at 132kV) with local load. The final scheme was presented in the 23rd ERPC meeting and the technical feasibility of the scheme was approved. DVC was requested to place the road map in OCC.

DVC may please inform the present status.

- In the special protection committee meeting held on 11.10.12, WBSETCL/WBSEDCL and WBPDCCL representatives had agreed to finalise. The islanding scheme of Bakreswar TPS of WBPDCCL with Gokarna loads of WBSETCL was approved in the 23rd ERPC meeting. The expected implementation would be by October, 2013.

WBPDCCL may please intimate the present status of implementation.

- Islanding of Farakka STPS unit with Lalmatia load

As reported by NTPC, the scheme for islanding Farakka unit with Lalmatia load has already been sent to NTPC's corporate office, for their approval.

Pending receipt of views of their HO, NTPC representative is requested to please elaborate their islanding scheme with necessary logic diagram.

Members may please discuss.

- DPL is requested to highlight the islanding schemes with local loads for further deliberation.

Deliberation in meeting

Farakka STPS: NTPC stated that they need matching load at Lalmatia and nearby areas of Jharkhand state as well as Kahalgaon, Sabour etc. area of Bihar state on a firm basis. Member Secretary I/C, ERPC advised Bihar and Jharkhand representatives to arrange the requisite loads (both Peak /Off Peak & Summer/Winter) to NTPC on urgent basis.

DPL : DPL representative stated that they are planning to island only Unit # 7 (300 MW) with their local loads around 280-300MW.

In order to review the various new islanding schemes proposed for TATA Power at Haldia, DPL with local loads, one 200MW Unit of FSTPS, NTPC with Lalmatia loads and DVC system islanding as a whole, it was decided that a separate meeting on islanding will be held on 22nd April 2013 to discuss the feasibility of their status/objective of islanding.

ITEM NO. 10 ISLANDING SCHEME OF CPPS

- i) In the 23rd ERPC meeting, WBSETCL was requested to interact with M/s Tata Power for devising an islanding scheme with Haldia loads of WBSETCL.

TATA Power & WBSETCL may highlight the final plan of islanding scheme.

- ii) A no. of CPPs are connected to the OPTCL system through 400 KV, 220 KV and 132 KV lines. Some of these CPPs like NALCO, ICCL and RSP have their islanding scheme in place which is recorded in Recovery procedures prepared by ERLDC and the same successfully operated during grid disturbance occurred in the past. However, details of islanding schemes of other CPPs in other states of ER are not available with ERLDC.

In view of above, action may be taken by SLDCs to furnish the details of islanding schemes of CPPs under their jurisdiction to ERLDC for including the same in Recovery procedures in the event of a major disturbance involving ER grid, the surviving CPP islands should be in a position to extend startup power to their nearest power stations. If any commercial and technical constraint exists for availing start up power from these CPPs, the same may have to be resolved.

SLDC / OPTCL may please intimate the status of healthiness of existing schemes of CPPs under their control area.

Deliberation in meeting

As discussed above the separate meeting will be held on 22.04.2013 to review its status.

ITEM NO. 11 FREQUENT TRIPPINGS OF IB TPS UNITS - OPGC POINT

OPGC vide their letter dated 29.03.2013 requested to include the following incidences of tripping due to disturbance in transmission system / remote end sub-station at Budhipadar (Refer Annexure-VI)

OPGC highlighted the following issues for discussion:

1. Strengthening of power evacuation in IB TPS- Budhipadar command area
2. Preventive maintenance of associated equipment
3. Implementation of Islanding Scheme at IB TPS
4. Installation of bus bar protection at Budhipadar Sub-station
5. Relay coordination and revival of carrier protection system

OPTCL & OPGC may please deliberate.

Deliberation in meeting

IB TPS & OPTCL agreed to discuss on the above issues mutually and would report within a month time.

ITEM NO. 12 ANY OTHER ITEMS

- i) BSEB requested POWERGRID to supply the Protection setting details in respect of newly commissioned 220 /132kV sub-stations in Bihar by POWERGRID.

Powergrid agreed to the above.

Annexure –I

List of Participants in the 15th Protection sub-Committee meeting of Eastern Region held on 09.04.2012 (Tuesday) at ERPC, Kolkata

Organisation	Name	Designation	Contact Number
BSPTCL	Shri S.B.PRASAD	EEE, CRITL, PATNA	
JSEB	Shri S.MISHRA	GM-CUM-CE	9431707313
DVC	Shri J.DUGGA	SE (CE)	9431515717
	Shri S.KONAR	AE (E)	9433156316
OPTCL	Shri S .S. NANDA	MANAGER	9438356128
	Shri P.K.PATTANAIK		9438907492
	Shri Z.SAHOO	AGM (E)	9438907403
WBSETCL,SLDC	Shri A.RAICHAUDHURI	Addl. CE/SLDC	9433419696
	Shri A.BISWAS	Addl. CE/SLDC	9831093513
	Shri S.ROY	S.E(E)	9432316727
WBSEDCL	Shri T.K.DE	ACE /ALDC	9433870748
WBPDC	Shri S.MAITY	DGM (OS)	9432021168
DPL	Shri B.MUKHERJEE		
CESC	Shri J.CHATTOPADHYAY		9432166352
APNRL	Shri S.GATTANI		9007477762
MPL	Shri A.BAJPAI		9804757804
GMR	Shri B.SAHOO	GM (E)	9178462895
NTPC	Shri B.MUKHERJEE	SUPDT.	9434751481
	Shri T.CHAKRABORTY	DGM (EMD)	9431600459
	Shri R.P.SINGH	DGM (OS), ERHQ-I	9431011366
	Shri S.M.DORAHIM RAZI	MANAGER	9431800242
NHPC	Shri J.PANI	ENGINEER	9800003595
	Shri A.GANGOPADHYAY		9932049476
OPGC	Shri D.N.GURU		9338715434
POWERGRID	Shri J.DAS	CHIEF MANAGER	9431815708
	Shri V.KUMAR	MANAGER	9434748239
ERLDC	Shri U.K.VERMA	GM	8902496220
	Shri P.MUKHOPADHYAY	GM	9433041810
	Shri D.K.SRIVASTAV	AGM	9433041802
	Shri P.S.DAS	CM	9433041837
	Shri S.BANERJEE	CM	9433041823
	Shri T.R.MOHAPATRA	DY.MANAGER	9433041873
	Shri S.K.SAHAY	Engineer	9432351832
ERPC	Shri A.K.BANDYOPADHYAY	Member Secretary I/C	9433068533
	Shri J. BANDYOPADHYAY	SE (C)	9432326351
	Shri B.SARKHEL	SE (PS)	9433065724
	Shri V.KALANARAMEN	EE	033-24233015
	Shri S.M.JHA	EE	9748216566
	Shri S.P.DATTA	DGM (NTPC)	9433067022
	Shri S.ROY	AD-I	

Annexure-II

Sl. No.	System/Sub-Station Date and Time	Incidence	Gen Loss (MW)	Load Loss (MW)	Deliberation on Following Points
1	OPTCL/ Budhipadar 22:50hrs, 10.12.12	At 22:50hrs, Y-Ø jumper of 220kV Budhipadar-SPS-I snapped at loc no-22 due to which following lines & units tripped immediately. 220kV Budhipadar-Bhusan-I 220kV Budhipadar-IbTPS-I, II, III & IV 220kV Budhipadar-SPS-I Both the running units of IbTPS tripped due to loss of evacuation path	275 MW	380 MW	OPTCL representative stated that they have already submitted a report on the tripping to ERPC. It was informed that prior to the fault, PT fuse in R-Phase of 220 kV Budhipadar-SPS –I had already blown off. Hence the Main (Distance) Protection did not operate. However, the back-up overcurrent and earth fault relay of the line operated. Due to fault in Y phase, open delta voltage was available. 220 kV Budhipadar-Bhushan-I tripped on Zone 2, 220 kV Budhipadar-IBTPS –I,II,III and IV also tripped in zone 2. Members opined that co-ordination of distance relays at IBTPS, Bhushan & Budhipadar need checking.
2	Patna & Barh substations, 09.01.13, 01:46hrs	At 10:51hrs, Due to bursting of B-ph CT of main bay of 400 Kv Patna – Balia – II at Patna S/S 400 kv Patna – Balia II,III & IV ckts tripped. At the same time 400 KV Patna – Barh – III line also tripped on O/V as direct trip sent from Barh S/S. Prior to incidence 400 KV Patna – Balia – I & 400 KV Patna – Barh II, IV were kept open on over voltage.	Nil	Nil	Powergrid representative stated that prior to disturbance at Patna following elements were already out of service. Patna-Barh-I, Patna-Balia-II along with its main and tie breaker, Patna-Barh IV and its main and tie breaker, tie breaker of Patna-Barh-III and Patna-Balia-III. Further he explained that At around 1: 46 Hrs of 09.01.13, 400 KV, 3000A, AREVA make B-Ph CT installed in the Main bay for Balia Ckt-II at Patna substation blasted causing operation of distance protection relay of Balia-II and Bus bar protection of Bus-I. The operation of distance protection caused the tripping of 400KV Patna-Balia ckt-II from both

					<p>the end. There was tripping of Barh ckt-III from Barh end due to operation of O/V protection. Patna end Breaker opened due to receipt of Direct trip command from Barh end .The operation of Bus bar protection caused tripping of all the main CBs connected with Bus-I. Due to tripping of main bay CB of Balia-III, the line remained charged from Balia end which caused tripping of the line on O/V from Balia end. Subsequent to the tripping of Main CB of Balia-IV, the line remained charged from Balia end which caused tripping of the line on O/V from Patna end. It was observed failure of CT is probably due to persistent high voltage and frequent switching operation. Recently 125 MVAR Bus Reactor-II has been commissioned at Patna substation which has reduced the voltage at Patna substation.</p>
3	Orissa (Meeramundali) 11.01.13, 11:07hrs	<p>At 11:07hrs, while closing of 400 KV Meeramundali-Mandasal line (O/V tripped), flashover occurred in the breaker at Meramundali of the said line due to which all the feeders at Meeramundali became dead.The following lines were tripped.</p> <ul style="list-style-type: none"> i. 400 kV Meramundali-Kaniha Ckt-I & II tripped at Meramundali on 'B' ph, E/F, O/V and pole discrepancy on 'B' ph limb. ii. 400 kV Meramundali-Bolangir Ckt tripped at Meramundali on O/V,'B' ph, E/F iii. ICT-I & II at Meramundali tripped on both sides on O/V. iv. 400 kV Meramundali-JSPL Ckt- II tripped at Meramundali on O/V. v. 220 kV Meramundali-Kaniha Ckt-II tripped at Meramundali on D/P, dist-32 %., E/F, 'B' ph vi. 220 kV Meramundali-TTPS Ckt-I& II tripped at TTPS end. vii. 220 kV Meramundali-NALCO Ckt-I &II tripped at NALCO end. viii. 220 kV Meramundali-Bhusan Ckt-I & II tripped at Bhusan end. 	Nil	200 MW	<p>Complete loss of power at 400kV and 220kV is a serious issue. OPTCL may please explain reason for such indiscriminate multiple trippings, supported by DR and and the missing relay indications. Action taken to prevent recurrence of such incident in future may please also be discussed.</p>

		ix. 400 kV bus & 220 kV bus-I at Meramundali become dead x. 220 kV Meramundali-Kaniha Ckt-I tripped at Meramundali on D/P, dist-99 %, E/F, 'B' ph xi. 220 kV Bus-II at Meramundali become dead. 220 kV bus coupler charged but did not stand and tripped on pole discrepancy			
4	Tenughat, Hatia, Patratu, 15.01.13, 05:15hrs	At 05:15hrs, a fault had occurred on one circuit of 132KV Hatia-HEC D/C due to which the total power failure occurred at Tenughat, Patratu and Hatia S/s on tripping of the following lines: <ol style="list-style-type: none"> 220 KV Tenughat – Biharshariff S/C 220Kv Tenughat-Patratu S/C 220 KV Hatia – Patratu D/C 220Kv Ranchi-Hatia S/C(tripped from Hatia end only) 132Kv Hatia-Patratu D/C (8C & 9C) 132Kv Hatia-HEC D/C 132 KV Chandil - Hatia 132 KV Hatia – Hatia-I 132 KV Hatia I – Namkum via transfer Bus at Hatia-II Both running units of Tenughat and Patratu U#4 tripped due to loss of evacuation paths. Traction power around 30MW failed due to power failure at Hatia, Namkum, Kamdara, Lodhma, Tatisiloi.	354 MW	218 MW	Fault in a 132kV line should not have caused such widespread tripping. It appears that the primary protection of the faulty HEC-Hatia 132kV line failed to operate or operated with inordinate delay. JSEB may please explain the incident with relay indications, DR etc. Action taken to prevent its recurrence may also be appraised
5.	Barh/Patna 16/01/2013 09:37Hrs	While opening of Isolator of 400kV Bus-III (connected with 400kV Bus-I) at Barh S/s bus differential protection operated & all the feeders connected to Barh S/s tripped from Barh. From remote end only 400 KV,Barh-Patna-III tripped. All other lines remained connected from remote end.	Nil	Nil	NTPC may please explain reason for operation of differential protection at Barh as well as the factors responsible for tripping of elements connected to both the buses. Remedial action taken, if any, to avoid recurrence of such incident may also be discussed.
6.	SIKKIM,17:40 hrs, 27.01.13	132 KV Rangit-Gangtok tripped at Rangit end at 17:40 hr due to operation of O/C relay at Rangit end leads to total power failure in SIKKIM. However, the single source fed from Rammam via 132 KV Rammam – Rangit was in service. Relay reading as reported by Rangit: <ul style="list-style-type: none"> Trip relay – 86 CB Auto trip Directional Over current, B-phase 	Nil	67 MW	The only line available to Sikkim for drawing power was 132kV Rangit – Gangtok. As the power flow through this line exceeded the load corresponding to the setting of the O/C relay at Rangit, the relay picked up and caused tripping of the line.
7.	South Odisha (Balimela & Jaynagar) 29.01.13, 20:08hrs	At 20:08hrs, 'Y' ph jumper between CT and breaker of 220 kV Balimela-Jaynagar Ckt-II snapped at Jaynagar S/S. Following units & lines tripped from Balemela & Jaynagar s/s. <ol style="list-style-type: none"> 220 kV Balimela-Jaynagar Ckt-I, II & III 220 kV Jaynagar-Jeypore PG Ckt-I Balimela U#1, #2, #3, #4, #5, #6 and #8 	420 MW	390 MW	220kV Jeypore S/S is having breaker-and-half scheme. Thus fault involving a bus should not cause loss of any element. OPTCL may please explain the incident with

		iv. 220 kV Jaynagar-Jeypore PG Ckt-II main breaker tripped but the Ckt was in service through tie breaker			the help of relevant diagram in detail, along with reasons for tripping from Balimela and Jeypore(PG) ends. Remedial measures taken to prevent recurrence of such incident may also be apprised.
8.	Purnea, Binaguri, 16:24 hrs , 29.01.13	400 KV Purnea – Malda – I (Tripped at Malda end only, A/R successful at Purnea end) 400 KV Purnea – Binaguri – I (Tripped at Purnea end only, A/R successful at Binaguri end) 400 KV Purnea – Binaguri – III A/R successfully operated at Purnea end. While closing breaker of 400 KV Purnea – Malda – I at Malda end bus coupler at Malda tripped leads to unequal power flow in 400 KV Farkka – Malda ckts and 400 KV Farkka – Malda – I flow touched 730 MW.	Nil	Nil	The distance relay of Purnea-Binaguri-III line at Binaguri should not have operated, unless the fault was within its reverse reach and the main protection of the concerned line had failed to operate. The indication of Main-II protection at Binaguri end thus appears to be inconsistent with the fault location. The receipt of carrier inter-trip signal at Purnea end from Binaguri and the reason why none of the relays at Binaguri for Binaguri-Bongaigaon, or Binaguri-Tala lines sensed fault, remain unexplained. It is also gathered from Malda that the main bus coupler got opened due to which Farakka-Malda-I along with Malda-Purnea-I and 315MVA ICT-V remained connected to Bus-1 only while Farakka-Malda-II along with Malda-Purnea-II and 315MVA ICT-III to Bus-2 only, resulting in unequal sharing of power by the two circuits of Farakka-Malda. The reason for opening of bus-coupler CB instead of the line CB for Malda-Purnea-I at Malda is not understood.
9.	JSEB/Chandil 03.02.13, 12:42hrs	At 12:42hrs, a long paper hording came with the flow of wind & fall on the Y-Ø & R-Ø of Powergrid bay at Chandil switchyard. Due to this 220kV Ranchi (PG)-Chandil ckt got tripped. At 12:46hrs, 132kV Adityapur-Rajkharswan ckt tripped on earth fault which leads to total power failure at Chandil s/s. The following lines tripped simultaneously. 220 KV Ramchandrapur – Chandil (tripped from Ramchandrapur) 220 KV Santaldih – Chandil (tripped from	Nil	151 MW	JSEB may explain, with relay indications and a suitable diagram, the reasons for complete loss of power at 220kV Chandil S/Stn initiated by a single fault. Action taken to prevent recurrence of such incident may please also be discussed.

		<p>Santaldih end) 132kV Chandil- Hatia loop (tripped from both end) 132kV Chandil- Adityapur (tripped from chandil end) 132kV Chandil-Rajkharswan Traction supply interrupted at Kendposhi, Rajkharswan, Golmuri and Manique.</p>			
10.	JSEB/Chandil, 05.02.13, 04:21hrs	<p>At 04:21hrs, LA blast occurred at Hatia S/s. The fault was not cleared from Chandil end, due to which all the 220kV, 132kV & ICTs emanating from Chandil s/s tripped causing total power failure at Chandil s/s. The following elements tripped.</p> <p>220 KV Ramchandrapur – Chandil (tripped from Ramchandrapur) 220 KV Santaldih – Chandil (tripped from Santaldih end) 132kV Chandil- Hatia loop (tripped from both end) 132kV Chandil- Adityapur (tripped from chandil end) 132kV Chandil-Rajkharswan Traction supply interrupted at Kendposhi, Rajkharswan, Golmuri and Manique.</p>	Nil	189 MW	Reason for non-clearance of fault by operation of main protection may be explained by JSEB. JSEB is also requested to explain the incident in detail with the help of a diagram. Missing relay indications may be provided and action taken to prevent recurrence of such incident may please be discussed.
11.	JSEB/Chandil, 19:40 hrs , 07.03.13	<p>3 X 100 MVA , 220 /132 KV ICTs tripped on overload at Chandil SS (as per verbal intimation) leading to power interruption to all 132 kv feeders - Rajkharsawan , Adityapur, Hatia & Golmuri.</p> <p>2 X 150 MVA , 220 /132 KV ICTs tripped on overload at RamchandrapurSS (as per verbal intimation) leading to power interruption to 132 kv feeders – Adityapur D/C Traction power around 20 MW failed at Manique, Golmuri, Rajkharsawan & Goelkera</p>	Nil	350 MW	JSEB may please explain the reason for overloading of its ATRs and the relays indications obtained. Action taken to avoid recurrence of the incident may also be apprised.
12.	Duburi, 13:40 hrs , 09.03.13	<p>JSL & Visa IPPs units tripped which was injecting generation of 50 MW to gridco system. 220 kv Meeramundali- Duburi – II & 220 kv Duburi – Duburi (new) - D/c tripped.</p>	Nil	250 MW	Reason for tripping is not Clear. OPTCL may please explain the incident with relay indications and a diagram
13.	BSEB(Purnea, Kishanganj), 09.03.13, 17:42hrs	<p>At 17:42hrs, due to fault in 220/132kV Purnea(PG) s/s 132kV Purnea(PG)-Purnea(BSEB)-I,II,III & 132kV Purnea(PG)-Kishanganj line tripped on operation of distance protection.</p> <p>Power flow (approx. 60MW) to Nepal through 132kV Purnea-Kishanganj-Kataiya-Duhabi also got interrupted</p>	Nil	190 MW	BSEB and ER-I may please explain the incident with diagram and relay indications
14.	Santaldih 13:55 hrs , 11.03.13	<p>At 13:55 hrs. 220 KV Santaldih – New Bishnupur-II line, connected to Main Bus -1 at STPS end, tripped due to fault at New Bishnupur end. But the 220KV breaker at STPS end did not operate. Due to non-opening of breaker at STPS end of 220 KV Santaldih – New Bishnupur-II line LBB operated at STPS end causing 220KV B/C</p>	Nil	248 MW	Reason for non-operation of breaker at STPS end of the faulty line, may be explained by WBSCTCL / WBPDCCL. Further, corrective taken, if any, may please also be

		breaker at STPS end to open leading to segregation of Main Bus 1 and Main Bus 2 and consequently all lines connected to Main Bus 1 tripped. STPS U#6 connected to main Bus-I also tripped			apprised.
15.	Meramundali, 12.03.2013, 23:55 Hrs	220 kV Meramundali- Bhanjanagar ckt-I, 220 kV Meramundali-Kaniha ckt-II and 220 kV Meramundali-Bidanasi Ckt tripped at Meramundali along with 400 kV Meramundali-Bolangir Ckt. and 400 kV Meramundali-Kaniha ckt-II. It is noticed that, 'R' Phase LA of Meramundali-Bidanasi ckt was burst with snapping of conductor between CVT and LA	Nil	110 MW	OPTCL may please explain the reason for multiple outage of elements from Meramundali , with the help of the S/Stn SLD, due to fault in 220kV Meramundali-Bidanasi. Prventive action taken, if any, may please also be apprised.
16.	Chandil, Rajkharsawan 09:45 hrs , 12.03.13	1) 220 KV Ranchi-Chandil 2) 220 kv RCP-Chandil 3) 220 KV Santaldih-Chandil Traction power around 12 MW failed at Manique & Goelkera	Nil	170 MW	JSEB may please explain the incident with the help of relay indications and relevant diagram.
17.	Chandil, Rajkharsawan:, Adityapur, Goelkara, Manique., Golmuri. 11:32 hrs , 12.03.13	While Charging 220 KV Ranchi-Chandil , following tripping occurred. 1) 220 kv RCP-Chandil 2) 220 KV Santaldih-Chandil 3) 3 X 100 MVA , 220 /132 KV ICTs at Chandil 4)132 kv Chandil- Hatia 5)132 kv Chandil- Golmuri 6)132 kv Chandil- Rajkharsawan 7)132 kv Chandil- Adityapur Traction power around 35 MW failed at Chandil, Rajkarswan,Manique , Adityapur	Nil	150 MW	JSEB may please explain the incident with the help of relay indications and relevant diagram.
18.	Meramunali/ Mendhasal, 13:10 hrs , 17.03.13	Due to some problem at Meramunali – Mendhasal line as reported by SLDC/OPTCL following elements tripped at 13:10 hr i)400KV Meramandali – Mendhasal ii)400KV Meramandali – TSTPP-II iii)400 KV Mendhasal – Baripada D/C iv)400/220 ICT – I at Mendhasal.(ICT – II was under SD) v)220 KV Mendhasal – Bhanjanagar vi)220 KV Mendhasal - Chandaka Q/C vii)220 KV Mendhasal - Nayagarh	Nil	300 MW	OPTCL representative stated that any fault occurring at 400 kV Meramundai-Mendasal cannot be cleared through CB operation at Meramundali as these CB are frequently getting stuck due to some mechanical problem. Due to this stuck breaker operation, LBB operated at Meramandali leading to tripping of many lines. Further OPTCL stated that due they are planning to replace all BHEL make CB at Meramandali since they are giving frequent problem.