

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

**MINUTES FOR THE 11th PROTECTION SUB-COMMITTEE MEETING HELD AT ERPC,
KOLKATA ON 24.11.2011 (THURSDAY) AT 11:00 HOURS**

List of Participants is enclosed at Annexure- I.

Member Secretary I/C, ERPC welcomed the participants and also the new GM, ERLDC, Shri U K Verma.

In his maiden address, GM, ERLDC mentioned that there are a no. of protection issues concerning ER Grid and requested all the constituents to deliberate on the issues for safe operation of the Grid. Member Secretary I/C then took up the agenda points in seriatim.

PART - A

ITEM NO.:1 CONFIRMATION OF THE MINUTES OF THE 10th PROTECTION SUB-COMMITTEE MEETING OF ERPC HELD AT ERPC, KOLKATA ON 12.08.2011

The minutes of the above meeting were circulated vide letter no. ERPC/SE (PS)/ PROTECTION/ 2011/ 3477-3510 dated 30.08.2011.

No other comments have been received from any constituent.

The minutes of the meeting may be confirmed.

The minutes of the 10th Protection sub-Committee were confirmed without any modifications.

PART - B

NEW ITEMS

ITEM NO.1 REVIEW ON IMPLEMENTATION OF THE APPROVED SPECIAL PROTECTION SCHEMES PARTICULARLY FOR OUTAGE OF ONE CIRCUIT OF 400 KV FARAKKA-KAHALGAON, OR FARAKKA-MALDA D/Cs LINE

- The following System Protection Schemes were approved in 16th ERPC meeting :-

i) SPS for Farakka - Kahalgaon D/C

ii) SPS for Farakka - Malda D/C

iii) SPS for Purnea - Muzaffarpur D/C

iv) SPS for Purnea - Binaguri D/C

v) SPS for Tenughat - Biharshariff S/C

vi) SPS for Sterlite Energy Ltd

vii) SPS for Mejia-B & MPL power stations

- In respect of implementation of the schemes mentioned at sl no. i) and ii), NTPC expressed their reservations in the 18th as well as 19th ERPC meetings. In the 19th ERPC meeting it was decided that both ERLDC & NTPC would make separate

studies and submit their results in a special Protection sub-Committee meeting to be convened before the next (20th) TCC meeting.

- 400kV Farakka - Kahalgaon 2nd D/C have already been commissioned, but yet to be made operational.
- ERLDC study results (considering above line) have indicated that SPS for tripping of a single circuit of Farakka-Kahalgaon line is not required. However, the steady-state results for loss of one and both circuits of Farakka-Malda line would lead to evacuation constraint. (ERLDC prepared the case studies)

ERLDC has now re-drafted the scheme, and the same may be presented for deliberation.

NTPC may present their study results and/ or deliberate on ERLDC results. Members may please discuss.

Deliberation in the meeting

Member Secretary I/C requested ERLDC to present their study results in respect of the SPS mentioned at (i) and (ii).

During presentation ERLDC highlighted that in winter / low hydro season, the possibility of heavy overloading of Farakka-Malda D/C, on account of high drawal by NR and NER cannot be ruled out, even if four circuits of 400kV Farakka-Kahalgaon line are in operation. In the event of tripping of one of the circuits of Farakka- Malda, the other circuit is also likely to trip. With loss of both the circuits, the power flow through 400kV Kahalgaon-Biharshiff Q/C, as per simulation study results, rises to unacceptably high level (more than 700MW through each circuit). The need for an SPS to prevent tripping of the remaining circuit cannot therefore be denied.

During deliberation in the meeting it was felt that owing to coal shortage problem in E. Region, the likelihood scenario considered by ERLDC may not be possible. NTPC opined that one unit of Pallatana Gas based station (2x363.3 MW) of ONGC and Bongaigaon TPS (2x500 MW) of NTPC in NER are expected to be commissioned during February,2012 & thereby importing power from ER to NER might not be required even in low hydro period. Moreover, implementation of SPS for 400 kV Farakka-Malda D/C may also take time (beyond low hydro condition in ER). So its necessity may be reconsidered /reviewed.

Therefore, in respect of SPS for 400 kV Farakka-Malda D/C, PCC members requested ERLDC and NTPC to arrive at a consensus through a further joint studies taking into consideration of most likely generation schedule of NTPC stations as well as expected load profile of NER & NR during winter in the near future with Pallatana & Bongaigaon one unit in operation to decide upon the necessity of SPS implementation for this line.

After detailed deliberation on the issue of the implementation of SPS for 400kV Farakka-Kahalgaon line, ERLDC expressed that in view of recent commissioning of 400kV Farakka - Kahalgaon circuits III & IV, the same will not now be required. NTPC and all constituents agreed to this.

After deliberation, it was decided that the present development is to be referred to next TCC for information.

**ITEM NO. 2 SPS FOR TEESTA -III HEP PROJECT (6 X 200MW)
(Item No. C.1 (b) of MoM of the 9th Protection sub-committee)**

After the Standing Committee meeting (SCM) NHPC conveyed that it may accord consent for interim arrangement for the evacuation of power of Teesta-III through existing Teesta-V system only after the above technical and commercial aspects are specified and agreed to by concerned utilities.

Thereafter, in the Protection sub-Committee meeting a basic scheme for reducing generation for Teesta-III HPS in the event of tripping of i) Teesta-V - Binaguri line or ii) Teesta -III-Binaguri line section was explained by ERLDC. The scheme was forwarded to NHPC for examination both by NHPC & Teesta Urja Ltd before its finalization. Subsequently, ERLDC vide its letter dated 01.09.2011 addressed to Teesta Urja Ltd. expressed the urgency for finalizing the SPS through deliberation in the 66th OCC meeting on 16.09.2011.

In the 19th TCC meeting NHPC expressed their reservation against the LILO of 400kV Teesta-Binaguri line for evacuation of power from Teesta-III HEP. It was decided that the issue would be further discussed at ERPC fora for further examination.

Further, in the 9th Protection sub-Committee meeting, a basic scheme for reducing generation at Teesta-III HPS, in the event of tripping of (i) Teesta V - Binaguri direct line or (ii) Teesta III -Binaguri line section, was explained by ERLDC. The scheme was forwarded to NHPC HQ for examination both by NHPC and Teesta Urja Ltd. before its finalization.

Subsequently, M/S Teestavalley Power Transmission Ltd., vide their letter no. TPTL/TUL/ERLDC/110912 dt 12-09-11 submitted a draft scheme conceived by them.

ERLDC is of the opinion that line power (MW) along with change of CB status may be monitored, instead of line current (amperes).

Members may kindly opine.

In all the SPSs the maximum continuous allowable and short-time (15-min) sustainable loading values of various lines have been assumed by ERLDC. As these values are crucial in deciding the appropriate corrective action, ERLDC vide letters no ERLDC/SS/2011/2685 and ERLDC/SS/2011/2686 dt 14/11/11 has already sought the views of ERTS-I and ERTS-II, in order to arrive at the exact value to be considered. This is for information of members.

NHPC & Teesta Urja may please deliberate.

Deliberation in the meeting

Representative from Teesta-Urja informed that commissioning schedule of Teesta-III units will be delayed in view of the recent earthquake in Sikkim. The dedicated evacuation system for Teesta-III HPS i.e. 400kV Teesta-III-Kishangunj D/C is under construction (280 foundations already completed) and likely to be ready by September, 2012.

In view of delayed schedule of commissioning of Teesta Urja units and expected commissioning of its ATS by September 2012, NHPC reiterated their reservation against LILO of 400 KV Teesta V -Binaguri line as was decided by Standing committee and thereby placed a proposal for reviewing the same.

After deliberation NHPC was requested to have interaction with Standing Committee on reviewing of decision on LILO and matter was also referred to TCC.

ERLDC opined that if the basic system protection scheme proposed for Teesta-III is accepted, then for tripping of the bus-coupler CB at Teesta-III 400kV station with tripping of either Teesta-III-Binaguri, or Teesta-V-Binaguri 400kV line, both MW and CB status of the concerned lines should be taken as inputs to the SPS. Teesta-Urja agreed to the suggestion.

- ITEM NO.3 ANALYSIS & DISCUSSION ON VARIOUS GRID INCIDENCES WHICH OCCURRED IN CTU / STU SYSTEMS DURING THE PERIOD BETWEEN AUGUST,2011 TO OCTOBER,2011 - Reports to be submitted by ERLDC / CTU / STU.**

Agenda submitted by ERLDC (Annexure-I).

Deliberation in the meeting

In the absence of representative from BSEB and non-availability of details from other members, all constituents were requested to go through the observations of ERLDC on the different incidents (mentioned in Annexure-II) and submit analysis / investigation reports on incidents, pertaining to their respective systems by the next OCC meeting.

- ITEM NO. 4 INTERMITTENT FAILURE OF MAIN-I-CARRIER PROTECTION CHANNEL IN RESPECT OF 400KV FARAKKA -JEERAT CIRCUIT AT JEERAT END - Agenda submitted by WBSETCL**

WBSETCL expressed concern over that Main-I protection channel of 400kV Farakka - Jeerat line at Jeerat end remained frequent outages since 28.10.2011. Although, Powergrid and M/s ABB attended the said protection channel from Farakka end but no result was yielded. It is further to mention that Main-II protection channel of the said circuit remained out of service since 01.09.2011.

However, in the last OCC meeting Powergrid pointed out that the LMU of the channel at Farakka end was found defective during investigation which will be replaced from the stock at Farakka. Main-II protection channel of the said circuit would be attended very soon.

Powergrid may please intimate the present status.

Deliberation in the meeting

Powergrid informed the house that the second channel would be restored shortly, by changing the LMU at FSTPP end, for which shutdown of the line for around 5 to 6 hours is required. It was agreed to avail the shutdown on 28.11.2011. The protection channel-I was restored on 05.12.2011 as reported by Powergrid in the OCC meeting.

PART - C FOLLOW UP OF DECISIONS OF THE PREVIOUS (10th) PROTECTION SUB-COMMITTEE MEETING

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

**ITEM NO. 1 SIKKIM
(Item No. B.1 of MoM of the 10th Protection sub-committee)**

The status of circuit breaker and proper protection and metering arrangement for Sagbari & Rohtak 66kV sub-stations.

Sikkim may please intimate the present status.

Deliberation in the meeting

The issue could not be discussed in the absence of Sikkim representative.

**ITEM NO. 2 INSTALLATION OF BUS DIFFERENTIAL PROTECTION SCHEME AT BIHARSHARIFF SUB-STATION
(Item No. B.2 of MoM of the 10th Protection sub-committee)**

- Construction of the extension part of the 220kV Biharshariff S/S was completed
- The bus-bar differential relays from M/s. AREVA have also been procured by BSEB
- BSEB requested (BSEB letter dtd. 16.03.2011), M/s. AREVA, to depute their commissioning Engineer for its installation
- POWERGRID agreed to get expedited commissioning of the bus differential protection scheme at Biharsharif S/s with M/s. AREVA.
- The issue was discussed in the 19th TCC meeting. It was opined that old PBDCB Scheme (procured by BSEB) should be replaced with suitable modern bus bar (low impedance differential) Protection Relay.
- BSEB was impressed upon by ERPC Secretariat for expediting the new scheme at Biharshariff

BSEB / Powergrid may intimate the present status.

Deliberation in the meeting

In the absence of representative from BSEB, the issue was not taken up for discussion. However, BSEB in a communication informed that M/s AREVA

assured to complete the rest of pending works during their next visit. The work is expected to complete by the vendor shortly.

Members opined that higher authority of BSEB might be approached for procurement of new low impedance differential Protection Relay as was earlier agreed to.

The issue was referred to TCC for further advice.

**ITEM NO. 3 STATUS OF AUTO-RECLOSER FACILITIES ON IMPORTANT 400KV TRANSMISSION LINES (BOTH CTU & STU)
(Item No. B.3 of MoM of the 10th Protection sub-committee)**

- 400kV Tala-Binaguri line (Tala HPA / POWERGRID)
ERLDC requested Tala authorities to put the single phase auto- reclosure feature in service at Tala end. THPA would not face any difficulty upon its implementation rather it reduces switching over voltages and improve stability etc.

BPCL representative agreed to discuss with THPA and explore the possibility of implementing single phase auto-recloser facility at Tala end.

The views of Tala authorities regarding its implementation may be intimated.

Deliberation in the meeting

As informed by Bhutan representative, no progress has been achieved on this issue.

Members felt that Tala HEP authority might be impressed upon to implement the above feature in the ensuing TCC meeting.

**ITEM NO. 4 PROCUREMENT AND INSTALLATION OF NUMERICAL RELAYS BY BSEB AND JSEB FOR KAHALGAON, SABOUR AND LALMATIA SUBSTATIONS
(Item No. B.4 of MoM of the 10 th Protection sub-Committee)**

- The following settings of the timer relay at Lalmatia end in respect of 132 kV Kahalgaon - Lalmatia line was done on 01.02.2011:

- i) T1 -0 m.sec
- ii) T2- 240 m.sec in place of 400 m. sec
- iii) T3- 800 m. sec in place of 1040 m.sec

- With the above modified setting, the condition has since improved and NTPC suggested to continue with the settings for observation

- *The need to install numerical relays was also felt for Kahalgaon, Sabour and Lalmatia ends for which BSEB and JSEB agreed to expedite its procurement and their installation*

BSEB and JSEB may intimate the present status.

Deliberation in the meeting

The issue could not be discussed in the absence of representative from

BSEB. However, BSEB in a communication informed that they have planned to replace the existing relays at Sabour and Kahalgaon by numerical distance protection relays after procurement which is in process.

JSEB also informed that the procurement of numerical relay for Lalmatia is under process. Both BSEB and JSEB requested to place this point to next TCC.

**ITEM NO. 5 PROTECTION COORDINATION OF 66KV RANGIT- RAVANGLA S/C LINE BETWEEN NHPC & GOVT. OF SIKKIM
(Item No. B.5 of MoM of the 10th Protection sub-Committee)**

- Distance Protection relay setting (Micom P442) is to be done by Rangit Power Station in coordination with POWERGRID and M/s. Alsthom. Energy & Power Dept., Govt. of Sikkim will provide all the line data. Zone-1 setting will be of 80% of the total line length with instant tripping. Zone-2&3 setting will be done as 120% with time settings 300 msec. as the line length is very small. (Action-Rangit HPS, NHPC, Powergrid, Govt. of Sikkim)
- The issue could not be discussed in the previous meeting.

Rangit HPS, NHPC may please intimate the modification of the settings of the distance protection relay and its present status.

Deliberation in the meeting

Rangit HPS, NHPC representative informed the following setting provided with distance protection relay (MICOM P442) at Rangit end :

- i) 66kV -Rangit -Ravangla line length - 9.8 Km
- ii) Line impedance - 1.03 ohm
- iii) 1st Zone setting (Z1) - 0.82 ohm (Inst.)
- iv) 2nd Zone setting (Z2) - 1.24 ohm (T2 / T3-300 m.sec)

The above setting has been done after the Special Protection meeting held at Rangit HPS on 12.04.2011 between NHPC, Govt. of Sikkim, Powergrid & ERPC.

The members agreed to the settings implemented by NHPC.

**ITEM NO. 6 FREQUENT TRIPPING / OUTAGES OF LINES ON OVERVOLTAGE
(Item No. B.6 of MoM of the 10th Protection sub-Committee)**

It is observed that a number of 400 KV lines are tripping on over voltage apart from number of 400 KV lines being kept open due to over voltage. Weakening of network may subject the system to instabilities.

In this context, to set right the over voltage problem, following actions need to be taken at the earliest

- i. Relook at existing over voltage relays with an effort to increase drop off to pick up ratio to 99% to avoid simultaneous tripping of no of line in same

station and to deploy standalone over voltage relays. (Concerned party: PGCIL, NTPC)

ii. To expedite commissioning of reactors already planned and planning of additional reactors in high voltage prone areas to get approval in Standing Committee. (Concerned party: DVC, PGCIL) - **POWERGRID/ DVC may please report the commissioning schedule of approved reactors.**

iii. Optimization of power order in HVDC, Gazuwaka and Talcher-Kolar HVDC line so that no MVAR from any of the HVDC station is injected to the grid. (Concern Party: PGCIL)

iv. Testing and declaration of Reactive capability of ISGS at different power level so that generators of the ISGS can be fully exploited to control voltages. (Concerned party: NTPC)

- To avoid over voltage tripping of multiple circuits, the drop-off to pick-up ratio needs to be increased to about 99% from its existing settings 95%. For this purpose, settings of existing relays need to be suitably changed with the help of their respective vendors. In case it is not possible to change the setting of existing relays then procurement of standalone over voltage relay may be thought of, since standalone numerical relay has facility for setting drop-off to pick-up ratio to 99%.

The above issue was already discussed in various OCC and PCC meetings and it was decided that utilities will review the setting of drop-off / pick-up ratio of O/V relays and coordination of their time grading, and interact with ERLDC for finalizing the setting.

- Over voltage problem can be controlled to a large extent if generators connected to grid run in leading power factor mode and starts absorbing reactive power. In this connection ERLDC presented voltage vs. MVAR recorded at HV side of some ISGS generators plotted on the unit capability curves to check the areas of the capability curves used in actual operation. In general, it was observed that the units do not absorb reactive power corresponding to their capabilities. It was decided to test the reactive capabilities of all power stations connected at 400kV level. Reactive capability of all the units having same type and make will be same. Hence the reactive capability test need to done only for one unit of a particular type and make.
- TSTPP, Farakka, Kahalgaon and Bakreswar thermal units and Teesta Unit had performed reactive capability test, the results found encouraging. ERLDC also circulated the test procedure and formats for data logging etc..
- ERLDC in coordination with SRLDC & NRLDC will try to optimize the power order of HVDC, Gazuwaka and Talcher-Kolar link, so that these HVDC station do not inject Var in the grid. ERLDC will also explore the possibility whether HVDC connections can consume more Vars.

ERLDC may please report of the above.

Members may please discuss.

Deliberation in the meeting

ERLDC informed the house that during testing of leading reactive capability of machines, a reduction of around 2kV to 3kV was observed at the corresponding 400kV bus even without utilizing the full leading reactive margin available in the generator. GM, ERLDC appealed to all generating stations to absorb MVAR as far as the capability of their machines permit in order that overvoltage conditions can be avoided and the 400kV station bus voltage is maintained as close to the nominal as possible. ERLDC also stated that whenever scope permits, power orders of HVDC Gajuwaka and Talcher-Kolar links are modulated to ensure that adequate reactive power is absorbed at the converter terminals.

ITEM NO. 7 SPS FOR IPSS GENERATION

(Item No. B.7 of MoM of the 10th Protection sub-committee)

- Regarding SPS for Mejia B and MPL, MPL and DVC, the concerned generating companies gave their consent for implementation in the 18th ERPC meeting. It was further decided that the scheme would be finalised through consultation between ERLDC and DVC. The scheme prepared by ERLDC (soft copy of which has already been forwarded to DVC) is enclosed. Members may kindly furnish valuable suggestions.
- In order to finalize the SPS for Sterlite, a meeting was held among ABB, SEL, OPTCL, ERPC and ERLDC on 27th July 2011 at ERLDC, Kolkata, wherein it was gathered that 3rd unit of SEL is likely to be synchronized shortly. In the said meeting, M/s. Sterlite Energy Ltd.(SEL) informed that various logics for reducing its generation under grid contingencies would be integrated to their CILMS (Composite Islanding and Load Management Scheme). Further, as SPS logic is incorporated through PLC it can be modified at any point of time.

DVC and sterlite may please intimate.

Deliberation in the meeting

Member Secretary (I/C), ERPC emphasized the importance of expeditious commissioning of SPS for evacuation of Mejia-B, DSTPS and Maithon-RB generation without endangering grid security. On the scheme and study results forwarded earlier to DVC by ERLDC, representative from DVC desired to examine a few more simulation cases considering generation of Koderma and a few additional lines, before finalizing the SPS with vendors who have designed the automation systems of respective power stations, for implementation. In this regard, it was agreed to conduct a joint simulation study by ERLDC and DVC, on receipt of requisite input data from the latter. DVC and ERLDC agreed to complete the studies at the earliest. The house was however unanimous on the decision of OCC regarding curtailment of generation from these stations by ERLDC if needed, in the interest of system security, in the absence of requisite SPS and telemetry by 15.12.2011.

As regards SPS for Sterlite, the present status / progress could not be

ascertained in the absence of representative from the power station.

It was finally decided that the concerned agencies are now allowed to complete the relevant works by 15.12.2011 to avoid any penal measures by ERLDC.

ITEM NO.8 REPLACEMENT OF PLCC SYSTEM OF 400 kV TSTPS (NTPC) -ROURKELA AND TSTPS (NTPC) - RENGALI D/C
(Item No. B.8 of MoM of the 10th Protection sub-committee)

- PLCC system and protection coupler (BPL-make) of the aforesaid lines has become obsolete and not-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
- POWERGRID was requested (vide letter dt. 05.04.2011) to revert back regarding the replacement and the modality. NTPC agreed to place the PLCC order and would send the technical specification to Powergrid.
- It was informed that the replacement work of PLCC system of the above lines is in progress and would be completed by 2012.

POWERGRID & NTPC may please intimate the present status.

Deliberation in the meeting

NTPC assured that the replacement work of PLCC system at the above power station will be completed by next financial year.

ITEM NO. 9 COMMISSIONING OF BUS BAR PROTECTION AT RAMCHANDRAPUR AND CHANDIL 220 KV SUB-STATION OF JSEB
(Item No. C.2 of MoM of the 10th Protection sub-committee)

In the 18th TCC meeting held on 30.06.2011 at Ranchi it was decided that a group with representation from ERLDC, ERPC, Powergrid and JSEB would study the feasibility of installation of bus bar protection at Ramchandrapur & Chandil 220 kV sub-stations of JSEB.

Accordingly the group was formed in the 10th Protection sub-Committee meeting with the following officers of the respective organization:

- i) Shri Shakeel Ahmed, ESE, JSEB
Alternately, Shri Ajay Prasad, ESE, JSEB, Jamshedpur
- ii) Shri Anurag Sribastava, Sr.Engineer, Jamshedpur S/s, Powergrid
- iii) Shri Saurav Sahay, Sr. Engineer, ERLDC
- iv) Shri V.Kalyanaramen, EE, ERPC

The group visited the above sub-station on 14.11.2011 and 15.11.2011 and may make a presentation before submitting its report.

In its finding the committee felt that the installation of the bus bar protection scheme might be feasible at 220kV Ramchandrapur S/Stn with some necessary retrofitting at the existing bus arrangement, but it is ruled out in respect of Chandil

S/Stn. Only LBB protection is feasible for Chandil 220kV sub-station to avoid total power failure at Chandil.

Members of the group may make a presentation in this regard.

Deliberation in the meeting

Members of the group placed their draft report on the feasibility of implementing bus-bar differential protection scheme at Ramchandrapur and Chandil S/Stns and briefed the house about their findings.

In its finding, the committee felt that the installation of the bus bar scheme might be feasible at Ramchandrapur 220kV sub-station with some necessary re-rofitting at the existing bus arrangement, but it is ruled out in respect of old Chandil 220kV sub-station. Only LBB protection, which is available, is feasible for implementation at Chandil 220kV s/Stn. to avoid total power failure.

In the light of the above, Member Secretary I/C requested Shri D. Chakraborty, CE, CLD, WBSETCL and Shri A. Ghosal, Dy. CE, Testing, CESC Ltd to go through the report and offer their expert comments at the earliest so as to report to ensuing TCC meeting. A copy of the report was handed over to them.

The expert comment was received on 13.12.2011 and enclosed at Annexure-III.

ITEM NO.10 AUTOMATION, LOAD SHEDDING AND LOAD RESTORATION

(Item No. C.3 of MoM of the 10th Protection sub-committee)

At present, ER is having three stages Under Frequency load shedding schemes beginning from 48.5 Hz. The UFRs installed in the constituents system are having the following connected loads as per the records available at ERPC:

	STAGE-I 48.5 Hz (INST.)		STAGE-II 48.2 Hz (INST.)		STAGE-III 48.0 Hz (INST.)		EMERGENCY 47.6 Hz
	Approved	Actual	Approved	Actual	Approved	Actual	Actual
BIHAR	30 MW	70MW	36MW	42MW	43MW	NIL	NIL
JHARKHAND	17MW	26MW	12MW	13MW	22MW	38MW	NIL
DVC	56MW	51MW	55MW	61MW	76MW	127MW	213MW
ORISSA	77 MW	77MW	77MW	77MW	105MW	105MW	NIL
WEST BENGAL	120MW	81MW	120MW	95MW	164MW	106MW	760MW
CESC		156MW		96MW		110MW	NIL
TOTAL	300MW	461MW	300MW	384MW	410MW	486MW	973MW

The following issues were discussed in the previous meeting:

- 1. Emergency load shedding setting to be raised to 47.8 Hz**
2. The present stages of UFRs should have twice the actual connected load over the approved connected load, as the above relays operate very rarely. The periodic inspection of UFRs in operation are to be carried out.
3. All the constituents agreed to re-furnish the latest data of sub-station/ feeder wise load connected to UFRs and their present status.
4. ERPC Secretariat requested to submit the present status of load connected (Peak / Average in MW) to UFRs installed in the feeders and its present status.

Constituent members may please submit the information & opine in respect of (1).

Deliberation in the meeting

In respect of (1.) the members present felt that any change in the setting of UFRs has to be done in consultation with the neighbouring regions. Accordingly, reviewing of settings has to be examined comprehensively by all the regions.

As discussed in the previous meeting and subsequent letter of ERPC on 2,3,4 regarding enhancement of quantum of load relief in respect of existing stages, DVC, WBSETCL, OPTCL & CESC submitted the present status of feeder-wise connected load details after re-arrangement, if any :

	STAGE-I 48.5 Hz (INST.)		STAGE-II 48.2 Hz (INST.)		STAGE-III 48.0 Hz (INST.)		EMERGENCY 47.6 Hz
	Approved	Actual	Approved	Actual	Approved	Actual	Actual
BIHAR *	30 MW	70MW	36MW	42MW	43MW	NIL	NIL
JHARKHAND *	17MW	26MW	12MW	13MW	22MW	38MW	NIL
DVC	56MW	114MW	55MW	135MW	76MW	161MW	56MW
ORISSA	77 MW	154MW	77MW	151MW	105MW	189MW	NIL
WEST BENGAL	120MW	83MW	120MW	95MW	164MW	106MW	375MW
CESC (SUMMER)		60/80MW		68MW		80MW	241MW
TOTAL	300MW	527MW	300MW	504MW	410MW	574MW	672MW

- Yet to submit

BSEB & JSEB were requested to furnish the above at the earliest.

In response to the query of ERLDC regarding status of the bulk UF Shedding scheme at 47.6 Hz from Jeerat 220kV Sub-station, WBSETCL informed that the scheme is no more in service.

On the query of some of the members regarding the present frequency response characteristics of NEW grid, ERLDC agreed to present the frequency vs. time plots recorded by PMUs in Northern Region, on some earlier incidents of major generation loss, in the next OCC meeting.

ITEM NO. 11 ZONE - 3 SETTINGS OF TRANSMISSION LINE (Item No. C.4 of MoM of the 10th Protection sub-committee)

For some of the important lines Zone - 3 settings have to be reviewed so that this would not conflict with emergency loading of the lines. The emergency load capability would give the Operator sufficient time to take corrective action, but if such loading can lead to load encroachment of Distance Relays in Zone - 3, the emergency situation would worsen and may lead to cascading of outages. Further, power swing blocking philosophy also needs to be revisited in the light of recent grid disturbances.

Constituents were requested to submit protection settings of transmission elements of important grid elements and the sample format was given for submission.

ERLDC may intimate the present status.

Deliberation in the meeting

As the settings have not been received from any entity of Eastern Region, all members were once again impressed upon to furnish the information, in respect of their own transmission systems.

**ITEM NO. 12 Islanding scheme for Hydro & Thermal Power plants
(Item No. C.6 of MoM of the 10th Protection sub-committee)**

- I. Islanding Scheme for Sagardighi Thermal power Station
- II. Islanding Scheme for Bakreswar Thermal power Station
- III. Islanding Scheme for U. Kolab and Balimela HEP
- IV. Islanding Scheme for Balimela power Station

The above islanding schemes were discussed in the previous meeting. Members agreed to examine the proposed scheme and revert back with the views before the next TCC meeting. GM, ERLDC requested the constituents to plan more such schemes.

ERLDC may please elaborate.

Deliberation in the meeting

As regards, Bakreswar and Sagardighi thermal stations, WBPDC agreed to furnish their views on the proposed islanding schemes discussed in the previous meeting by one month time.

SLDC, OPTCL informed that DG sets for blackstart operation of Balimela and Upper-Kolab HPS generator is likely to be installed at these hydro stations by end of December 2011. Once these are installed, station-islanding might not be required.

ITEM NO. 13 Islanding scheme of CPPs

(Item No. C.7 of MoM of the 10th Protection sub-committee)

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 constraints exists for availing start up power from these CPPs, the same may have to resolved.

SLDCs of the constituents including DVC agreed to examine the proposed scheme and revert back with their views.

ERLDC may please elaborate.

Deliberation in the meeting

Representative from SLDC, OPTCL agreed to furnish the islanding scheme details of NBVL, Narbaram (Dhenkanal), NALCO (Damonjodi),

Vedanta(Lanjigarh) and confirm the present status of islanding schemes existing at NALCO(Anugul), RSP and ICCL by 31/12/11. He also assured the house of assessing the feasibility of extending start-up power to nearby thermal plants from these CPPs after their successful islanding, following a major grid disturbance involving Orissa, in consultation with the concerned CPPs.

A copy of the letter addressed to various IPPs by OPTCL to furnish the islanding schemes of the CPPs for submission to ERPC & ERLDC has been received.

ITEM NO.14 ISLANDING SCHEME OF IB TPS UNITS

- The issue was discussed in the 10th Protection sub-Committee meeting.
- On the request of OPGC, OPTCL agreed to convene a meeting at Budhipadar sub-station on 16.08.2011
- OPTCL /SLDC apprehended difficulty in implementation of islanding scheme with matching radial load at Budhipadar sub-station.

OPTCL / SLDC may intimate the present status.

Deliberation in the meeting

SLDC, OPTCL appraised the house that the islanding scheme of IBTPS has been agreed mutually by OPTCL and OPGC in a meeting held on 30-09-11. A copy of the minutes was made available to ERPC and ERLDC.

The following feeder wise bus arrangement was agreed upon:

- i) For 220kV Bus -I - The feeder 1,2,3 & 4 of IB TPS , ATR-I,ATR-II, Katapalli-I & II
- ii) For 220kV Bus-II - Vedanta - I & II, Korba- II & III, Tarkera-I & II, Raigarh, SPS, Bhusan- I & II with bus coupler being in closed condition.

With above distribution the normal power flow through bus coupler would 20-30MW from Bus-II to Bus-I. Upon opening the bus coupler breaker, IB TPS units will be on islanding mode by catering the loads of ATR-I, ATR-II, Katapalli-I & II. The scheme is enclosed at Annexure-IV.

It was opined that the above islanding scheme for IB TPS may be implemented and continued.

ITEM NO. 15 DATE AND VENUE OF THE NEXT (12th) PROTECTION SUB-COMMITTEE MEETING

The next (12th) Protection sub-Committee meeting will be held during the end of March, 2012.

Annexure –I

**List of Participants in the 11th Protection sub-committee meeting of Eastern Region held on 24.11.2011
(Thursday) at ERPC, Kolkata**

Organisation	Name	Designation	Contact Number
JSEB	Shri A.K.SINGH	EEE	9973850208
DVC	Shri C.KARMAKAR	DCE(Comml)	9831954298
	Shri B.PAN	DCE	9903247102
	Shri D.BHADRA	SE	
	Shri A.MAITY	Sr. DE	9433033064
OPTCL	Shri J.DUTTA	Sr. DE	9431515717
	Shri S.K.DAS	GM	9437000261
	Shri S.K.PANIGRAHI	Manager	9437301441
	Shri P.K.DAS		9238593200
	Shri P.P.BISWAS	ADDL. CE/ ALDC	9433394968
WBSEDCL	Shri D.CHAKRABORTY	CE	9831093513
	Shri S.K.DEY	CE	9830255465
WBSETCL	Shri A.RAICHAUDHURI	Addl. CE/SLDC	9433419696
	Shri B.C.MUKHERJEE	Addl. CE	9153077467
	Shri A.BISWAS	Addl. CE	9239292572
	Shri A.HALDER	Manager	9231823672
CEEC	Shri A.GHOSAL	Dy. Chief Engineer(Testing)	9831054664
NHPC	Shri R.R.THAKUR	CM	9800048857
TEESTA URJA LTD.	Shri S.K.BHOWMICK	Sr. Vice President	9958008265
BPCL	Shri C.TSHERING	Engineer	97517628536
	Shri T.TSHERING	Engineer	77230441
NTPC	Shri A.SEN	AGM	9650992601
	Shri A.DASGUPTA	DGM	9434018821
	Shri R.KUMAR	DGM (OS)	9431011344
	Shri A.SAMADDER	ENGR	9434028752
POWERGRID	Shri S.K.SINGH	CM (OS)	9434740009
	Shri A.KUMAR	SR.ENGR	9431820467
ERLDC	Shri U.K.VERMA	GM	8902496220
	Shri P.MUKHOPADHYAY	DGM	9433041810
	Shri G.MITRA	DGM	9433041811
	Shri S.BANERJEE	CM	9433041823
ERPC	Shri S.K.SAHAY	Engineer	9432013173
	Shri M.K.THAKUR	Dy. Manager	9432351832
	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 G.GHOSH	EE	
	Shri S.P.DATTA	DGM (NTPC)	9433067022
	Shri S.PAUL	EE	9874929946
	Shri S.KEJRIWAL	EE	9831919504
	Shri S.ROY	AD-I	

ANNEXURE-II

SYSTEM / SUB-STATION DATE & TIME	INCIDENCE	RESTORATION	DELIBERATION ON THE FOLLOWING POINTS
BSEB Biharshariff S/s 05.08.11 16:10 hrs	Power supply failed at 220/132kV Biharshariff S/s in BSEB due to tripping of all three 400/220kV, 315MVA ICTs on over current protection at Biharshariff(BSEB)end. 220kV Biharshariff–Fatuah, 220kV Biharshariff–Bodhgaya lines were also tripped. It was found that 220kV CB of 315MVA ICT-I has not closed properly & its CB has pole discrepancy.	Fatuah availed power form Patna (PG) & Bodhgaya availed power form Dehri at 16:25hrs. 400/220kV, 315MVA ICT-I, II & III charged at 16:30, 16:38 & 16:57hrs respectively. 220/132kV, 150MVA ICT-II was charged at 16:40hrs 220/132kV, 150MVA ICT-III was charged at 16:42hrs & but it didn't hold & tripped on Buchholtz's relay 220kV Biharshariff-Fatuah-I & II charged at 16:55hrs 220kV Biharshariff-Bodhgaya-I & II charged at 16:58hrs 220/132kV, 150MVA ICT-III was charged at 19:57hrs	1) It appears that delayed tripping of 220/132kV, 150MVA ICT-III of Biharshariff(BSEB) lead to tripping of 315 MVA ICT of Biharshariff(POWERGRID). The subsequent tripping of 220/132kV ICT-3 on Buchholtz protection during its restoration, indicates that internal fault was already developing in the ICT - Please Confirm. 2) Pole discrepancy of 220kV side CB of 400/220kV ICT-1 should have caused tripping of that particular transformer only instead of loss of multiple elements- POWERGRID and BSEB may please explain the incident with relevant relay indications and DR and SOE printouts. BSEB may take expeditious action to install DR and SOE recorder at their Biharshariff S/Stn, to enable proper analysis of incidents. 3) Long pending issue of non-availability of Bus bar protection at Biharshariff (BSEB)
<u>BSEB</u> <u>Biharshariff</u> 07.09.11 12:16 hrs	At around 12:16hrs power supply failed at 220/132kV Biharshariff S/s in BSEB due to tripping of all three 400/220kV,315MVA ICTs on back up over current protection at Biharshariff(PG) end. 220kV Biharshariff–Fatuha, 220kV Biharshariff–Bodhgaya lines were also tripped. Disruption of traction power is reported in the area of Gaya, Bodhgaya, Sonenagar and Jahanabad Area.	Fatuha availed power form Patna (PG) at 12:27hrs 400/220kV, 315MVA ICT-I, II & III charged at 12:51, 13:13 & 13:39hrs respectively. 220/132kV, 150MVA ICT-II was charged at 12:54hrs 220/132kV, 150MVA ICT-III was charged at 13:02hrs Fatuah made off from Patna(PG) at 13:58hrs & 220kV Biharshariff-Fatuha-I & II charged at 14:00hrs 220kV Biharshariff-Bodhgaya-I & II charged at 13:05hrs & 13:28hrs respectively. 220kV Biharshariff-Begusarai charged at 13:15hrs.	1.Reason for tripping to be properly ascertained as all elements were restored subsequently. BSEB may please elaborate the pre-disturbance power flows, network configuration (with diagram) and complete relay indications of the affected area. It is further observed that 220kV Tenughat – Biharshariff line has remained unaffected under similar circumstance in the past. 2.All relays at Biharshariff (BSEB) and Powergrid may be checked for proper coordination and functioning. Installation of Bus-bar differential protection at Biharshariff-BSEB to be expedited.
BSEB (220/132kV Purnea (PG) System	All three ICTs (3x100) MVA at Purnea (PG) S/s tripped on WTI protection. Also very high oil temperature observed. 132kV Purnea (BSEB)-Barauni TPS-D/C line always remain connected at Barauni TPS bus along	315 MVA ICT-I, II & III charged at 21:32, 21:28 & 21:30hrs respectively. 132 KV Duhabi- Kataiya-Purnea restored at 21:50 hrs.	All constituents need to assess their respective import / export transfer capabilities and maintain their net interchange within the limits. Procedure for regulating demand / generation in the event of

<p>12.09.11 19:20 hrs</p>	<p>with 132kV BTPS-Samastipur-D/C line & Power flow takes place from Purnea to Muzaffarpur Via BTPS. Due to this power flow, drawal from Purnea raises & to counter this overdrawal SLDC isolates BSEB from Purnea (PG) by opening 132kV Purnea (BSEB)-Barauni TPS-D/C line at BTPS end. This opening takes place normally during peak hours.</p> <p>In the event of availability of Barauni TPS generation, BSEB's drawal at Purnea(PG) reduces and remains close to its limiting value of 210MW. On 12/09/11 Barauni TPS unit was not in service & SLDC was not able to open the 132kV Purnea (BSEB)-Barauni TPS-D/C line due to some communication error at peak hour. Drawal after 19:00hrs crossed the limit & overload tripping of the 220/132kV transformers took place. Power flow was disrupted at 132kV Purnea & Kisanganj S/s of BSEB. Power flow to Nepal through 132kV Purnea-Kataiya-Duhabi also got interrupted. Total load loss was 300 MW (approx.).</p>		<p>encroachment of the import / export limit needs to be formulated by all constituents to prevent system disturbance as well as equipment damage.</p>
<p>BSEB system 13.09.11 11:01 hrs.</p>	<p>At around 11:01 Hrs due to some problem all three 400/220 KV 315 MVA ICTs at Biharsariff (POWERGRID) tripped due to operation of over current protection at Biharsariff (as verbally informed by Biharsariff, POWERGRID). Power Supply affected in Bodhgaya, Hatidah, Barhi, Baripahari, Rajgir areas.</p>	<p>315 MVA ICT- I- 11:35 Hrs 315 MVA ICT -II- 11:30 Hrs 315 MVA ICT- III- 11:30 Hrs</p>	<p>No report received from BSEB</p>
<p>JSEB Chandil 03.08.11 14:18hrs</p>	<p>Total power failure occurred at Chandil S/S in JSEB due to fire hazard & bursting of auxiliary supply transformer (300KVA).</p>	<p>1.132 Hatia – Sikidri -14:42 Hrs 2.220/132 KV, 150 MVA ICT-I at RCP- 14:26 Hrs 3.220/132 KV, 150 MVA ICT-III at RCP -14:30 Hrs 4.220/132 KV, 100 MVA ICT-I & III at Chandil -14:40 Hrs 5.220/132 KV, 100 MVA ICT-II at Chandil -14:55 Hrs 6.220 KV Chandil –Maniki-14:41hrs 7.220 KV Chandil -RCP -14:45 Hrs 8.132 KV Chandil –RKSJ-14:51hrs 9.132 KV Hatia – Patratu(8C & 9C)-16:15 & 16:25 Hrs 11.132 KV Chandil –Hatia-14:50 Hrs 12.220KVChandil-Santaldih-17:18Hr 13.132KVChandil-Adityapur -17:37 14.Tenughat U#2 -18:40 Hrs 15. Sikidri U#2 -18:50 Hrs.</p>	<p>1. Reason for tripping of ICTs at Ramchandrapur. The status of 220kV Ranchi-Chandil S/C – whether tripped or manually switched off. 2.Relay indications of both ends of each element are not available. 3. The fault at Chandil should have been isolated by tripping of all 220kV and 132kV elements (manual opening of radial lines) emanating from Chandil 220kV and 132kV buses, and not caused such widespread tripping. 4.JSEB may furnish the pre-disturbance powerflows, generation at PTPS, Tenughat and Subarnarekha. The prevailing network configuration around Chandil, Ramchandrapur, Hatia and PTPS along with settings of relevant</p>

			distance and overcurrent protections of all elements (220 & 132kV) including DR & SOE of Chandil, Ramchandrapur, Hatia and PTPS at both ends.
JSEB 20.10.11 at 20:43 hrs.	<p>Total power failure occurred at 220kV Ranchi S/s in JSEB due to tripping of 220KV Ranchi-Chandil on earthfault (Y-Ø-N,13.3km from Ranchi end) & 220kV Ranchi-Hatia S/C. 220/132kV Hatia S/s also affected due to tripping of 132KV Hatia-Patratu-D/C (Direc.E/F), 132KV Hatia-Namkum-II(Relay 86), both 150MVA transformer at Hatia & 132KV Hatia-Chandil loop(MHO 30B). Patratu U#4 & 6 tripped at the same time.</p> <p>Namkum availed power from after charging of 132kV Hatia-SHPS-I at 20:45hrs. At 20:48hrs 132kV Hatia-Namkum-II charged after normalization of both transformer. At 21:10hrs & 21:30hrs PTPS U#4 & 6 light up. 220kV Ranchi-Chandil remains in breakdown condition.</p> <p>Again at 21:38hrs while charging of 132kV Patratu-Hatia-I(8C) line conductor of the said line snapped on Bus-2 at Patratu switch yard. Both units Tenughat ,132KV Patratu-Hatia-II(L-9C) & 220kV Patratu-Tenughat tripped immediately.</p>	<p>220KV Patratu-Tenughat normalised at 22:50hrs.</p> <p>132 KV Patratu-Hatia-II normalised at 23:25hrs</p> <p>Patratu U#6 light up at 00:50hrs. of 21.10.11.</p> <p>Tenughat U#2 synchronized at 04:50hrs.</p> <p>220kV Ranchi-Hatia charged at 13:36hrs.</p> <p>Tenughat U#1 synchronized at 15:58hrs.</p> <p>220kV Ranchi-Chandil normalized at 16:58hrs of 22.10.11.</p> <p>132kV Hatia-Chandil loop charged at 13:52hrs of 23.10.11.</p> <p>132 KV Patratu-Hatia-I(9c) normalised at 18:40hrs of 24.10.11.</p>	<p>1. Fault in 220KV Ranchi-Chandil S/C leads to multiple line tripping in JSEB system apparently due to non-clearance of fault from Chandil end. JSEB may further clarify.</p> <p>2. In the 2nd incidence, fault in 132 KV Patratu-Hatia-I(8c) line lead to tripping of 220kV Patratu-Tenughat S/C and 220 KV PTPS-Hatia-II. But 220 KV PTPS-Hatia-I did not trip. The fault should have been cleared by line protection of 132 KV Patratu-Hatia-I(8c). It appears that non operation of line protection leads to such large scale disturbance in JSEB system</p> <p>3. Remedial measure taken</p>
JSEB 24.10.11 12:40 hrs.	<p>220kV Tenughat-Patratu line tripped on earth fault, Zone-III from Tenughat end along with the tripping of Tenughat U#1. After some time, at around 12:55hrs, total power failure occurred at Patratu TPS with the tripping of all outgoing feeders. Running units #4 & 6 of Patratu TPS tripped along with 220kV Patratu-Hatia-D/C, 132kV Patratu-Hatia-9C & 220kV Patratu-Tenughat bypass line.</p> <p>At Hatia end, 220kV Ranchi-Hatia-I tripped on R-Φ to ground fault F/L-10.8km from Ranchi end. Both 220/132kV, 150MVA transformers & all 132kV outgoing feeders from Hatia tripped.</p> <p>Relay: Tr-I-Trip relay Gr'B' S/d, Div E/F, AR6TN-167N</p> <p>Tr-II-Div E/F, 167N, trip relay, Gr'A' 86A, Div E/F 67N.</p> <p>No tipping occurred at Namkum end.</p>	<p>220KV Patratu-Tenughat normalised at 13:12hrs.</p> <p>220 KV Patratu-Hatia-I normalised at 13:20hrs</p> <p>220kV Ranchi-Hatia charged at 13:36hrs.</p> <p>220 KV Patratu-Hatia-II normalised at 13:45hrs</p> <p>132kV Ranchi-Hatia (L-9C) charged at 13:37hrs</p> <p>Patratu U#4 synchronized at 16:35hrs.</p> <p>Tenughat U#1 synchronized at 16:24hrs.</p> <p>Subarnarekha HPS U#1 synchronized at 13:05hrs.</p> <p>132kV Patratu-Hatia (L-8C) charged at 19:24hrs</p>	<p>1. Tripping of 220KV Patratu-Tenughat S/C in zone-III Dist protection operation appears to be malfunctioning of relay as there was no other tripping at that time. Also reason for tripping of TVNL#1 not furnished.</p> <p>2. Reason for total system fail could not be ascertained due non-availability of details</p> <p>3. Remedial measure taken</p>
DVC Bokaro-B	<p>At 20:18hrs, 220kV Bokaro-B-CTPS-D/C tripped on transient earth fault along with tripping of 220/132 KV, 150</p>	<p>220kV Bokaro-B-CTPS-I 21:32hrs</p> <p>220kV Bokaro-B-CTPS-II-</p>	<p>1. Reason for voltage dip-due to power swing? Fault involving all three phases of both circuits is a rare</p>

<p>05.08.11 20:18 hrs.</p>	<p>MVA ICT at Chandrapura. Tripping of L # 205, 206 were accompanied by severe voltage dip causing auxiliary power failure of some 6.6 KV bus. Boiler of the running units tripped subsequently. All the three running units of Bokaro-B & CTPS U#8 tripped.</p>	<p>21:39hrs Bokaro-B U #1 - 22:15hrs Bokaro-B U #2 -03:25 (06/08/11) Bokaro-B U #3 -00:05 (06/08/11) CTPS U#8 -00:55 (06/08/11)</p>	<p>occurrence. The relay indications at CTPS end indicate that the fault involved only R & B phases. DVC may explain such discrepancy in relay indications between Bokaro-B and CTPS ends. 2.Reason for tripping of units-due to low voltage in auxiliary system? Since tripping on Zone-1 protection is practically instantaneous, a momentary dip in 6.6kV voltage should not have caused operation of U/V relays at power stations, since such relays usually have a finite time delay in operation. Further, AVR of units should have responded to compensate the station voltage dip. DVC may please clarify these aspects, with supporting records like DR prints and excitation system responses recorded by the DCS at Bokaro-B and CTPS stations. 3.Remedial measure taken</p>
<p>OPTCL Tarkera 01.08.11 13:55 hrs & 15: 30Hrs</p>	<p>On 01.08.11 at 13:55 hrs all the 220 kV lines emanating from Tarkera S/S tripped. At the same time 220 kV Budhipadar-Raigarh Ckt tripped at Budhipadar end. Again the above tripping reoccurred at 15:30 hrs.</p>	<p>220 kV Tarkera-Budhipadar-II-14:08 220 kV Tarkera-Budhipadar-I-14:11 132 kV Tarkera-Rourkela-II & III-14:12 100 MVA Auto-IV at Tarkera-14:13 100 MVA Auto-II at Tarkera-14:15 132 kV Tarkera-Rajgangpur-II-14:17 220 kV Tarkera-Bisra PG-II -14:39 220 kV Tarkera-Bisra PG-I-14:40 220 kV Budhipadar-Raigarh-14:45 At 15:30 hrs the disturbance reoccurred. 220 kV Tarkera-Budhipadar-I -15:44 220 kV Tarkera-Budhipadar-II -15:45 100 MVA Auto-II at Tarkera -15:48 100 MVA Auto-IV at Tarkera -15:50 220 kV Tarkera-Bisra (PG)-I & I-15:51 132 kV Tarkera-Rajgangpur-II-15:55 220 kV Budhipadar-Raigarh -15:55</p>	<p>1.Tripping of 220 kV Budhipadar-Raigarh is due to overloading 2.Tripping of 220 kV Tarkera-Bisra (PG)-I from PG end only on zone-II dist relay operation implies that fault lied between Tarkera-Budhipadhar section which was not cleared in time. 3.Exact nature of fault could not be identified from the available information. OPTCL may kindly explain the incidents with the help of suitable diagrams, stating the pre-disturbance powerflows, generation and network configuration around Budhipadar and Tarkera along with settings of relevant distance and overcurrent protections of all elements (220 & 132kV) emanating from Budhipadar and Tarkera , at both ends. It is further felt that DR and SOE prints are absolutely essential for proper analysis of such incidents. 4.Remedial measure taken.</p>
<p>OPTCL Theruvalli 20.08.11 13:45 hrs.</p>	<p>At 13:45 hrs, all running units of Balimela & Indravati tripped on over Voltage followed by tripping of 220kV Jaynagar-Jeypore(PG)-I & II at PG end. There was no power supply at Jayanagar S/S. 220 kV bus Voltage at</p>	<p>220 kV Theruvalli-Bhanjanagar Ckt-I-13:55 220 kV Theruvalli-Jayanagar ckt-I -14:04 220 kV Theruvalli- Indravati-ckt-II -</p>	<p>1.It is understood that distance protection is not in service at Theruvalli S/stn. Further a number of lines tripped on E/F from one end (Theruvalli) only. Reason for non-operation of distance protections</p>

	<p>Jayanagar shoots up to 272 kV.U#1 at Indravati & U# 7 at Balimela tripped.400 kV Indravati-Indravati PG tripped at Indravati end.</p> <p>All the 220 kV feeders emanating from Theruvali grid S/S tripped at Theruvali end on E/F relay indication, except 220 kV Theruvali-Upper Kolab and 220 kV Theruvali-Indravati-II, which were tripped at the other end. 220 kV Theruvali-Narendrapur-I did not trip.</p>	<p>14:04</p> <p>220 kV Theruvali- Narendrapur ckt-I-14:08</p> <p>Auto-II at Theruvali -13:40</p> <p>All 132 kV feeders at Theruvali charged -13:40</p> <p>220 kV Theruvali- Bhanjanagar ckt-II-14:11</p> <p>220 kV Theruvali- Indravati- ckt-III-14:12</p> <p>Auto-I at Theruvali -14:13</p> <p>220 kV Theruvali-Narendrapur ckt-II-14:15</p> <p>220 kV Theruvali- U.Kolab-14:19</p> <p>220 kV Theruvali- Jayanagar ckt-II-14:19</p>	<p>from other ends of Theruvali is not understood. OPTCL & POWERGRID may kindly explain the incident with suitable diagram, pre-disturbance power flows and network configuration around Theruvali and Jeynagar.</p> <p>2.POWERGRID and OPTCL may also explain reasons for tripping of 220kV Jeynagar-Jeypore D/C and 400kV Indravati(PG)-Indravati(OHPC) S/C. On loss of evacuation path, Balimela and Indravati units should have tripped on overspeed protection. The overvoltage observed at Jeynagar 220kV and Indravati(OHPC) also needs to be analysed.</p> <p>3.OPTCL, OHPC and POWERGRID may please make available all relevant relay indications , DR and SOE prints (including those of units) and discuss the remedial measure taken.</p>
<p>OPTCL</p> <p>Theruvali & Jaynagar</p> <p>21.09.11</p> <p>12:23 hrs.</p>	<p>All running units of Balimela & Indravati tripped on over Voltage followed by tripping of 220kV Jaynagar-Jeypore (PG)-I & II at PG end. There was no power supply at Jayanagar S/S.U#2 at Indravati & U# 2,6,7 & 8 at Balimela tripped.400 kV Indravati(GR)-Indravati(PG) tripped at Indravati(GR) end.</p> <p>All the 220 kV feeders emanating from Theruvali grid S/S tripped at Theruvali end on E/F relay indication. 220 kV Theruvali-U.Kolab, 220 kV Jaynagar-U.Kolab & 220 kV Theruvali-Indravati Ckt-II & III tripped on overvoltage & Bus bar protection.</p>	<p>At 12:40 hrs 220 kV Theruvali-Bhanjanagar Ckt-I charged from Bhanjanagar.</p> <p>At 12:41 hrs 220 kV Theruvali-Indravati Ckt-III charged from Theruvali.</p> <p>At 12:42 hrs 220 kV Theruvali-Jaynagar Ckt-I charged from Theruvali.</p> <p>At 12:57 hrs 220 kV Theruvali-U.Kolab Ckt charged from Theruvali</p> <p>At 12:59 hrs 220 kV Jaynagar-Balimela Ckt-II charged from Jaynagar.</p> <p>At 13:00 hrs 220 kV Theruvali-Bhanjanagar Ckt-II charged.</p> <p>At 13:02 hrs 20 kV Theruvali-Jaynagar Ckt-II charged.</p> <p>At 13:12 hrs 132 kV Jaynagar-Theruvali Ckt- I &II tripped at Theruvali end on E/F relay indication due to bursting of 'B' phase PT at Jaynagar end. Jaynagar 220 kV bus become dead.</p> <p>At 13:17 hrs 220 kV Theruvali-Narendrapur Ckt-I charged.</p> <p>At 13:45 hrs 220 kV Theruvali-</p>	<p>1.Reason for Bus bar protection operation on the first incident could not be ascertained.</p> <p>2.Jaynagar S/stn having one and half breaker scheme, for both the incidents case of tripping of one bus, other bus should be in service and there should not be any tripping of line.</p> <p>3. Remedial measure taken</p>

		<p>Jaynagar Ckt-I charged from Theruvali.</p> <p>At 13:49 hrs 220 kV Jaynagar-Balimela Ckt-II charged from Jaynagar.</p> <p>At 13:55 hrs 220 kV Jaynagar-Jeypore PG Ckt-II charged.</p> <p>At 13:57 hrs 220 kV Jaynagar-U. Kolab Ckt-I charged from Jaynaga</p> <p>At 14:12 hrs 400 kV Indravati PH-Indravati PG Ckt charged.</p> <p>At 14:29 hrs 220 kV Jaynagar-Jeypore PG Ckt-I charged.</p> <p>At 14:32 hrs #2 at Indravati PH synchronized to grid.</p> <p>At 15:20 hrs #7 at Balimela PH synchronized to grid.</p> <p>At 15:52 hrs 220 kV Balimela PH-Balimela Grid charged.</p> <p>At 18:16 hrs 220 kV Jaynagar-Balimela Ckt-III charged.</p> <p>At 23:48 hrs 220 kV Jaynagar-Balimela Ckt-I charged.</p> <p>On 22.08.11 at 12:37 hrs 220 kV Jaynagar-U. Kolab Ckt-II charged.</p>	
<p><u>OPTCL (400/220kV Baripada and Balasore) system</u> 22/09/11 13:59 hrs</p>	<p>400kV Baripada-Kolaghat line tripped on Y-N fault, (Fault current-1.755KA,F/L-116.4km from Baripada). Soon after, 400kV Baripada-Rengali line tripped on Y-N fault (Location-163.5km from Baripada). Since both 400kV lines connecting Baripada S/Stn tripped, all ICTs & 220kV lines hand tripped due to no voltage & no power situation. Power supply failed at 220/132kV Balasore (GR) S/s as 220kV Baripada (PG) - Balasore Ckt-I & II become zero. Power supply interrupted to Bhadrak, Bhadrak (Traction), Soro, FACOR, Balasore, Balasore (Traction), Jaleswar, Jaleswar (Traction), Ispat Alloys, Emami, Birla Tyre</p>	<p>400kV Rengali-Baripada line charged at 15:07 Hrs.</p> <p>400/220 kV, 315 MVA ICT-I at Baripada charged at 15:17 Hrs.</p> <p>At 15:20hrs 220kV Balasore-Baripada PG Ckt-II charged.</p> <p>400/220kV 315 MVA ICT-II at Baripada charged at 15:24 Hrs.</p> <p>At 15:25hrs 220kV New Duburi-Duburi Ckt charged from Duburi through bus coupler as there was some relay problem.</p> <p>At 15:26hrs 220kV Balasore-Baripada PG Ckt-I charged.</p> <p>220/132kV, 160 MVA ICT- I at Baripada charged at 15:29 Hrs.</p> <p>132kV Baripada-Baripada (OPTCL) charged at 15:30 Hrs.</p> <p>At 15:32 hrs 220kV Duburi-New Duburi Ckt made through.</p> <p>220/132kV, 160 MVA ICT – II</p>	<ul style="list-style-type: none"> • From the relay indications and fault locator readings, it is apparent that the faults were close to Kolaghat and Baripada ends. Further, the nature of faults at the two ends (remote from Baripada) were also identical; viz. Y-phase to ground. • Relay indications from Kolaghat TPS and Rengali (PG) 400kV S/Stn may be furnished by WBPDC and POWERGRID respectively, and their consistency with Baripada end readings also needs to be examined. • Since both 400 KV lines supplying power to Baripada tripped, total power failure occurred in those areas which are fed from Baripada.

		<p>at Baripada charged at 15:35 Hrs.</p> <p>132kV Baripada–Rairangpur ckt charged at 15:42 Hrs.</p> <p>At 15:51 hrs 220kV New Duburi-Balasore charged.</p> <p>400kV Baripada –Kolaghat normalized at 15:51 Hrs.</p>	
<p>WBSETCL</p> <p>Jeerat</p> <p>01.08.11</p> <p>09:54hrs.</p>	<p>Due to flashing in 220kV, Y-phase line side isolator of 315MVA Tr-I, the said transformer made off immediately. To avoid overloading of 315MVA Tr-III, following lines made off.</p> <p>220KV Jeerat-Kasba-D/C</p> <p>220kV Subhashgram-Kasba</p> <p>220KV Jeerat-NewTown</p> <p>132KV Jeerat- Ashokenagar –D/C</p> <p>132kV Kasba-Saltlake-D/C</p> <p>132kV Kasba-CESC-I, II & III</p> <p>132kV Kasba-BEH</p> <p>132kV Kasba-Sonarpur</p> <p>220kV Jeerat-Bantala</p> <p>Due to this no power at Ashokenagar, Basirhut, Kasba(WBSETCL), NewTown S/s. CESC system also got split from Kasba point.</p>	<p>The following lines were restored at:</p> <p>220KV Jeerat-Kasba-D/C-09:59 Hrs.</p> <p>220KV Jeerat-NewTown-12:44 Hrs.</p> <p>220kV Subhashgram-Kasba-21:28 Hrs</p> <p>315MVA Tr-I at Jeerat-12:18 Hrs.</p>	<p>To prevent overloading of 315 MVA transformer-III of Jeerat, above mentioned lines were switched off.</p>
<p>WBSETCL</p> <p>Jeerat</p> <p>04/08/11</p> <p>18:57hrs.</p>	<p>At 18:57hrs, CB of 220KV Jeerat-Newtown burst at Jeerat S/s in WBSETCL system causing tripping of all three 400/220 KV ICTs, all three 220KV/132KV ICTs and 220KV Kasba–Subhashgram. CESC system got split due to tripping of 220KV Jeerat-Kasba-D/C and 220 KV Jeerat-Newtown-Kasba along with Budge-Budge U#3. Due to tripping of all 132KV feeders, power failed at Dharampur, Kalyani, Titagarh, Ashokenagar, Basirhat, Bongaon & Debagram S/s.</p>	<p>315 MVA ICT of Jeerat-I - 19:50</p> <p>315 MVA ICT of Jeerat-II-19:16</p> <p>315 MVA ICT of Jeerat-III-19:17</p> <p>160 MVA Transformer of Jeerat -19:16</p> <p>220KV Kasba-Newtown - 19:04</p> <p>CESC system synchronized at Howrah point -19:10</p> <p>Sonarpur S/s -18:58</p> <p>Dharampur S/s -19:06</p> <p>Titagarh S/s -19:06</p> <p>Kalyani s/s -19:10</p> <p>Budge-Budge U#3-21:27</p>	<p>1. Absence of Busbar protection lead to tripping of lines/ICTs</p> <p>2. Reason for tripping of Budge-Budge U#3</p> <p>3. Remedial measure taken</p>
<p>Chhukha HEP</p> <p>25/08/11</p> <p>11:04 hrs.</p>	<p>400/220kV, 315MVA ICT at Bongaigaon (NER) tripped. At the same time 220kV bus coupler breaker at Malbase got opened. All Chhukha HEP units were tripped on the operation of over speed relay due to sudden load throw off. There was no supply from Malbase; Birpara & Salakati as there is no bus voltage at Malbase & Salakati.</p>	<p>400/220kV, 315 MVA ICT at Salakati -11:30 Hrs</p> <p>220kV Birpara–Salakati-II-11:32</p> <p>220kV Birpara–Malbase-11:33</p> <p>220kV Birpara–Chhukha-I-11:34</p> <p>Chhukha U#1 -12:04 hrs</p> <p>220kV Birpara–Chhukha-II-12:12 Hrs</p> <p>220kV Birpara–Salakati-I-12:22</p> <p>220kV Birpara–Binaguri-I-12:24</p> <p>220kV Birpara–Binaguri-II-14:59</p>	<p>1. Reason for tripping of Bus coupler circuit breaker of Malbase and 220kV Chhukha-Birpara I & II</p> <p>2. Reason for tripping of 220kV Birpara-Salakati D/C is also not clear. It is understood that 220kV Salakati S/Stn is synchronized with NER grid through other 220kV lines.</p> <p>3. POWERGRID and BPC / CHPC may clarify the incident with necessary DR prints and SOE.</p> <p>4. Remedial measure taken.</p>

<p>400/220KV Binaguri POWERGRID 14/09/11 00:29 hrs.</p>	<p>400KV Tala-Binaguri-III tripped due to Y-B to ground fault, Z-I, 118.53km from Binaguri. At that time heavy rainfall & lightning observed in Bhutan. 400KV Tala-Binaguri-IV tripped on Y-Phase to ground fault, Z-I, 99.12km from Binaguri at the same time. Soon after, Main-II bus bar protection operated causing total loss of Tala (120MWx6) generation.400KV Tala-Binaguri-I & II tripped due to direct trip received from Tala end as a result of over voltage. 400kV Binaguri-Bongaigaon-I was also tripped on over voltage at the same time.</p> <p>The units were normalized using DG set for black start. Since the 400kV Tala-Malbase-III was still charged through ICT and the breaker was still in closed at Malbase end, Tala synchronized Unit-VI at 02:05 hrs. via feeder- 3 i.e. Tala-Malbase section.</p> <p>After synchronization of Unit-VI Tala starts increasing its generation which causes overloading in 220kV CHPC-Birpara & 220kV CHPC-Malbase section. At around 02:25hrs, 220KV Birpara-Binaguri-D/C (RB-N phase fault, 64.95km) tripped which causes overloading in 220kV Birpara-Salakati-D/C line. At 02:27 hrs,315MVA ICT at Salakati tripped due to which 220KV Chhukha-Birpara-D/C (Micom start, 3-Φ, Z-I,Ia-537.9A,Ib-572A,Ic-555A), 220KV Chhukha-Malbase-Birpara (Micom, 3-Φ,Ia-634A,Ib-668.4A,Ic-650A) and 315MVA ICT at Malbase along with Tala U#VI tripped on power swing.. All 4 units of Chhukha HPS (4x84MW) tripped on over speed.400KV Teesta-Binaguri-I was also tripped on over voltage at 03:112hrs during the normalization process.</p>	<p>400KV Purnea-Binaguri I &III opened at 03:26hrs to regulate voltage. Tala U#V black started using DG set. 400kV Tala-Binaguri-I got extended from Binaguri end & the feeder was brought to bar at 03:40 hours at Tala end. It was closed & normalized at 03:50hrs at Binaguri end. 400 kV Purnea-Binaguri-I closed at 03:55. Tala U#IV synchronized at 04:30 hrs (Tala faced problem to sync due to persistent high voltage around 440kV). 400KV Tala-Malbase-Binaguri closed at 04:35hrs. 400KV Teesta-Binaguri-I charged at 05:08hrs. Unit-III & VI synchronized at 05:10 hrs. 400KV Tala-Binaguri-IV closed at 05:37 hrs. Unit-I & II cannot be put to bar due to bearing problem. 400KV Purnea-Binaguri-II charged at 05:20hrs. 220KV Chhukha Birpara-I closed at 03:38 hrs. Chhukha U#1 synchronized at 04:00hrs along with 220 KV Chhukha –Malbase- Birpara closed at.220 KV Chhukha Birpara-II closed at 4:15 hrs.220KV Birpara-Binaguri closed at 07:22hrs.All other Chhukha units synchronized subsequently.</p>	<p>Closer coordination required between Bhutan and ERLDC operating personnel for proper appreciation of constraints existing in Bhutan and India(ER) systems and also before undertaking any operation.</p>
<p>RANGIT system 26.10.11 17:06hrs</p>	<p>All three running units of Rangit hydro power station tripped due to tripping of all outgoing feeders, accompanied by heavy storm, lightning & rainfall around Rangit.132KV Rangit-Ramam line tripped at16:48hrs.Thereafter all outgoing feeders tripped at 17:06hrs along with running units of Rangit.</p>	<p>132KV Siliguri-Rangit charged from Siliguri end at17:40hrs. Rangit U#3 synchronized at17:44hrs. Rangit U#1 & 2 synchronized at18:05hrs & 18:09hrs respectively. 132KV Rangit-Rammam normalized at 18:24hrs. 132KV Gantak-Rangit normalized at 18:25hrs. 66KV Rangit-Melli normalized at 18:39hrs.</p>	<p>The reason for tripping was due to inclement weather. Delayed restoration 132KV Rangit-Melli S/C was due to communication problem between Melli and Rangit.</p> <p>Relay indications from Melli, Gangtok, Siliguri(PG) and Rammam may also be made available and corroborated with those obtained at Rangit end</p>

		132KV Rangit-Melli normalized at 09:47hr of 27/10/11	
<p><u>POWERGRID</u></p> <p>Binaguri</p> <p>15/09/11</p> <p>18:05 Hrs.</p>	<p>Following lines tripped from 220 KV Birpara S/S along with Chukha HPS units 2,3 & 4, reportedly due to operation of Bus Differential Protection of Bus –II at Birpara.</p> <ul style="list-style-type: none"> • 220 KV Chukha Birpara-I • 220 KV Chukha Birpara-II • 220 KV Birapara – Siliguri - II • 220 KV Birpara- salakati –II • 50 MVA ICT- II at Birpara S/s <ul style="list-style-type: none"> • Loss of generation was approximately 250 MW from Chukha HEP. • System Frequency before the incident was 49.95 HZ; post incident change was marginal. 	<ul style="list-style-type: none"> • 220 KV Chukha Birpara- I 19:23 hrs • 220 KV Chukha – Birpara – II 19:27 hrs. • 220 KV Birpara – Siliguri – II 18:52 hrs. • 220 KV Birpara- Salakati –II 19:29 hrs. • 50 MVA ICT – II at Birpara S/s 18:52 hrs. • All units of Chukha HEP synchronized by 20:25 hrs. 	<p>1) Reason for Bus bar protection operation at Birpara. Whether 220kV Chukha-Malbase and 220kV Malbase – Birpara continued to be in service. If so, then reason for tripping of Chukha units.</p> <p>2) Connectivity of different lines and transformers to 220kV Bus-I and II at Birpara 220kV S/Stn. Reason for tripping of other lines which were not connected to Bus-II of Birpara</p> <p>3) Remedial measure taken</p>

ISLANDING SCHEME OF BUDHIPADAR 220KV SUB-STATION AS FINALISED BY OPGC AND OPTCL

