North Eastern Regional Power Committee

Agenda For

50th PCC Sub-Committee Meeting

Time of meeting : 10:00 Hrs.

Date of meeting : 10th May, 2018 (Thursday)

Venue : "Hotel RajMahal", Guwahati.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 49th MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

The minutes of 49th meeting of Operation Sub-committee held on 13th March, 2018 at Guwahati were circulated vide letter No. NERPC/SE/PCC/2018/2565-589 dated 23rd March, 2018.

The Sub-committee may confirm the minutes of 49th PCCM of NERPC as no comments/observations were received from the constituents.

ITEMS FOR DISCUSSION

1. FOLLOW UP OF REMEDIAL ACTIONS:

The suggested measures as per 49th PCC:

Sl. No	Name of element	Actions to be taken	Concerned Utilities	Status as per 49th PCC Meeting	Latest status
1	132 kV Haflong - Umranshu Line	Over Current Settings (to be made directional) at Umranshu end need to be reviewed by AEGCL.	AEGCL	By April'18	
2	134 kV Haflong - Umranshu Line	Healthiness of Protection System as well as DPR settings at Umranshu for 132 kV Haflong - Umranshu Line to be checked.	AEGCL	By April'18	
3	133 kV Lekhi - Nirjuli Line	Checking of healthiness of Protection System (Relays, Circuit breaker, DC system etc) of downstream substations	DoP, AP	Status could not be updated due to absence by DoP, AP	

4	132 kV Agia - Medipathar I line and 132 kV Mawngap - Nongstoin I line	Healthiness of Protection System at Nongstoin for 132 kV Mawngap - Nongstoin Line to be done by MePTCL.	MePTCL	Under PSDF works By Nov'18	
5	133 kV Agia - Medipathar I line and 132 kV Mawngap - Nongstoin I line	Checking of healthiness of Protection System (Relays, Circuit breaker, DC system etc) of downstream substations	MePTCL	Under PSDF works By Nov'18	
6	400 kV Killing (Byrnihat) - Silchar Line	DT from Byrnihat before dead time to be rectified by Byrnihat	MePTCL	NR replaced on 20.12.17 but problem still persists. Works will be attended during shut down of Silchar-Byrnihat Line.	
7	132 kV Monarchak - Udaipur Line , 132 kV Rokhia - Agartala I line & 132 kV Monarchak - Rokhia Line	Review of relay Settings at Monarchak, Rokhia, 79-Tilla & Udaipur	NEEPCO & TSECL	Team will visit Monarchak, Rokhia , 79 Tilla(Agartala) and Udaipur Substation and resolve the matter	
8	133 kV Monarchak - Udaipur Line , 132 kV Rokhia - Agartala I line & 132 kV Monarchak - Rokhia Line	Relay co-ordination of downstream substations of Monarchak are to be done with Monarchak	NEEPCO & TSECL	Team will visit Monarchak, Rokhia , 79 Tilla(Agartala) and Udaipur Substation and resolve the matter	
9	132kV Khliehriat-Khliehriat I	Activation of DPR	NERTS &MeECL	NERTS end done. MeECL to activate by 21.03.18.	
10	400 kV Bongaigaon TPP-Bongaigaon Line	Maloperation 86A relay	NTPC	Status could not be updated due to absence NTPC	

11	132 kV Kolasib-Badarpur line & 132 kV Kolasib-Aizwal line	Relay Coordination to be done at Kolasib & downstream substations of Kolasib by P&ED Mizoram.	P & ED Mizoram	Status could not be updated due to absence by P&ED, MZ	
12	133 kV Kolasib-Badarpur line & 132 kV Kolasib-Aizwal line	Checking of healthiness of Protection System (Relays, Circuit breaker, DC system etc) of downstream substations	P & ED Mizoram	Status could not be updated due to absence by P&ED, MZ	
13	132 kV Aizawl - Zungtui Line	Relay coordination of downstream substations of Aizwal is to be done by P&ED Mizoram in consultation with POWERGRID.	P&ED Mizoram	Status could not be updated due to absence by P&ED	
14	133 kV Aizawl - Zungtui Line	Checking of healthiness of Protection System (Relays, Circuit breaker, DC system etc) of downstream substations	P&ED Mizoram	Status could not be updated due to absence by P&ED	
15	220 kV AGBPP - Mariani (AEGCL) 1 Line & 220 kV Mariani (AEGCL) - Misa 1 Line	Review of Settings of Earth Fault relays of 220 kV AGBPP - Mariani (AEGCL) Line at Mariani(AS) (Directionality of Earth fault Relay at Mariani to be checked).	POWERGRID	By Mar'18	
16	400 kV Azara - Bongaigaon Line	AEGCL(Azara) to keep the fault clearing time within 100 msec.	POWERGRID & AEGCL	Specific case to be sent by NERLDC to POWERGRID and AEGCL. POWERGRID and AEGCL will review the settings.	
17	132 kV Lekhi - Nirjuli Line	Relay coordination to be done at Nirjuli & downstream substations of Nirjuli by POWERGRID & DoP,AP.	POWERGRID & DoP,AP	NERTS end complete.	

18	132kV Haflong-Umrangsho	Checking of healthiness of protection system(CB, relay, DC supply etc.) at Umrangsho	AEGCL	Apr'18	
19	132kV Khliehriat-Khleihriat I	O/C, E/F relay auxiliary contacts to be assigned to NR for DR indication.	MePTCL	By 21.03.18	
20	132 kV AGTCCPP-Agartala	Over-reach of DPR at AGTCCPP. Setting to be revised after HTLS upgradation.	NEEPCO	Mar'18	
21	132 kV Rangia - Motonga	Checking of relay settings at Rangia	NERTS	NERPC to write to NLDC. Subsequently NERTS to visit.	
22	400kV Balipara-BNC I&II	POR settings to be disabled. Till SVC is in service Z-I to be kept at 80%	NERTS	Mar'18	
23	220/132kV Dimapur ICT-1	Backup O/C, E/F settings to be reviewed such that it operates before Z-III at Misa	NERTS	Mar'18	
24	220kV Dimapur-Misa -2	Z-III protection timing to be reviewed such that it operates after operation of backup of ICT at Dimapur	NERTS	Mar'18	
25	132kV Palatana-Udaipur	NR to be time synchronized at Palatana	OTPC	-	
26	132kV Bus Bar at Palatana	Healthiness/operation of bus bar protection need to be reviewed	OTPC	-	

Concerned utilities may please intimate the latest status.

A. OLD ITEMS

A.1 Third Party Protection audit of NER Sub-Stations

The 48th PCC Forum decided that Report of 1st Phase of 3rd Party Protection Audit of NER Substations has to be completed by the Committee formed during Subgroup Meeting held on 06.12.17 by 31.01.18, only after which the 2nd Phase of 3rd Party Protection Audit shall be started. DGM, NERLDC informed the Forum that the report shall comprise of both recommendations as well as action plans. Corrective actions that are taken by Power Utilities against observations of audit team may be monitored in the PCC Meeting.

The Forum discussed the audit procedures followed for +/- 800 kV Biswanath Chariali HVDC Station as it is different from other substations. NERLDC expressed that the DC protection part is complex and would need more than 1 day to audit the entire Substation.

Member Secretary, NERPC requested POWERGRID to find out the audit procedures of other HVDC stations outside NER like +/- 500 kV Rihand – Dadri, +/- 500 kV Talcher – Kolar HVDC Station etc, which can be practiced in NER as well.

Member Secretary informed the forum that proposal has been sent recently for obtaining Protection Database Management System(PDMS) from PSDF. PDMS will comprise of mainly 2 parts: i) Collection of data from all stations of NER and ii) Collection of Settings. This will make the auditing practice easier as unavailability of Data and Settings is one of the common issue that has been observed during 1st phase of 3rd Party Protection Audit.

Also, NERLDC informed the forum that as per draft "Reliability Standard for Protection System", periodic protection audit has to be conducted once in year for critical substation and once in four years other substations. Subgroup had discussed to find out the list of critical substations in the Meeting held on 6th December, 2017. After detailed deliberation, forum finalized the **critical substations of NER** and are as follows:

a. POWERGRID: 400/220/33 kV Balipara, 400/132 kV Biswanath Chariali, 400/220/33 kV Bongaigaon, 400/220/33 kV Misa, 400/132/33 kV Silchar, 220/132 kV Dimapur, 220 kV Mariani (PG), 220/132 kV Salakati

b. NEEPCO: 400/132 kV Ranganadi, 220/132 kV AGBPP

c. OTPC: 400/132 kV Palatana

d. NTPC: 400/220 kV BgTPP

e. AEGCL: 400/220 kV Azara, 220/132/66/33 kV Agia, 220/132/33 kV BTPS, 220/132/66/33 kV Mariani, 220/132/33 kV Samaguri, 220/132/33 kV Sarusajai, 220/132 kV Sonabil

f. MePTCL: 400/220/132 kV Byrnihat (Killing)

g. TSECL: 132/33/11 kV Agartala (79 Tilla), 132/33 kV Surajmani Nagar

In 49th PCC, Member Secretary enquired about the status of the Audit Report. It was intimated that the First Phase Audit report is in final stage and would be submitted by 31.03.2018. MePTCL informed the forum that the First Phase Audit report and Template settings as per Ramakrishna Task Force Committee is completed and will be submitted to the Convener Audit Protection for approval. MS,NERPC opined that upon his visit to +/-800kV HVDC it was observed that only audit of AC system is possible.

DGM(SO-II), NERLDC suggested forum to arrange a separate meeting to discuss the observations and recommendations of 3rd Party Protection Audit Report before next PCC Meeting for fruitful deliberation in the PCC Meeting.

MePTCL has already submitted the Audit Report for Meghalaya and Mizoram.

Members may please discuss

A.2 Standardization of Disturbance Recorder Channels:

In 49th PCCM, AEGCL representative informed that for remaining 6 sub-stations standardization would be completed by May'18. E E (System Protection), MePTCL informed that after obtaining the ABB software from AEGCL, the standardisation for remaining stations of Mendipathar SS, Killing SS, Stage III PS and Stage IV PS will be completed by 30.04.2018. The forum requested NERLDC to circulate the DR template to all concerned utilities.

SE(O&P),NERPC suggested that during erection works under R&U scheme the commissioning engineers should do the work of DR channel standardization.

Members may please discuss

A.3 Implementation of SPAR

In 48th PCCM, NTPC informed the forum that they are having problem with implementation of the scheme due to coordination issue between differential and distance protection. POWERGRID informed that they will take up the issue.

NERLDC suggested to the forum that Single Phase/Three Phase Auto-reclosing scheme as applicable considering breaker mechanism has to be implemented in all the lines to ensure reliability. For Single pole breaker, Single Phase Auto reclosing scheme has to be enabled for maintaining synchronism through other healthy phases. Also, priority scheme is to be ensured in one and half breaker scheme.

The committee requested all constituent to furnish the status report of SPAR implementation to NERPC and NERLDC latest by 31st January, 2018.

In 49th PCCM, DM(E/M), NEEPCO enquired whether there are any specific guidelines regarding activation of A/R for lines connecting two generating stations eg. 132kV Khandong-Kopili D/C. NERLDC informed the forum that as per Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010, 3 ph A/R should be in place for 132 kV lines. EE,SP,

MePTCL informed that a feasibility report regarding implementation of A/R in MeECL system would be submitted by Apr'18. The forum decided that availability of A/R facility would be specifically mentioned in the Protection Audit Report. It was also discussed that once installation of Numerical Relays under PSDF scheme is done, the implementation of Auto-reclosing schemes in all the states can be done more effectively.

Members may please discuss.

A.4 Disturbance in Tripura System

As discussed in previous PCC meeting there have been a number of disturbances in Tripura system. However no fruitful resolution was achieved due to non-participation by TSECL. Brief recommendations of 48th PCC are as follows:

- Non-directional E/M relays for O/C, E/F at PKBari to be made directionsl
- Installation of Numerical relay at 132kV PKBari
- Installation of Line differential relay for 132kV PKBari - Kumarghat

These are to be addressed immediately.

Further Kumarghat blackout happened on 04.02.18. This could not be analysed in the Sub-group meeting on 06.03.18 due to absence of DR/EL outputs from Tripura.

In 49th PCCM DGM(AM),NERTS informed that line differential relay for 132kV PKBari-Kumarghat would be installed at both ends by NERTS. The Sub-Committee decided that TSECL would hand over spare NR at 132kV PKBari to NEEPCO for installation at AGTCCPP for 132 kV AGTCCPP – Kumarghat line.

DGM(SO-II),NERLDC informed that a team from NERLDC would visit Rokhia, 79Tilla, Udaipur, Monarchak to co-ordinate downstream relay settings.

NERTS/TSECL may please update the status.

A.5 Voltage Collapse observed in Tripura Power System at 16:11 Hrs on 23rd Sep'17

In the 48th PCC Meeting, NERTS, POWERGRID informed the forum that the PD setting for ICT is 500ms and for line is 2.5s. After detailed deliberation, it was decided that this is to be followed by all utilities at the earliest.
In 49th PCCM, Palatana was requested to intimate the PD timing for both ICTS in the next meeting

OTPC may please update the status.

B. NEW ITEMS

AGENDA ITEMS FROM NERLDC

B.1. Operation of SPS-3 due to spurious signal on 21st April'18 & 30th April'18

As communicated by Palatana OTPC, there was an incident of operation of SPS-3 at 17:36 Hrs on 21st April'18 and due to spurious signal resulting in tripping of GTG-I & GTG II at Palatana.

Before that there were 2 more incidents of spurious operation of SPS-3 in the last 6 months:
At 16:35 Hrs on 8th February'18
At 18:05 Hrs on 21st September'17

As communicated by OTPC, SPS-3 operated due to spurious signal on 30th April'18 at 17:42 Hrs also.

All these events occurred in the evening hours with sudden loss of generation from largest plant in NER, which is a serious threat to the safe operation of NER Grid.

NERLDC may please deliberate.

B.2. Identification of short lines to install line differential protection

As per deliberation of 47th PCC Meeting of NERPC, it was decided to change the criterion for installation of Line Differential Protection (LDP) in 132 kV lines from 5 kms. to 10 kms to cover important lines of NER like 132 kV AGTCCPP – Agatala D/C.

During 47th PCC Meeting of NERPC, Member Secretary, NERPC requested all constituents make a list of following information:
List of all short lines.
List of lines where differential protection was commissioned.
List of all short lines where differential protection was installed but not commissioned.
List of all short lines where installation of differential protection is envisaged

The forum requested all states to make the above-mentioned list and make DPR for PSDF funding for installation of differential protection.

NERLDC may please deliberate.

B.3. Review of relay settings- Substation wise (including downstream state substation):

In 47th PCC Meeting, NERLDC informed the forum that frequent tripping of upstream elements is occurring due to improper relay coordination at downstream state-substations (33 kV & 11 kV) especially in Tripura, Mizoram & Nagaland power systems.

The committee visited the following substations and the relay settings of the downstream was reviewed, verified and changed accordingly if necessary:
132/33 kV Dimapur (DoP, Nagaland) on 8th March'18
132/33 kV Kohima (DoP, Nagaland) on 9th March'18
132/33 kV Zuangtui (P&ED, Mizoram) on 17th March'18
132/33 kV Agartala (TSECL) on 22nd March'18
132/33 kV Rokhia (TSECL) on 24th March'18
132/33 kV Udaipur (TSECL) on 24th March'18
132/33 kV Lekhi (DoP, Arunachal Pradesh) on 28th March'18

The Minutes of Meetings are attached in **Annexure-B.3.**

NERLDC may please deliberate.

B.4. Root cause and remedial measures of Grid Events

As per IEGC 5.9.4, root cause of each grid event is identified based on the data submitted by Power Utilities and accordingly remedial measures are suggested for these events.

In case of any difference in root cause as per analysis at your end, Power Utilties are requested to intimate NERLDC & NERPC the root cause with necessary justifications within 1 week from the date of reporting. Otherwise, it is requested to take necessary actions at your end as per suggested remedial measures and intimate NERLDC & NERPC the status within 15 days from the date of reporting.

Event report along with root cause, remedial measures and actions taken will be uploaded in the NERLDC website for information.

NERLDC may please deliberate.

B.5. Analysis & Discussion on Events, Grid Incidences, Grid Disturbances which occurred in NER Grid w.e.f 1st March 2018 - 30th April 2018.

The following numbers of Grid Disturbances (GD) & Grid Incidents (GI) occurred during the period w.e.f 1st March 2018 - 30th April 2018:

Sl. No.	Control Area	Grid Incidents in nos. (Mar'18 to Apr'18)	Grid Disturbance in nos. (Mar'18 to Apr'18)	Grid Incidents in nos. (Jan'18 to Apr'18)	Grid Disturbance in nos. (Jan'18 to Apr'18)
1	Palatana	3	0	5	0
2	AGBPP	11	0	13	0
3	AGTPP	20	1	24	1
4	Ranganadi	0	0	0	0
5	Kopili	2	0	5	0
6	Khandong	1	0	1	0
7	Doyang	0	0	0	0
8	Loktak	0	0	0	0
9	BgTPP	6	0	9	0
10	Arunachal Pradesh	0	14	0	17
11	Assam	0	6	0	8
12	Manipur	0	4	0	4
13	Meghalaya	0	0	0	0
14	Mizoram	0	4	0	7
15	Nagaland	0	9	0	14
16	Tripura	0	13	0	16

Sl. No.	Category of GD / GI	Grid Disturbance in nos.	
		Mar'18 to Apr'18	Jan'18 to Apr'18

1	GI-I	21	25
2	GI-II	22	32
3	GD 1	43	59
4	GD 2	1	1
5	GD 3	0	0
6	GD 4	0	0
7	GD 5	0	0
8	Total GI	43	57
9	Total GD	44	60

This is for information to the members.

B.6 Actions recommended by Sub-group:

The Sub-group in its meeting held on 04.05.18 recommended the following actions:

Sl. No	Name of element	Actions to be taken	Concerned Utilities	Latest Status
1	400 kV Killing (Byrnihat) - Silchar Line	Regular patrolling and necessary vegetation clearance. *High priority*	NETC	
2	220 kV BTPS - Salakati	05.04.2018 14:24 hrs. Root cause not concluded due to unavailability of DR / EL outputs. Unwanted operation of Trip relay at BTPS to be investigated y AEGCL.	AEGCL	
3	132 kV Rangia - Motonga	AEGCL to provide proper relay indication & DR output of Rangia end. NERPC letter to NLDC issued vide. dtd.07.05.18	AEGCL/NERTS	
4	Blackout of 220 kV Mariani(PG) on 06.03.18	POWERGRID to review over voltage setting at Mariani and Mokokchung SS and time grading may be provided.** Issue of non-tripping at AGBPP end of Mariani(PG)-AGBPP line & at Misa end of Mariani(PG)-Misa line are to be attended.	NERTS/NEEPCO	
5	132 kV Badarpur - Kolasib Line & 132 kV Aizawl - Kolasib Line	Review of relay settings and testing of relays at Kolasib end of 132 kV Badarpur - Kolasib line. Directionality of Earth fault relay at Kolasib end to be ensured. Review of downstream settings at Kolasib SS	NERTS/ P&ED Mizoram	
6	Disturbance in Tripura on 22nd,	Status of Installation of DPR in 132 kV Rokhia - Agartala D/C	TSECL	

	26th & 31st Mar'18 and 30th Apr'18 Fault in 132 kV Rokhia - Agartala D/C. Delayed fault clearance due to absence of DPR.	O/C & E/F co-ordination after installation of DPR		
		Review of Z-II (to be 150% of line length) settings at SM Nagar for Agartala D/C		
		R & B phase analog DR input to be reversed at SM Nagar.		
		Review of Z-II (to be 120% of line length) settings at Budhajnagar for Agartala line		
		Review of Z-II & Z-III settings at Palatana for SM Nagar line. Adopted CT ratio & CT ratio in relay settings at Palatana for SMNagar line to be checked.	OTPC	
7	132 kV AGTCCPP - Agartala D/C on 31.03.18	Installation of Line Differential in 132 kV AGTCCPP - 79 Tilla D/C & Review of impedance setting of both ends as a temporary measure.	NERTS/NEEPCO	
8	132 kV Dimapur (PG) - Dimapur (DoP, Nagaland)	Co-ordination of O/C & E/F relay settings at Dimapur(PG) & Dimapur(DoP Nagaland)	NERTS/ DoP Nagaland	
9	220 kV Mariani (AS) - Misa Line & 220 kV AGBPP - Mariani (AS) Line on 11.04.18	Review of DPR & Earth Fault settings at Mariani (AS)	NERTS	
10	132 kV Khliehriat (MePTCL) - Khliehriat (PG) 2 Line	Healthiness of Protection System at Khliehriat end & Leshka end of 132 kV Khliehriat - Leshka D/C line to be ensured, Z-II settings at KHL(MePTCL) for Leshka lines to be reduced.	MePTCL	
		DPR & Earth Fault Relay settings at Khliehriat(PG) for Khliehriat(MePTCL) line-2 to be reviewed	NERTS& MePTCL	
11	400 kV Balipara - Biswanath Chariali 4 Line	Review of DPR settings to clear the fault within limits allowed in CEA standards	NERTS	

** **At Mariani PG**
Mokokchung-I: 110%, 5s
Mokokchung-II :110%, 6 sec
AGBPP: 111%, 6 sec
Misa: 111% 5 sec
At Mokokchung
Mariani-I :110%, 5 sec
Mariani-II: 110% , 6 sec

Issues already attended/rectified by concerned utilities:

Sl. No	Name of element/incident	Actions taken	Name of respective utility

1	220 kV BTPS - Salakati on 22.03.18	Earth wire snapped near gantry at Salakati end due to lightning. Rectified.	NERTS.
2	220/132 kV Dimapur - Transformer 2	CT PT cards of NR replaced	NERTS
3	132 kV Khliehriat (MePTCL) - Khliehriat (PG) 2 Line	earth fault high set settings re-configured	MePTCL
4	400 kV Balipara - Bongaigaon 2 Line & 400 kV Balipara - Biswanath Chariali 4 Line tripping.	Problem with the contact of 86 rectified	NERTS
5	400 kV Balipara - Biswanath Chariali 3 Line	Z-4 settings of DPR of 400 kV Balipara - Biswanath Chariali 3 Line at Balipara has been disabled	NERTS

Concerned utilities may please update the status.

Any other item:

Date and Venue of next PCC

It is proposed to hold the 51st PCC meeting of NERPC on second week of July, 2018. The date & exact venue will be intimated in due course.

Agenda of 12th System Studies Meeting in NER

Date: 10.05.2018. Venue: Hotel RajMahal, Guwahati

1. Review of SPS 1 & 4.

SPS-1:

As per design, when both Modules of Palatana CCGT trip, a signal will be generated from trip relay of the Modules. This signal should then trip the CB of 132 kV Silchar – Srikona D/C, 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C lines at Silchar. Subsequent to tripping of 132 kV Silchar – Panchgram line, a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

SPS-4:

As per design, when 400 kV Silchar – Byrnihat line and 400 kV Silchar – Azara line trips (with no generation from Palatana), a signal will be generated from trip relays at Silchar. Also, in case of outage of either 400 kV Silchar – Byrnihat line or 400 kV Silchar – Azara line, if other line trips, signal will be generated from trip relays at Silchar. This signal should then trip the CB of 132 kV Silchar – Srikona D/C, 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C lines at Silchar. Subsequent to tripping of 132 kV Silchar – Panchgram line, a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

132 kV Silchar (PG)- Hailakandi (AEGCL) D/C was commissioned in 30th November'17. After commissioning of 132 kV Silchar (PG)- Hailakandi (AEGCL) D/C, the network configuration changed due to non-exisiting of 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C. Currently after operation of SPS 1 & 4, only 132 kV Silchar – Srikona D/C lines will trip which will lead to cascading tripping in Southern Part of NER.

In view of the above, it is requested to review SPS I and SPS 4.

Members may deliberate.

2. Review of Island II

Load-generation balance of Island no 2 consisting of Island comprising of generating units of AGTPP (Gas), generating units at Baramura (Gas), Rokhia (Gas) & Gumati (Hydro) and loads of Tripura system & Dullavcherra area (Assam) has changed since commissioning of 132 kV Surajmaninagar- Comilla D/C lines. In recent disturbances in Tripura system, Island no. 2 could not survive due to load-generation balance mismatch.

In view of the above, it is requested to review Island No. 2
Members may deliberate.

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Minutes of Meeting (MoM) of

Visit to 132/66/33/11 kV Dimapur (Nagaland) Sub-station held on 8th Mar, 18

1. As per discussion in 40th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from Dimapur (PG) visited Dimapur (Nagaland) substation for review of the same on 8th March, 2018.
3. NERTS has done a thorough study of the relay settings submitted by Dimapur (Nagaland), the softcopy of which has been beforehand shared with NERLDC Team as well as DoP, Nagaland. However upon physical inspection by NERLDC Team, it was found that some of the relay settings were different from the settings sent by NERTS. The necessary corrections based on study results by NERTS were done as mentioned in Annexure 1.
4. In addition to these, NERLDC Team checked the presence of breakers in all the feeders and Transformers at Dimapur (Nagaland) Substation, and found the presence of breaker in all the feeders except at 11kV level where 2 feeders have a common indoor breaker. It was also noticed that all the 11 kV breakers were 1948 GEC Made.
5. NERLDC Team also checked the tripping records of the elements at 132/66/33/11 kV Level emanating from Dimapur (Nagaland). It was found that instances of tripping of different feeders and elements have been duly recorded in different registers at Dimapur (Nagaland) control room.
6. It was informed by the officials at Dimapur (Nagaland) Substation that Vegetation Problem (Resistance from local people to cut down the Bamboo) at Location No 1 of 132 kV Dimapur (PG) – Dimapur (Nagaland) Line 1 may be one of the reasons for tripping of the line at POWERGRID end.

Members Present:

NERLDC

Jerin Jacob, Engr ---

Ranajit Pal, JE --

Palash Jyoti Borah, Engr- 08.03.18

Utpal Das, AE --- 08/03/18

DoP, Nagaland

R. Iralu- 8.3.2018

RELAY SETTINGS OF 132/66/33/11KV S/STATION NAGARJAN DIMAPUR

	Feeder/ICT	Make	Characteristics	CT RATIO	Current Setting (Iset) % O/C	Current Setting (Iset) % E/F	Current Setting (Iset) Ampere O/C	Current Setting (Iset) Ampere E/F	TMS (Sec) O/C	TMS (Sec) E/F
	Dimapur (PG)-I			**300**	**1.25**	**0.4**	**375**	**120**	**0.4**	**0.4**
	Dimapur (PG)-II			**300**	**1**	**0.2**	**300**	**60**	**0.4**	**0.4**
1	**132KV PGCIL INCOMING I**	**Siemens 7SR1003**	**Normal Inverse**	1200	0.3	0.2	**360**	**240**	0.38	0.4
	132KV PGCIL INCOMING II	**Siemens 7SR1004**	**Normal Inverse**	1200	0.3	0.2	**360**	**240**	0.35	0.4
2	**132KV KOHIMA OUTGOING**			450						
3	**132/66KV 100MVA TRANS**									
	(A) 132KV SIDE	AVANA NPA 141N	3s NI	600	0.75	0.2	450	120	0.22	0.3
	(B) 66KV SIDE	AVANA NPA 141N	3s NI	1200	0.75	0.2	900	240	0.18	0.25
4	**66KV OUTGOING FEEDERS**									
	(A) 66KV Powerhouse	AVANA NPA 141N	3s NI	600	0.5	0.2	300	120	0.2	0.2
	(B) 66KV Ganeshnagar (Now chargded at 33 kV)	CDG31	As per curve	300	0.5	0.2	150	60	0.2	0.2
	(C) 66KV Chumukedima	CDG31	As per curve	300	0.5	0.2	150	60	0.2	0.2
5	**66/33KV 20MVA TR-1-Not in service (Instead 20 MVA, 132/33 kV Trf)-Temporary arrangement**									
	(A) 132KV Side	CDG61	As per curve	100	0.75	0.2	75	20	~~0.4~~ 0.3	0.3
	(B) 33KV Side	AVANA NPA 141N	3s NI	400	0.75	0.17	300	68	0.16	0.16
6	**66/33KV 20MVA TR-2**									
	(A) 66KV Side	CDG61	As per curve	250	0.75	0.2	187.5	50	0.2	0.2
	(B) 33KV Side	AVANA NPA 141N	3s NI	500	0.62	0.2	310	100	0.16	0.16
7	**66/33KV 20MVA TR-3 (10 MVA)**				0.5					
	(A) 66KV Side	CDG61	As per curve	250	~~0.75~~	0.2	187.5	50	0.2	0.2
	(B) 33KV Side	AVANA NPA 141N	3s NI	500	0.75	0.2	375	100	0.16	0.16

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8	33KV OUTGOING FEEDERS					
	(A) 33KV Referral	CDG31	As per curve	200	1	0
	(B) 33KV Medziphema	CDG31	As per curve	200	1	0
	(C) 33KV Powerhouse	CDG31	As per curve	200	0.75	0
	(D) 33KV Industrial	CDG31	As per curve	200	0.75	0
	(E) 33KV R.Pahar Army	CDG31	As per curve	200	0.5	0.
	(F) 33KV Metha Colony	CDG31	As per curve	500	0.75	0

28.03.18

8/3/18

8/3/2018.

Minutes of Meeting (MoM) of

Visit to 132/33/11 kV Kohima Substation held on 10th Mar, 2018

1. As per discussion in 140th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from Dimapur (PG) visited 132/33/11 kV Kohima substation for review of the same on 10th March, 2018.
3. NERTS has done a thorough study of the relay settings submitted by Kohima, the softcopy of which has been beforehand shared with NERLDC Team as well as Kohima. However upon physical inspection by NERLDC Team, it was found that some of the relay settings were different from the settings sent by NERTS. Also necessary corrections had to be done for coordinating the tripping of different feeders at Kohima Substation. The final settings implemented at 132/33/11 kV Kohima Substation is attached in Annexure I.
4. In addition to these, NERLDC Team checked the presence of breakers in all the feeders and Transformers at Kohima Substation and found the presence of breakers in all the feeders. The officials of Kohima Substation informed that 4 No. MOCB at 132 kV Level will be replaced with SF6 CBs, for which material has already arrived at site and foundation for the same is ready for the installation of the SF6 CBs.
5. NERLDC Team also checked the switching and tripping records of the elements at 132/33/11 kV Level emanating from Kohima Substation. It was found that instances of tripping of different feeders and elements upto 11 kV have been duly recorded in different registers at Kohima Substation control room.

Members Present:

NERLDC

Jerin Jacob, Engr --- 10/3/18

Palash Jyoti Borah, Engr- 10/3/18

Ranajit Pal, JE -- 10/03/18

Utpal Das, AE --- 10/03/18

POWERGRID

Abhijnan Hazarika, AET-- A. Hazarika 10/3/18

Kohima Substation

Lengminlal Singson-SDO Transmission(Kohima)---- 10/3/18

Sub Divisional Officer
Transmission Sub-Division
Kohima : Nagaland

RELAY SETTINGS OF 132/33KV S/STATION KOHIMA

	Feeder/ICT	Make	Characteristics	CT RATIO	Current Setting (Iset) % O/C	Current Setting (Iset) % E/F	Current Setting (Iset) Ampere O/C	Current Setting (Iset) Ampere E/F	TMS (Sec) O/C	TMS (Sec) E/F
1	132KV PGCIL O/G (PGCIL End)	-		300	0.75	0.2	225	60	0.2	0.2
2	132KV KOHIMA INCOMING	CDG 31E, GEC Alstom	IDMT (PMS-10 Time of operation-3S)	400	0.75	0.2	300	80	0.12	0.15
3	132KV WOKHA O/G			300	0.5	0.2	150	60	0.2	0.15
4	132KV KARONG O/G	AVANA NPA 141 N	3S NI	250	~~0.5~~ 0.75	0.2	125	50	0.2	0.15
5	132KV MELURI O/G	AVANA NPA 141 N	3S NI	150	1	0.2	150	30	0.2	0.2
6	132/33kV TRANSFORMERS (31.5MVA)	I II	I II			I II				I II
i	132KV Side	AVANA / Siemens	3S NI / IEC NI	150	0.7	0.2 / 0.24	105	30	0.2	0.15 / 0.15
ii	33KV Side	No 33 kV side protection / Siemens TSR	No 33 kV side protection / IEC NI	600	0.7 (630A)	0.2	420	120	0.1	0.2
7	33/11 KV TRANSFORMER									
i	33KV Side TRF-I	Easun Reyrolle, 2TM11	IDMT 3Sec.	200	0.75	0.20	150	40	0.1	0.1
ii	33KV Side TRF-II	Easun Reyrolle, 2TM11	IDMT 3Sec.	200	0.75	0.20	150	40	0.1	0.1
iii	11KV Side TRF-I	CDG 31	IDMT 3Sec	600	0.75	0.20	450	120	0.05	0.05
iv	11KV Side TRF-II	CDG 31	IDMT 3Sec	600	0.75	0.20	450	120	0.05	0.05
8	33KV OUTGOING FEEDERS									
i	33KV ITI	Easun Reyrolle	IDMT 3Sec.	200/5	0.75	0.20	30	8	0.1	0.1
ii	33KV BOTSA	CDG31	IDMT 3Sec	150/5	0.50	~~0.20~~ 0.5	15	6	0.1	0.1
iii	33KV LALMATI	Easun Reyrolle	IDMT 3Sec.	50/5	0.75	0.20	7.5	2	0.1	0.1
iv	33KV CHAKHABAMA	Easun Reyrolle	IDMT 3Sec	100/5	0.75	0.20	15	5	0.1	0.1
v	33KV AP-I	Easun Reyrolle	IDMT 3Sec.	200/5	0.75	0.20	30	8	0.1	0.1
vi	33KV KRM-I	JVS Electronics	Inverse Time	200	~~0.75~~ 0.75	0.20	150	40	0.1	0.1
vii	33KV KRM-II	CDG 31 Areva	IDMT 3Sec.	200	~~0.70~~ 0.75	0.20	140	40	0.1	0.1

Not in service Not changed.

10/03/18

10/3/18

10/03/18

Sub Divisional Officer
Transmission Sub-Division
Kohima : Nagaland

Minutes of Meeting (MoM) of

Visit to 132/33 kVZuangtui (P&ED, Mizoram) Substation held on 17.03.18

1. As per discussion in 48th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by two officials from SLDC Mizoram, 1 official from Aizawl(PG) visited Zuangtui (P&ED, Mizoram) substation for review of the same on 17th March, 2018.
3. NERTS has done a thorough study of the settings of Earth Fault and Over Current relays at Zuangtui(P&ED, Mizoram) Substation with coordination at Melriat(PG) and Aizawl(PG) Substation and the softcopy of which has beenbeforehand shared with NERLDC Team. However during the physical inspection by the whole Team on visit to Zuangtui (P&ED, Mizoram) Substation,few changes on PSM and TMS were made in proposed settings (to avoid instantaneous tripping of downstream feeders as informed by P&ED Mizoram) to coordinate the Earth Fault and Over Current settings and the same has been implemented. List of implemented settings is attached as Annexure I.
4. P&ED Mizoram informed that they will coordinate the relay settings of downstream elements (132 kV, 33 kV & 11 kV) as per changes made in relay settings of 132 kV elements at Zuangtui substation.
5. In addition to these, Team checked the presence of breakersin all the feeders(132 kV and 33 kV) and Transformers at Zuangtui (P&ED, Mizoram) Substation, and found the presence of breaker in all the feeders.
6. Team also checked the tripping records of the elementsat 132/33 kV Level emanating from Zuangtui (P&ED, Mizoram). It was found that instances of tripping of different feeders and elements have been duly recordedin different registers at Zuangtui (P&ED, Mizoram) control room.

17/3/2018

17/3/18

Members Present:

NERLDC:

Shashi Kumar Bhagat, Sr. Engineer

Jerin Jacob, Engr 17/3/18

Chitra Bahadur Thapa, Engr.

Sumit Kumar, Engr.

Sakaldeep, Asst. Engr. 17/3/18

POWERGRID

BinodDebbarma 17/3/18

132/33 kV Substation, Zuangtui(P&ED, Mizoram)

Lalramnghaka, SDO 17/3/2018

MRT Sub-division(P&ED, Mizoram)

Zoramdina, SDO

Bijoy Singh, JE

SLDC Division (P&ED, Mizoram)

LalremruataSailo, JE 17/3/18

David Lalnunpuia, JE

BACK-UP PROTECTION SETTINGS AT ZUANGTUI SUB STATION OF MIZORAM

Name of the feeder	Relay	CTR	Present				
			PSM	TMS	Op Time(Seconds)		
					A		
Fault Currents (Primary)					1000	500	300
132 kV Incomer	O/c	400	0.8	0.225	1.366575	3.513392	
	E/F	400	0.2	0.16	0.432331	0.600028	0.836207
132 kV Serchip Feeder	O/C	200	0.75	0.15	0.543037	0.861655	1.504354
	E/F	200	0.2	0.15	0.315813	0.40531	0.510687
132 kV Saitul Feeder	O/C	100	0.75	0.15	0.394954	0.543037	0.746963
	E/F	100	0.15	0.125	0.19972	0.240885	0.28342
132 kV side of Transformer-1/2	O/C	125	0.8	0.15	0.44559	0.641958	0.94529
	E/F	125	0.2	0.15	0.274268	0.340103	0.412138

BACK-UP PROTECTION SETTINGS AT MELRIAT SUB STATION OF POWERGRID

Fault Currents (Primary)					1kA	0.5kA	0.3kA
132 kV Zemabawk Line	O/C	300	1.2	0.38	2.577119	8.070741	
	E/F	300	0.2	0.18	0.435373	0.581755	0.77035
132 kV Aizawl Feeder	O/C	300	1.1	0.3	1.873252	5.032993	
	E/F	300	0.2	0.11	0.266061	0.355517	0.470769

directional as informed by NERTS

BACK-UP PROTECTION SETTINGS AT AIZAWL SUB STATION OF POWERGRID

Fault Currents (Primary)					1kA	0.5kA	0.3kA
132 kV Melriat Line	O/C	300	1	1	5.744366	13.63343	
	E/F	300	0.2	0.35	0.846559	1.13119	1.497902

14/3/2018

17/3/18

Minutes of Meeting (MoM) of

Visit to 132/33/11 kV 79 Tilla (TSECL) Sub-station held on 22nd Mar'18

1. As per discussion in 48th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from Kumarghat(PG) visited 79 Tilla (TSECL) substation for review of the same on 22nd March, 2018.
3. Over Current & Earth Fault Relay settings of elements in 79 Tilla wereshared beforehand with NERLDC Team by TSECL on 21st Mar'18.Same was discussed with NERTS and after detailed deliberations at site, necessary changes (for 11 kV & 33 kV feeders) were implementedat 79 Tilla. Following are the corrections done at 79 Tilla on 22nd Mar'18:

SL. NO.	Name of Feeders	CT-Ratio	Previous Setting		Present Setting		Remarks
			O/C TMS	E/F TMS	O/C TMS	E/F TMS	
79 Tilla Sub-Station, Agartala							
(A) 132KV Feeders							
1	Rokhia Feeder no-2	600/1-1-1	0.15	0.15	0.15	0.08	To avoid delayed fault clearance for a fault in this line. Now settings matching with feeder no.~~2~~1
(B) 33 KV Feeders							
1	Banamalipur Feeder	400/1-1	0.1	0.1	0.025	0.025	To avoid tripping of 25 MVA, 132/33 kV Transformer-5 and 132 kV lines for a fault in any 33 kV feeder
2	College Tilla Feeder	400/1-1	0.1	0.1	0.025	0.025	
3	Rampur Feeder	400/1-1	0.075	0.05	0.025	0.025	
4	Durjoynagar Feeder	200/1-1	0.05	0.15	0.025	0.025	
5	Mohanpur Feeder	400/1-1	0.08	0.05	0.025	0.025	
6	Capital Complex Feeder-1	400/1-1	0.05	0.05	0.025	0.025	
7	Capital Complex Feeder-2	400/1-1	0.05	0.05	0.025	0.025	
8	MES Feeder	400/1-1	0.05	0.05	0.025	0.025	
(C) 11 KV Incoming and Feeders							
1	Kalikapur Feeder	200/1-1	0.05	0.05	0.025	0.025	To avoid tripping of 7.5 MVA, 33/11 kV Transformer-1&2 and 132 kV lines (Low upstream Earth Fault settings) for a fault in any 11 kV feeder
2	GB Feeder	200/1-1	0.05	0.05	0.025	0.025	
3	ITI Feeder	200/1-1	0.05	0.05	0.025	0.025	
4	Spare Feeder	200/1-1	0.05	0.05	0.025	0.025	
5	GB Special Feeder	200/1-1	0.05	0.05	0.025	0.025	
6	Rajbhavan Feeder	100/1-1	0.04	0.03	0.02	0.02	
7	Station Feeder	200/5-5	0.5		0.025	0.025	
8	11 KV Incoming -2	1200/1-1-0.577	0.1	0.075	0.1	0.075	
9	DRC-1	50/1-1	0.01	0.06	0.08	0.06	
10	Secretary	100/1-1	0.01	0.06	0.08	0.06	

Note: 1. Core-2 is used for O/C & E/F relays 2. Fault current (3-ph bus fault current) considered for relay operation time calculation is around 13 kA for 11 kV & 12 kA for 33 kV.

4. As informed by TSECL official, there were few instances of tripping of 132/33 kV Transformer-5 along with 132 kV Banamalipur Feeder. To avoid tripping of Trf, TMS of both O/C & E/F relays of 33 kV& 11 kV feeders reduced. It was suggested that TSECL may take neccssary actions upon further tripping of 132/33 kV Transformer-5 for downstream faults.
5. On 22nd Mar'18, disturbance occurred at capital area of Tripura system (79 Tilla blacked-out). As informed by TSECL, jumper failure occurred in the 132 kV 79 Tilla – Rokhia 2 line. Earth fault relay operated at 79-Tilla for this line. However, breaker did not trip at 79 Tilla due to mechanical problem.
6. Upon checking the fault records of numerical relays installed at 79-Tilla (available for RC Nagar D/C and SM Nagar D/C), it is observed that distance protection of SM Nagar-2 line operated in Z-1 for a fault at 30 Kms (line length: ~18 Kms) after fault in 132 kV 79 Tilla – Rokhia 2 line (SM Nagar D/C not tripped at 79 Tilla for fault in 132 kV 79 Tilla – Rokhia 2 line). However, breaker not tripped at SM Nagar. It is suggested that issue of non-operation of breaker and over reaching of distance protection of 132 kV SM Nagar-II line may be attended at the earliest by TSECL.
7. Team also checked the tripping records of the elementsat 132/66/33/11 kV Level emanating from 79 Tilla (TSECL). It was found that instances of tripping of different feeders and elements have been duly recordedin different registers at 79 Tilla(TSECL) control room. Also, fault records of numerical relays (available for only few feeders) for 33 & 11 kV feeders also noted down for future reference.
8. Present O/C & E/F settings at 79 Tilla is attached as **Annexure-I.**Relay operating times for 79 Tilla are presently adequately graded. If there is indiscriminate operation of any relay, the same need to be tested.

Members Present:

POWERGRID
Arindam ~~Chaudhuri, Sr.~~ Chakraborty Engr

NERLDC
MomaiDey, Sr. Engr
Jerin Jacob, Engr

TSECL
Sankar Chaudhuri, Sr. Manager
Santanu Das, Sr.Manager

Annexure-I

SL.NO.	Name of Feeders	CT- Ratio	CT- Ratio	Relay Type	Curve	O/C Relay		E/F Relay	
						PSM	TMS	PSM	TMS
79 Tilla Sub-Station, Agartala									
(A) 132KV Feeders									
1	Rokhia Feeder no-1	600/1-1-1	600	CDD21, E/Mech	IDMT	1	0.15	0.2	0.08
2	Rokhia Feeder no-2	600/1-1-1	600	CDG31, E/Mech	IDMT	1	0.15	0.2	0.08
3	Bodhjungnagar Feeder	400/1-1-1	400	CDD21, E/Mech	IDMT	1.5	0.08	0.2	0.05
4	Dhalabil Feeder	400/1-1-1	400	CDG31, E/Mech	IDMT	1.5	0.08	0.2	0.08
5	SMNagar Feeder 1 &2	600/1-1-1	600	P127, Numerical	IEC SI	1	0.15	0.2	0.3
(B) Transformers in 132 KV Side									
1	25MVA,132/33KV	150/1-1-1	150	P14D, Numerical	IEC SI	150A	0.1	30A	0.7
2	15MVA, 132/33KV	100/1-1-1	100	P14D, Numerical	IEC SI	60A	0.1	20A	0.7
3	15MVA, 132/33KV	100/1-1-1	100	P14D, Numerical	IEC SI	60A	0.1	20A	0.7
4	15MVA, 132/33KV	100/1-1-1	100	P14D, Numerical	IEC SI	60A	0.1	20A	0.7
5	25MVA,132/33KV	150/1-1-1	150	P14D, Numerical	IEC SI	100A	0.15	20A	0.25
(C) Transformers in 33 KV Side									
1	25MVA,132/33KV	600/1-1-0.577	600	CDG31, E/Mech	IDMT	0.5	0.15	0.2	0.15
2	15MVA, 132/33KV	400/1-1-0.577	400	MIT 103,Numerical	IDMT	0.75	0.15	0.2	0.15
3	15MVA, 132/33KV	400/1-1-0.577	400	CDG31, E/Mech	IDMT	0.75	0.15	0.2	0.15
4	15MVA, 132/33KV	400/1-1-0.577	400	CDG31, E/Mech	IDMT	0.75	0.15	0.2	0.15
5	25MVA,132/33KV	600/1-1-0.577	600	CDG31, E/Mech	IDMT	1	0.1	0.2	0.15
6	7.5MVA, 33/11KV	200/1-1-1	200	CDG31, E/Mech	IDMT	0.5	0.14	0.2	0.15
7	7.5MVA, 33/11KV	400/1-1-1	400	MIT 103,Numerical	IDMT	0.27	0.14	0.1	0.075

(D) 33 KV Feeders						
1	Banamalipur Feeder	400/1-1	400	P14D, Numerical	IEC SI	400A
2	College Tilla Feeder	400/1-1	400	P14D, Numerical	IEC SI	380A
3	Rampur Feeder	400/1-1	400	CDG31, E/Mech	IDMT	0.75
4	Durjoynagar Feeder	200/1-1	200	CDG31, E/Mech	IDMT	1
5	Mohanpur Feeder	400/1-1	400	CDG61, E/Mech	IDMT	0.75
6	Capital Complex Feeder-1	400/1-1	400	CDG31, E/Mech	IDMT	1
7	Capital Complex Feeder-2	400/1-1	400	CDG31, E/Mech	IDMT	0.5
8	MES Feeder	400/1-1	400	MIT 103,Numerical	IDMT	0.05
SL.NO.	**Name of Feeders**	**CT- Ratio**	**CT- Ratio**	**Relay Type**	**Curve**	**O/C R PSM**
(E) 11 KV Incomming and Feeders						
1	11 KV Incomming -1	600/1-1-0.577	600	CDG31, E/Mech	IDMT	0.5
2	Kalikapur Feeder	200/1-1	200	CDG31, E/Mech	IDMT	0.75
3	GB Feeder	200/1-1	200	CDG31, E/Mech	IDMT	1
4	ITI Feeder	200/1-1	200	CDG31, E/Mech	IDMT	1
5	Spare Feeder	200/1-1	200	CDG31, E/Mech	IDMT	0.75
6	GB Special Feeder	200/1-1	200	CDG31, E/Mech	IDMT	1
7	ILS Feeder	200/1-1	200	CDG31, E/Mech	IDMT	0.5
8	Rajbhavan Feeder	100/1-1	100	CDG31, E/Mech	IDMT	1
9	AGMC Feeder	200/5-5	40	CDG31, E/Mech	IDMT	3.75
10	Sarkarpara Feeder	200/5-5	40	CDG31, E/Mech	IDMT	2.5
11	Litchubagan Feeder	200/5-5	40	CDG31, E/Mech	IDMT	5
12	Station Feeder	200/5-5	40	CDG31, E/Mech	IDMT	3.75
13	11 KV Incomming -2	1200/1-1-0.577	1200	CDG31, E/Mech	IDMT	0.5
14	DRC-1	50/1-1	50	P111, Numerical	IEC S1	1
15	Secretary	100/1-1	100	P111, Numerical	IEC S1	1

Minutes of Meeting (MoM) of

Visit to 132/66 kV Rokhia (TSECL) Power Station held on 24th Mar'18

1. As per discussion in 48th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from Kumarghat (PG), an official from SLDC Tripura and an official from Monarchak (NEEPCO) visited Rokhia (TSECL) power station for review of the same on 24th March, 2018.
3. Over Current & Earth Fault Relay settings of elements in Rokhia were shared beforehand with NERLDC Team by TSECL on 24th Mar'18. Same was discussed with NERTS and after detailed deliberations at site, necessary changes (for 66 kV feeders) were implemented at Rokhia. Following are the corrections done at Rokhia on 24th Mar'18:

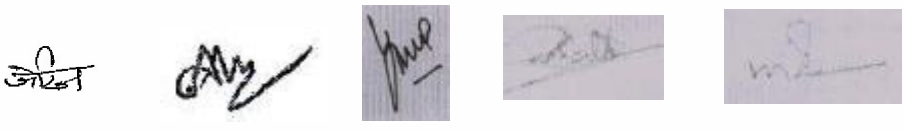
SL. NO.	Name of Feeders	CT-Ratio	Previous Setting		Present Setting		Remarks
			O/C TMS	E/F TMS	O/C TMS	E/F TMS	
Rokhia Gas Thermal Sub-Station, Rokhia							
1	66 KV Rabindranagar Feeder	300/1-1	0.1	0.05	0.025	0.025	To avoid tripping of 132 kV Rokhia - Monarchak line (E/F TMS is very low,0.03) for a fault in any 66 kV feeder
2	66 KV Badharghat Feeder	200/1-1	0.06	0.05	0.025	0.025	
3	66 KV Boxanagar Feeder	100/1-1	0.09	0.09	0.025	0.025	

TSECL may review the settings of downstream elements of 66 kV Rokhia.

4. It was observed from the logsheet that 132 kV Rokhia – Monarchak line tripped several times at Monarchak end on directional E/F (Electro Mechanical Relay). Few of these tripping were due to fault in 132 kV Rokhia – 79 Tilla D/C as informed by TSECL.

   It is suggested to TSECL to check the directionality of this relay. As numerical distance protection is installed for this line at both ends, O/C & E/F relay settings at Rokhia & Monarchak may be coordinated with Z-3 time setting of DPR.

   It is also suggested that in case of E/F relay could not be made directional, this relay may be disabled and E/F function may be enabled in the numerical DPR after necessary testing/checking of this relay as well as trip circuit.
5. Team also checked the tripping records of the elements at 132/66kV Level emanating from Rokhia (TSECL). It was found that instances of tripping of 66kV Rokhia - Badarghat feeder and 132 kV elements have been duly recorded in different registers at Rokhia (TSECL) control room.



6. Present O/C & E/F settings at Rokhia is attached as **Annexure-I.** Relay operating times for 66 kV feeders are presently adequately graded. If there is indiscriminate operation of any relay, the same need to be tested. In case of tripping of any upstream element due to fault in downstream of Rokhia, healthiness of protection system of faulty downstream elements is to be ensured.

Members Present:

POWERGRID

Arindam Chakraborty, Engr

NERLDC

Jerin Jacob, Engr

TSECL

Mrinal Paul, Sr. Manager

Dibakar Nath

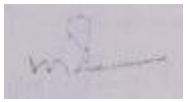
NEEPCO

Gobindro, Asst. Manager

Annexure-I

SL.NO.	Name of Feeders	CT- Ratio	CT- Ratio	Relay Type	Curve	O/C Relay		E/F Relay	
						PSM	TMS	PSM	TMS
Rokhia Gas Thermal Sub-Station, Rokhia									
1	132 KV Agartala Feeder-1	600/1-1-1	600	CDG 31 , E/Mech	IDMT	1	0.1	0.2	0.08
2	132 KV Agartala Feeder-2	600/1-1-1	600	CDD 21, E/Mech	IDMT	1	0.07	0.2	0.07
3	132 KV Monarchak Feeder	600/1-1-1	600	CDD 21, E/Mech	IDMT	1	0.03	0.2	0.03
4	66 KV Rabindranagar Feeder	300/1-1	300	CDD 21, E/Mech	IDMT	0.75	0.025	0.2	0.025
5	66 KV Badharghat Feeder	200/1-1	200	CDD 21, E/Mech	IDMT	0.75	0.025	0.2	0.025
6	66 KV Boxanagar Feeder	100/1-1	100	CDD 21, E/Mech	IDMT	0.5	0.025	0.2	0.025
7	30 MVA,132/66 KV Auto Transformer								
	132 KV Side	200/1-1-1	200	CDD 21, E/Mech	IDMT	0.75	0.1	0.4	0.12
	66 KV Side	400/1-1-1	400	CDD 21, E/Mech	IDMT	0.75	0.15	0.2	0.2






Minutes of Meeting (MoM) of

Visit to 132 kV Monarchak (NEEPCO) Power Station held on 24th Mar'18

1. As per discussion in 48th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from Kumarghat (PG) and an official from TSECL visited Monarchak (NEEPCO) power station for review of the same on 24th March, 2018.
3. It was observed that DR for 132 kV lines at Monarchak was not configured properly. Accordingly, DRs of 132 kV lines were configured properly by the team.
4. Mismatch observed in settings of E/F function enabled in DPR and backup O/C E/F protection. Also, backup protection setting is not as per recommendations of Ramakrishna Task Force (Presently O/C & E/F settings are of Definite Time with 1.5 sec time delay). Recommended settings will be provided after discussion with PCC subgroup members.
5. Since both ends of the 132 kV Rokhia – Monarchak line has main & backup protection, settings of backup protection may be coordinated with Z-3 timing of DPR.
6. Fault records of 132 kV Monarchark – Rokhia & 132 kV Monarchak – Udaipur lines at Monarchak were checked by Team Members. Z-1 operation and Z-2 & Z-3 initiations were observed from the event logger outputs.
7. 132 kV Busbar protection was found blocked. CT circuit faulty alarm in both Z-1 &Z-2 was observed in central unit-1 and suspected hardware error code was observed in peripheal unit of Service Transformer-1. This issue with busbar protection may be taken up at the earliest.
8. Over Voltage settings enabled for 132 kV lines may be disabled.
9. Power Swing may be blocked for all Zones for 2 seconds.
10. No fault record found for 132 kV Monarchak – RabindraNagar D/C in both main & backup protections. Also, O/C E/F settings are not as per recommendations of Ramakrishna task force. These settings may be reviewed and testing of these relays may be done to avoid tripping of 132 kV Monarchark – Rokhia & Monarchak – Udaipur lines for a fault in 132 kV Monarchak – Rabindranagar D/C.
11. After implementation of settings at Monarchak, TSECL may review the settings of downstream elements of Rabindranagar.
12. As informed by TSECL, breaker is not available for 132 kV Monarchak – Rabindranagar D/C at Rabindranagar end.

Members Present:

POWERGRID

Arindam Chakraborty, Engr

NERLDC

Jerin Jacob, Engr

TSECL

Sankar Chaudhari, Sr. Manager

NEEPCO

Gobindro Sarkar, Asst. Manager

Minutes of Meeting (MoM) of

Visit to 132/66/33/11 kV Udaipur (TSECL) Sub-station held on 24th Mar'18

1. As per discussion in 48th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from OTPC and an official from SLDC Tripura visited 132/66/33/11 kV Udaipur (TSECL) Sub-station for review of the same on 24th March, 2018.
3. 132/11 kV, 15 MVA Transformer is feeding 11kV Bagma Feeder, 11kV District Feeder, 11kV Jumjuri Feeder, 11 kV Killa Feeder, 11kV Udaipur Town Feeder, 11kV Matarbari Feeder, 11kV Temple Feeder, 11 kV Dhajanagar Feeder and 11 kV Water Supply Feeder.
4. 33/11 kV, 5 MVA Transformer is feeding 11kV Maharani and Futamati Feeder and 11kV Chandrapur Feeder.
5. Earth Fault Relay at 132kV side of 132/11 kV, 15 MVA Transformer was changed. Current Setting is PSM- 0.2 & TMS- 0.15.
6. Over Current & Earth Fault Relay settings of elements in Udaipur wereshared beforehand with NERLDC Team by TSECL.Same was discussed with NERTS and after detailed deliberations at site, necessary changes (for 11kV, 33 kV &66 kV feeders) were implementedat Udaipur. Following are the corrections done at Udaipur on 24th Mar'18:

SL. NO.	Name of Feeders	CT- Ratio	Previous Setting		Present Setting		Remarks
			O/C TMS	E/F TMS	O/C TMS	E/F TMS	
Udaipur Sub-Station, TSECL							
1	66 KV GokulnagarFeeder	200/1-1-1	0.025	0.03	0.015	0.025	To avoid tripping of 132/66 kV 3x10 MVA Transformers
2	33kV Power House Feeder	300/1-1	0.2	0.1	0.03	0.03	To avoid tripping of 66/33 kV 10 MVA Transformer
3	33kV Killa Feeder	200/1-1	0.05	0.05	0.025	0.025	
4	33kV Rani Feeder	200/5-5	0..05	0.04	0.025	0.025	
5	11 kV Temple Feeder	300/1-1	0.025		0.025	Inst.	
6	11kV Maharani &Futamati Feeder	100/1-1	0.04	0.02	0.03	0.03	To avoid Tripping of 33/11 kV, 5 MVA Transformer

7. As informed by TSECL, Official no instances of tripping of 132/11 kV, 15 MVA Transformer alongwith 11 kV Feeders.
8. The team also tested for DC Earth Fault prevailing during Protection Audit done on 31.10.17. TSECL informed that the source for Earth Fault was found and necessary action has been taken. Results found during Testing: Positive to Ground: 63 V, Negative to Ground: 60.5V.
9. Present O/C & E/F settings at Udaipur S/S is attached in **Annexure-I.** Relay operating times for Udaipur are presently adequately graded. If there is indiscriminate operation of any relay, the same need to be tested.

Members Present:

OTPC

Shri SubhajitGanguly, Sr. Executive Ganguly. 24/3/18

NERLDC

Ms. MomaiDey, Sr. Engineer मोमाई 24/3/18

TSECL

Shri S. Debbarma, DGM, Udaipur S/S 24/3/18

Shri Sankar Chaudhuri, Sr. Manager 24/3/18

Annexure-I

SL. NO.	Name of Feeders	CT- Ratio	CT- Ratio	Relay Type	Curve	O/C Relay		E/F Relay	
						PSM	TMS	PSM	TMS
	BANDUAR SUBSTATION, UDAIPUR								
1	132 KV Monarchak Feeder	400/1-1-1	400	CDG 31,E/Mech	IDMT	0.75	0.1	0.1	0.02
2	132 KV Palatana Feeder	400/1-1-1	400	P127,Numerical	IEC S1	1	0.1	0.5	0.05
3	15 MVA,132/11 KV Power Transformer								
	132 KV Side	100/1-1-1	100	CDG 31,E/Mech	IDMT	0.5	0.15	0.2	0.15
	11 KV Side	1200/1-1-0.577	1200	CDG 31,E/Mech	IDMT	0.5	0.1	0.2	0.06
4	15 MVA,132/66 KV Auto Transformer								
	132 KV Side	100/1-1-1	100	CDG 31,E/Mech	IDMT	0.75	0.075	0.15	0.075
	66 KV Side	200/1-1-1	200	CDG 31,E/Mech	IDMT	0.75	0.075	1	0.05
5	10 MVA,132/66 KV Auto Transformer-1								
	132 KV Side	100/1-1-1	100	CDG 31,E/Mech	IDMT	0.5	0.1	0.1	0.15
	66 KV Side	200/1-1-1	200	CDG 31,E/Mech	IDMT	0.5	0.075	0.1	0.05
6	10 MVA,132/66 KV Auto Transformer-2								
	132 KV Side	100/1-1-1	100	CDG 31,E/Mech	IDMT	1	0.05	0.2	0.05
	66 KV Side	200/1-1-1	200	CDG 31,E/Mech	IDMT	0.5	0.075	0.1	0.075
7	66KV Bagafa Feeder	200/1-1-1	200	CDG 31,E/Mech	IDMT	1	0.025	0.2	0.025
8	66 KV Gokulnagar Feeder	200/1-1-1	200	P127,Numerical	IEC S1	1	0.025	0.2	0.015
9	66 KV Gumati Feeder	200/1-1-1	200	P127,Numerical	IEC S1	0.8	0.025	0.2	0.025
10	10 MVA,66/33 KV Power Transformer-1								
	66 KV Side	100/1-1-1	100	CDG 31,E/Mech	IDMT	1	0.1	0.2	0.05
	33 KV Side	200/1-1-1	200	CDG 31,E/Mech	IDMT	1	0.05	0.2	0.05
11	10 MVA,66/33 KV Power Transformer-2								
	66 KV Side	100/1-1-1	100	CDG 31,E/Mech	IDMT	0.75	0.05	0.2	0.05
	33 KV Side	200/1-1	200	CDG 31,E/Mech	IDMT	1	0.05	0.2	0.05
12	33 KV Rani Feeder	200/5-5	40	CDG 31,E/Mech	IDMT	3.75	0.025	0.5	0.025
13	33KV Killa Feeder	200/1-1	200	CDG 31,E/Mech	IDMT	1	0.025	0.2	0.025
14	33 KV Power House Feeder	300/1-1	300	CGI14N,Numerical	IDMT	0.4	0.03	0.15	0.03
15	5MVA,33/11KV Tr. 33KV Side	400/1-1-1	400	CDG 31,E/Mech	IDMT	0.75	0.09	0.15	0.09
16	11Kv Bagma Feeder	200/1-1	200	CDG 31,E/Mech	IDMT	1	0.025	0.1	0.025
17	11KV District Hospital	200/1-1	200	CDG 31,E/Mech	IDMT	0.5	0.025	0.1	0.025
18	11KV Jumjuri Feeder	200/1-1	200	CDG 31,E/Mech	IDMT	1	0.025	0.2	0.025
19	11KV Killa Feeder	200/1-1	200	CDG 31,E/Mech	IDMT	1	0.025	0.2	0.025
20	11 KV Udaipur Town Feeder	300/1-1	300	CDG 31,E/Mech	IDMT	1	0.025	0.1	0.025

Annexure-I

SL. NO.	Name of Feeders	CT- Ratio	CT- Ratio	Relay Type	Curve	O/C Rel
						PSM
	BANDUAR SUBSTATION, UDAIPUR					
21	11KV Matarbari Feeder	200/1-1	200	CDG 31,E/Mech	IDMT	1
22	11 KV Dhajanagar Feeder	200/1-1	200	CDG 31,E/Mech	IDMT	1
23	11KV Water Supply Feeder	300/1-1	300	CDG 31,E/Mech	IDMT	1
24	11KV Temple Feeder	300/1-1	300	CDG 31,E/Mech	IDMT	0.75
25	11 KV Incomming Feeder-2	1250/1-1-0.577	1250	CGI14N,Numerical	IDMT	0.2
26	11 KV Chandrapur Feeder	500/5-5	100	CDG 31,E/Mech	IDMT	2.5
27	11KV Maharani & Futamati.	100/1-1	100	CGI14N,Numerical	IDMT	0.9

Minutes of Meeting (MoM) of

Visit to 132/33 kV Lekhi Substation held on 28th Mar, 2018

1. As per discussion in 48th PCC Meeting, it was decided to form a team comprising of NERPC, NERLDC, NERTS and affected states of NER to review the downstream relay settings.
2. NERLDC team accompanied by an official from Nirjuli (PG) visited 132/33 kV Lekhi substation for review of the same on 28th Mar, 2018.
3. NERTS has done a thorough study of the relay settings of 132/33 kV Lekhi Substation submitted by Nirjuli (PG), the softcopy of which has been beforehand shared with NERLDC Team. Upon physical inspection by NERLDC Team, it was found that the relay settings were coordinated properly and apparently no changes in the O/C and E/F settings are required. The details of relay settings implemented at 132/33 kV Lekhi Substation is attached in **Annexure I.**
4. NERLDC Team also checked the switching and tripping records of the elements at 132/33 kV Level emanating from Lekhi Substation. It was found that instances of tripping of different feeders and elements upto 33 kV have been duly recorded in different registers at Lekhi Substation control room. Also hourly readings of Voltage, Current, Power Flow (MW), Frequency and Power Factor are being taken in appropriate registers for different feeders.
5. The meter readings of the 132 kV incoming and outgoing feeders i.e., 132 kV Lekhi- Pare S/C, 132 kV Lekhi - Itanagar (Chimphu) S/C and 132 kV Lekhi – Nirjuli S/C were found to be accurate.
6. NERLDC team also checked the functioning of the Remote Terminal Unit of make Alstom, installed at 132/33 kV Lekhi Substation. The RTU has been commissioned, but it has not been powered up due to non-availability of DC Supply. Also, the link for data transfer from Lekhi to SLDC Arunachal Pradesh has not been established yet.
7. The team also noticed that no means of VoIP communication is available at 132/33 kV Lekhi Substation.
8. It was found that there is no PLCC facilities is available at 132/33 kV Lekhi Substation.
9. Manpower provision is inadequate and No Annual Maintenance Plan is available.

Members Present:

NERLDC

Ratul Sarma, Engr --- **Sachin Kumar Singh, Engr** --

Palash Jyoti Borah, Engr- **Suvrah Das, AE** –

Anirban Bhattacharya, AE-

POWERGRID

B. S. Gogoi, Manager (Nirjuli S/s) —

Lekhi Substation

J Deka, JE-