North Eastern Regional Power Committee

MINUTES OF THE 34th PROTECTION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 16/06/2015 (Tuesday)
Time : 10:00 hrs
Venue : "Hotel Nandan", Guwahati.

The List of Participants in the 34th PCC Meeting is attached at **Annexure – I**

Shri P.K. Mishra, Member Secretary, NERPC welcomed all the participants to the 34th PCC meeting. He expressed concerned about less number of participants from the constituents and stated that due to the absence of members many issues could not be resolved and have to be repeated again and again in various sub-committee meetings. He informed that NERPC will take up with all the concerned constituents to nominate their representatives to attend the meeting regularly. He further mentioned that protection Sub-committee is also one of the most vital meeting and constituents should look into the matter seriously and he mentioned that as per Recommendation of Enquiry Committee constituted by Govt. of India, NER is also a part and parcel of the National Grid and unless protection system is healthy, unnecessary tripping will continue to occur which hampers the smooth operation of the grid. He once again requested all the members to actively participate in the meeting so that old pending agenda should be resolved and not be repeated again and again.

Thereafter, Member Secretary requested Sh. B. Lyngkhoi, Director/SE(O) to take up the agenda items for discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 33rd MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

The minutes of 33rd meeting of Protection Sub-committee held on 19th May, 2015 at Guwahati were circulated vide letter No. NERPC/SE (O)/PCC/2015/4520-4555 dated 04th June, 2015.

The Sub-Committee confirmed the minutes of 33rd PCCM of NERPC as no observations or comments were received from the constituents

I T E M S F O R D I S C U S S I O N

A.1 Implementation of 3-phase Auto Reclosure Scheme in all lines associated with Khandong and Kopili HEP:

For reliable operation of Power system it is required to implement 3-Phase Auto Reclosure Scheme in all the 132kV lines associated with Kopili and Khandong HEP of NEEPCO. The lists of such lines are:

a) 132kV Khandong – Umrangso - Halflong
b) 132kV Kopili – Khandong #1

During 33rd PCC meeting, the sub-committee requested Assam, NERTS & NEEPCO to co-ordinate amongst them and implement the 3-Phase Auto-reclosure by 15.06.15 and the status should be intimated in the next PCC meeting. Assam, NERTS and NEEPCO agreed.

Deliberation of the sub-Committee

DGM (AM), NERTS informed that approval for shifting of PLCC Panels has already been given to AEGCL by POWERGRID for establishment of Khandong-Umrangsoo-Haflong Link necessary implementation of Auto Reclose Scheme but, the same has not yet been done by AEGCL.

AGM, AEGCL informed that he will take up the matter with their site engineer and find out the exact position. Further, he informed that PLCC is not in place on above line. Also he informed that the existing panel will be shifted from Halflong end and put it in Umrangso end. Regarding Kopili end, he mentioned that bays belong to NEEPCO and requested them to intimate the status on this matter.

Sr. Manager, NEEPCO also informed that the scheme at Khandong end of NEEPCO is ready and requested Assam to comply the same at their Umrangso end.

DGM (AM) stated that without PLCC, the AR Scheme cannot be implemented and requested Assam to ensure that all equipments should be made available to implement the scheme at the earliest.

After detailed deliberation, the sub-committee requested NERPC to conduct a special meeting along with other issues so that the matter can be resolved at the earliest. The Sub-committee also suggested that representative from Communication wing of Assam has to attend the above meeting. NERPC agreed to host the above meeting soon and the date will be intimated soon.

Action: NERPC

A.2 Implementation of 3-Phase Auto Reclosure scheme of Radially fed 132kV Lines associated with Ranganadi HEP:

At present, the power flows to Nirjuli, Gohpur and Ziro radially fed from Ranganadi HEP and any transient fault in line causes undesirable outages. Hence, to avoid outages during transient fault it is essential to implement 3- Phase Dead Line charging of following 132kV Lines.

a) 132kV Ranganadi – Nirjuli Line (Dead Line Charging at RHEP)
b) 132kV Nirjuli – Gohpur Line (Dead Line Charging at Nirjuli)
c) 132kV Ranganadi – Ziro Line (Dead Line Charging at RHEP)

During 31st PCC meeting, EE, SLDC, Ar. Pradesh informed that due to many VIP visits during the month of February, 2015, the shutdown could not be given by them. He requested NEEPCO to avail the shutdown on any dates after 10.04.2015.

Deliberation of the sub-Committee

EE, SLDC AR. Pradesh requested NEEPCO to intimate their plan atleast one week in advance so that necessary action can be taken by them.

The sub-committee requested NEEPCO to take up the matter with M/S Alstom immediately to finalize the implementation program and intimate Ar. Pradesh in advance for necessary Shut Down. Further, NERPC will monitor the status of action taken by NEEPCO on weekly basis to expedite the implementation of long pending Auto Reclose Scheme.

Action: NEEPCO

A.3 Implementation of the recommendations of the Protection Audit:

As per Sl. no 9.1.1 & 9.1.4 of Report on Enquiry Committee on Grid Disturbance in Northern Region on 30th July 2012 and in Northern, Eastern & North-Eastern Region on 31st July 2012, thorough Third Party protection audit needs to be carried out periodically along with independent audit of Fault Recording Instruments.

In the 32nd PCCM, all the constituents were requested to furnish the data as per check list of Task force in **Annexure A.3(II)** and the data as per format of NERPC in **Annexure A.3(I)** for future reference**.**

AEGCL have furnished check list of protection objects. AEGCL are requested to confirm whether these protection objects are applicable for all transmission elements owned by them and also requested to furnish details as per format of NERPC. All the other constituents were requested to furnish the details as early as possible.

During 32nd PCC meeting, the sub-committee had also requested NERPC to hold the special meeting to finalize the standard scheduling of O&M comprising of NERLDC, NERTS, NERPC, NEEPCO, Assam & Meghalaya etc., at the earliest so that the best O&M practices can be evolved in the region.

Deliberation of the sub-Committee

SE(O) informed that since there were other issues to be discussed along with above agenda, the meeting could not be held in May, 2015. The above meeting as suggested by the Sub-committee will be conducted soon by NERPC.

Status of submission of data related to Third Party Protection Audit			
Name of Constituent	***As per format of Task Force***	***As per format of NERPC***	***Remarks***
DoP, Ar. Pradesh	*Not submitted*	*Not submitted*	
AEGCL	*Yes (only checklist submitted)*	*Not submitted*	*Details of Protection not submitted*

MSPCL	*Not submitted*	*Not submitted*	
MePTCL	*Not submitted*	*Yes (Khliehriat, Mawphlang, EPIP I, Mawlai, NEHU, NEIGRIHMS, Ronkhon, Sohra, EPIP II, Lumshnong, Nangalbibra, Nongstoin & Umiam)*	*Leshka, Umiam Stg I, Umiam Stg II, Umiam Stg III, Umiam Stg IV ,Umtru not submitted. Private owned S/S not submitted.*
P&E Deptt, Mizoram	*Not submitted*	*Not submitted*	
DoP, Nagaland	*Not submitted*	*Yes (Kohima,Wokha, Meluri,Kiphire, Dimapur, Mokokchung)*	
TSECL	*Not submitted*	*Not submitted*	
POWERGRID	*Not submitted*	*Not submitted*	
NEEPCO	*Not submitted*	*Yes (Khandong & Kopili)*	*Ranganadi, Doyang, AGBPP, AGTPP not submitted*
NTPC	*Not submitted*	*Not submitted*	
NHPC	*Not submitted*	*Not submitted*	
OTPC	*Yes*	*Not submitted*	

The sub-committee requested all the remaining constituents who have not furnished the data both as per check list of Task Force in Annexure – A.3 (II) and also, as per the format of NERPC in Annexure A.3 (I) above at the earliest.

A.4 <u>Standardization of Disturbance Recorder Channels</u>:

Disturbance Recorders on Transmission elements are necessary for post disturbance analysis, and identification & rectification of any protection mal-operation. As per CBIP's manual on Protection of Generators, GT, Transformers and Networks, it is recommended to have minimum 8(eight) analog signals and 16(sixteen) binary signals per bay or circuit. Also, it should have a minimum of 5 sec of total recording time, minimum pre-fault recording time of 100 msec and minimum post-fault recording time of 1000 msec.

During 32nd PCC meeting, GM, NERLDC requested NERTS to consider the peculiarity of NER system where 132 kV level is pre-dominant and hence this should be kept in mind while finalizing the procedure.

DGM (AM), NERTS informed that suggestion in this regard has already been communicated by them to their corporate office

Deliberation of the sub-Committee

DGM (AM), NERTS informed that standardization for transformers & reactors are being finalized by their Corporate Centre for the whole country, the report would be circulated as soon as it is received from them. He also informed that suggestion by GM, NERLDC for NER States have already been communicated by them. He stated that the final report is expected within 15 days and the same will be intimated to NERPC/NERLDC accordingly.

DGM (AM), NERTS informed that standardization for transformers & reactors are being finalized by their Corporate Centre for the whole country, the report would be circulated as soon as it is received from them. He also informed that suggestion by GM, NERLDC for NER States have already been communicated by them. He stated that the final report is expected by 30th June, 2015 and the same will be intimated to NERPC/NERLDC accordingly.

The Sub-committee noted as above.

Action: NERTS, POWERGRID

A.5 Submission of formats for charging/first time synchronization of new elements:

Information related to charging/first time synchronization of new elements/units is to be furnished to NERLDC (two month in advance). All the activities related to charging/first time synchronization of new elements are to be completed before charging/first time synchronization of new elements. The technical data of the elements are also necessary for preparation of Base Case for system study for NER system.

During the 107th OCC meeting, the Sub-committee requested to intimate the Nodal Officer for above issue so that correspondence can be taken up with them directly. The name of Nodal Officer along with contact number is given below:

Constituent	Name of Nodal Officer	Contact No	Email id:
Ar. Pradesh	N. Perme, EE, SLDC	09436288643	sldcitnagar@gmail.com
Assam	B.C. Borah, DGM, LDC	09435119248	sldcaseb@rediffmail.com
Manipur	L. Haokip, Manager	08575004401	l.haokip@mspdcl.com
Mizoram	Vanlalrema, SE, SLDC	09436140353	sldc_mizoram@rediffmail.com
Meghalaya	F.E. Kharshiing, SE, SLDC	09612170657	sldc.shg@gmail.com
	H.F. Shangpliang, EE, MRT	09863315562	hector_fd@rediffmail.com
Nagaland	Atoho Jakhalu, EE, SLDC	09436002696	atoho.jk@gmail.com
Tripura	Mrinal Pal, Manager	09436137022	mrinalpaulnit@gmail.com
NEEPCO	Bhaskar Goswami, Sr. Mgr	09436163983	pbhaskargoswami@yahoo.com
NHPC	R.C. Singh, Manager	09436894889	rcsloktak@yahoo.com
NERTS	Supriya Paul, Dy. Mgr.	09436302995	nerts_os@yahoo.in
	Deep Bhaumick, Engineer	09436335255	-do-
OTPC	Narendra Gupta, Manager	09774233426	nk.gupta@otpcindia.in
NTPC	J. Bhattacharyya, AGM(EMD)	09435720036	jayanbhattacharjee@ntpc.co.in
	G. K. Kundu, AGM(EEMG)	09401826314	

Deliberation of the sub-Committee

SE(O) informed that due to unavoidable circumstances, the above meeting could not be held as per Sub-committee directive. He mentioned that above meeting will be held soon and the date will be intimated accordingly.

The Sub-committee noted as above.

Action: NERPC

A.6 Reporting of failure of equipment/towers of transmission lines to Standing Committee of Experts:

CEA vide letter dated 04.02.2015 has intimated that as per Section 73 of Electricity Act 2003, CEA is to carry out investigation of failure of substations/generating stations and failure of transmission line towers. Accordingly two Standing Committees have been constituted taking representation from academic institutes, Research Institutes like CPRI and utility to investigate the cause of failures:

(a) Standing Committee of Experts to investigate the failure of Transmission line towers of 220 kV and above voltage level of Power utilities.

(b) Standing Committee of Experts to investigate the failure of Equipments of 220 kV and above substations/Generating stations of power utilities.

In view of above, in 30th PCC meeting, MS, NERPC requested that all utilities may report the incidences of failure immediately after occurrence of such failure to Chief Engineer (SE&TD), CEA with copy to NERPC.

The format for reporting the first hand information about the failure of equipment in substations/generating stations and failure of transmission line towers are attached at earlier minutes.

During 32nd PCC meeting, Meghalaya representative stated that Recent failure of one 63 MVAR reactor at 400 kV S/S Byrnihat of Me.ECL would be sent to CEA for investigation as directed above as suggested by SE(O) to CEA within one week.

DGM (AM) intimated that they have already sent the information to CEA regarding failure of above equipment at Bongaigoan.

During 33rd PCC meeting, Meghalaya representative requested NERPC to take up the matter with Director (Trans) regarding failure of above equipment at Byrnihat.

The Sub-committee requested NERPC to write to Director (Transmission), Me. PTCL regarding above failure of important reactor at Byrnihat.

Deliberation in the Meeting:

SE(O) informed that NERPC had written to Director (T), Meghalaya but the reply is still awaited.

The Sub-committee requested NERPC to take up the matter with Me. PTCl once again.

Action: NERPC

A.7 Status of R&M Implementation of NER from PSDF:

The Sub-committee requested all the constituents to intimate the status of progress to NERPC regularly so that the same could be intimated to CERC.

Deliberation in the Meeting:

The Status as intimated during 34th PCC meeting is attached at **Annexure – A.7**.

The Sub-committee requested all constituents to complete the proactive actions like taking Board's approval, floating of NITs, selection of bidders etc., as directed by the Hon'ble CERC.

Action: All 7 NER States.

A.8 Furnishing Protection Details of Transmission Lines, Transformers, Reactors and Bus Bars:

a. Transmission Line

As per section 43.4.c (Schedule V) of Technical Standards for construction of Electrical Plants and Electric Lines Regulation, 2010, Protection system of **400 kV lines** consists of Main I, Main II, DEF, Two Stage Over Voltage, Auto Reclosing and Carrier Aided Inter Tripping. Protection system of **220 kV lines** consists of Main I, Main II/Over Current & DEF, Auto Reclosing and Carrier Aided Inter Tripping. Protection system of **132 kV lines** consists of Main I, Over Current & DEF, Auto Reclosing and Carrier Aided Inter Tripping.

AEGCL, MSPCL, MePTCL, P&E, Mizoram, POWERGRID, NEEPCO (only AGBPP, Ranganadi HEP, Doyang HEP, Kopili & AGTPP), NHPC, DoP, Nagaland, TSECL has furnished the information.

DoP, Arunachal Pradesh, NEEPCO (for Khandong & Kopili Stg II), OTPC & NTPC were requested to furnish Protection Details of Transmission Lines as per enclosed format in Annexure – A.8.

b. Transformer

As per section 43.4.c (Schedule V) of Technical Standards for construction of Electrical Plants and Electric Lines Regulation, 2010, Protection system of **Transformer** consists of Differential Protection, Over Flux Protection, REF

Protection, Backup Directional Over Current and Earth Fault Protection (HV & LV side)/Impedance Protection, Buchholz, WTI, OTI, MOG, OSR for OLTC, PRD, SA, Tertiary Winding Protection, Over Load Alarm.

AEGCL, MSPCL, MePTCL, P&E, Mizoram, POWERGRID, NEEPCO (only AGBPP, Ranganadi HEP, Kopili & AGTPP), NHPC, DoP, Nagaland & TSECL has furnished the information.

DoP, Arunachal Pradesh, NEEPCO (for Khandong, Doyang & Kopili Stg II), OTPC & NTPC were requested to furnish Protection Details of Transformer as per enclosed format in Annexure – A.8.

c. Reactor

As per section 43.4.c (Schedule V) of Technical Standards for construction of Electrical Plants and Electric Lines Regulation, 2010, Protection system of **Reactor** consists of Differential Protection, REF Protection, Backup Definite Time Over Current and Earth Fault Protection/Impedance Protection, Buchholz, WTI, OTI, MOG, SA.

AEGCL, MePTCL, NEEPCO (Rangaandi HEP) and POWERGRID have furnished the information.

OTPC was requested to furnish **Protection Details of Reactor** as per enclosed format in ***Annexure –A.8.***

d. Bus Bar & LBB

As per section 43.4.c (Schedule V) of Technical Standards for construction of Electrical Plants and Electric Lines Regulation, 2010, Bus Bar Protection and Local Breaker Backup Protection are to be provided in **220 kV and above voltage** interconnecting sub-station and all generating station switchyards.

MePTCL, POWERGRID, NEEPCO (AGTPP, AGBPP & Ranganadi HEP) & NHPC have furnished the information.

DoP, Arunachal Pradesh (Deomali), AEGCL (BTPS, Agia, Boko, Sarusajai, Langpi, Samaguri, Jawaharnagar, Mariani, Tinsukia), NTPC & OTPC were requested to furnish Bus Bar Protection and Local Breaker Backup Protection as per enclosed format in Annexure –A.8.

e. Bus Coupler

MSPCL, MePTCL, P&E, Mizoram, NEEPCO (only AGBPP, Ranganadi HEP, Kopili & AGTPP), DoP, Nagaland, TSECL & NHPC have furnished the information.

DoP, Arunachal Pradesh, AEGCL, NTPC, POWERGRID, NEEPCO (for Doyang, Khandong & Kopili Stg II) & OTPC were requested to furnish Bus Coupler Protection as per enclosed format in Annexure –A.8.

Protection System Database prepared based on information furnished by power utilities of NER, which is attached at ***Annexure - A.8***). Power utilities of NER were requested to check & validate the same.

During 33rd PCC meeting, the sub-committee requested NERPC to write a letter to remaining constituents (i.e. AEGCL (for Bus Coupler (for all) & Bus Bar & LBB (for BTPS, Agia, Boko, Sarusajai, Langpi, Samaguri, Jawaharnagar, Mariani, Tinsukia)), DoP, Arunachal Pradesh (for Transmission Line, Transformer, Bus Coupler, Bus Bar (for Deomali) & LBB (for Deomali), DOP, Nagaland (for Transmission Line, Transformer, Bus Coupler), NEEPCO (Transmission line (for Khandong & Kopili Stg-II), Transformer (for Kopili, Khandong & Kopili Stg-II), Bus Bar & LBB (Kopili), Bus Coupler (Kopili, Khandong, Kopili St II), OTPC (for Transmission Line, Transformer, Reactor, Bus Copuler, Bus Bar & LBB), POWEERGRID (for Bus Coupler) to furnish the data as per enclosed format in Annexure – A.8 at the earliest.

Deliberation in the Meeting:

SE(O) informed that NERPC had written to all concerned constituents as per directive of the Sub-committee and the reply is awaited.

Status of submission of data related to Protection Systems as per CEA regulations							
Sl No	***Name of Constituent***	***Transmission Line***	***Transformers***	***Reactor***	***Bus-Bar & LBB***	***Bus Coupler***	***Remarks***
1	***DoP, Arunachal Pradesh***	***Not submitted***	***Not submitted***	*Not Applicable*	***Not submitted***	***Not submitted***	

2	***AEGCL***	*Submitted*	*Submitted*	*Submitted*	***Not submitted***	***Not submitted***	*AEGCL informed Bus Bar & LBB Relays at Azara & Rangia was installed*
3	***MSPCL***	*Submitted*	*Submitted*	*Not Applicable*	*Submitted*	*Submitted*	
4	***MePTCL***	*Submitted*	*Submitted*	*Submitted*	*Submitted*	*Submitted*	
5	***P&E Deptt, Mizoram***	*Submitted*	*Submitted*	*Not Applicable*	*Submitted*	*Submitted*	
6	***DoP, Nagaland***	*Submitted*	*Submitted*	*Not Applicable*	*Submitted*	*Submitted*	
7	***TSECL***	*Submitted*	*Submitted*	*Not Applicable*	*Submitted*	*Submitted*	
8	***POWERGRID***	*Submitted*	*Submitted*	*Submitted*	*Submitted*	***Not Submitted***	
9	***NEEPCO***	*Submitted (AGBPP, AGTPP, Ranganadi, Doyang, Kopili)*	*Submitted (AGBPP, AGTPP, Ranganadi, Kopili)*	*Submitted (Ranganadi)*	*Submitted (AGBPP, Ranganadi,, AGTPP, Kopili)*	*Submitted (AGBPP, Ranganadi,, AGTPP, Kopili)*	***Details of Khandong, Kopili STG-II & Doyang not submitted***
10	***NTPC***	***Not submitted***	***Not submitted***	*Not Applicable*	***Not submitted***	***Not submitted***	
11	***NHPC***	*Submitted*	*Submitted*	*Not Applicable*	*Submitted*	*Submitted*	
12	***OTPC***	***Not submitted***	***Not submitted***	***Not submitted***	***Not submitted***	***Not Submitted***	

The sub-committee requested the remaining constituents who have not submitted at the earliest.

A.9 Major Oscillations in NER:

DGM (SO-II), NERLDC informed that during the month of May, 2015, there were persistent Low Frequency Oscillations (LFOs) in NER Grid which led to tripping of some generators in the Southern part of NER Grid around Khliehriat (Meghalaya) system.

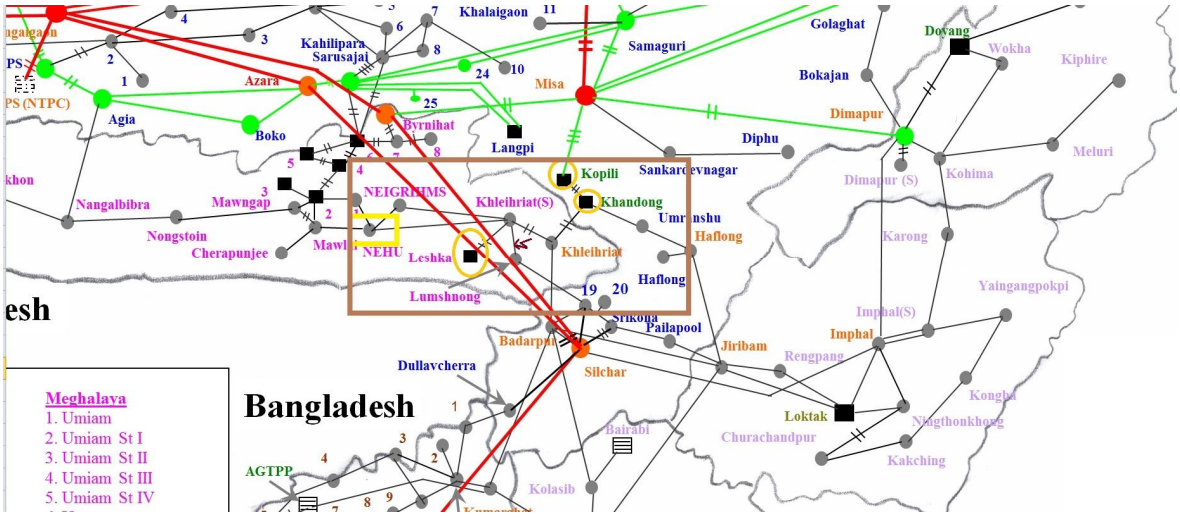
The oscillations occurred from 03:38:56.080 Hrs to 03:41:37.040 Hrs (around 3 minutes) and from around 03:42:33.440 Hrs to around 03:45:24.480 Hrs (around 3 minutes) on 29.05.15, & from around 22:56:30 Hrs to 22:58:15 Hrs on 31st May 2015.

In both the incidents, Low Frequency Modes in the system around 1.2 Hz and it's 2nd Harmonic mode around 2.4 Hz was observed in the system, and the modes have Poor / Negative damping.

In the 29th May incident, the oscillations started after fault in Meghalaya system leading to tripping of 132 kV Khliehriat – Lumshnong line followed by oscillations in Leshka HEP of MePGCL and Khandong HEP of NEEPCO. There was tripping of Leshka units and Khandong units due to jerk in the system. The oscillations later continued between units of Kopili HEP and Kopili St-II HEP.

In the 31st May incident, the oscillations started again after fault in Meghalaya system leading to tripping of 132 kV Khliehriat (PG) – Khliehriat (MePTCL) I & II lines followed by oscillations in Leshka HPP of MePGCL and Khandong HEP of NEEPCO. There was tripping of Leshka units, Umiam St IV units and Khandong unit due to jerk in the system. The oscillations later continued between units of Kopili HEP and Kopili St-II HEP.

The Zone of oscillations in NER Grid is indicated below:



Oscillations were more prominent in Active power/ Frequency than in Voltage. It thus suggests a lack of system stability as a whole. To address this issue, PSS (Power System Stabilizers) may be installed in Myndtu Leshka Power Station to enhance stability of the system.

Deliberation in the Meeting:

DGM (SO-II), NERLDC gave presentation on occurrences of Low Frequency Oscillation (LFO) due to tripping of some elements in Southern part of NER Grid. It was shown that LFO was persisted longer duration due to poor/negative damping characteristics and machines of Khandong & Leshka tripped. They expressed the seriousness of these oscillations as longer duration of oscillation may trip larger size machine and as a result wide spread disturbance may occur due to this type of incidence. They requested to the sub-committee to take the matter to the concerned authority.

After detailed deliberation, the sub-committee requested NERPC to conduct a special meeting on above issue and directed that all concerned person from Distribution, Generation & Transmission wings to attend the meeting and to analyze the exact cause of oscillation. NERPC agreed and inform that meeting will be convened soon and the date will be intimated shortly.

Action: NERPC

A.10 Grid Disturbances during May, 2015:

The following numbers of Grid Disturbances (GD) occurred during the period **w.e.f 1st May to 31st May, 2015**:

Sl No	Control Area	Grid Disturbance in nos.	
		1st May, 2015 to 31st May, 2015	1st January, 2015 to 31st May, 2015
1	Palatana	1	5
2	AGBPP	0	1
3	AGTPP	1	4
4	Ranganadi	2	3
5	Kopili	0	1
6	Khandong	0	1
7	Doyang	0	2
8	Loktak	0	4
9	Arunachal Pradesh	2	22
10	Assam	4	25
11	Manipur	6	34
12	Meghalaya	6	9
13	Mizoram	2	5
14	Nagaland	1	13
15	Tripura	1	3

Sl No	Category of GD	Grid Disturbance in nos.	
		1st May, 2015 to 31st May, 2015	1st January, 2015 to 31st May, 2015
1	GD 1	18	83
2	GD 2	2	4
3	GD 3	0	0
4	GD 4	0	0
5	GD 5	0	1
	Total	**20**	**88**

Deliberation in the Meeting:

This is for information to the members. Remedial actions to be taken by the concerned power utilities of NER to avoid such disturbances in future.

A.11 Root Cause analysis of Grid Disturbacnes:

i. Disturbance in Meghalaya system – Repeated tripping of 132 kV Khliehriat (PG) – Khliehriat (Me. PTCL) – I & II lines:

During the month of May, 2015, there were 6 nos. of grid disturbances in Khliehriat (including Lumshnong) area of Meghalaya.

W.e.f 01.06.15 to 08.06.15, there were 10 nos. events involving tripping of 132 kV Khliehriat (PG) – Khliehriat (MePTCL) I & II lines, resulting in 9 nos. of grid disturbances.

During the month of May15

a. **At 1544 Hrs on 19.05.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines **(** Line 1 : **Khliehriat (PG) - DP, Z-III, R-B-E & Khliehriat (MePTCL)- Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-II, R-B-E & Khliehriat (MePTCL)- Not furnished),** 132 kV Khliehriat – Lumshnong line **(Khliehriat (MePTCL) - Earth Fault & Lumshnong - Not furnished)** and 132 kV Khliehriat – NEIGRIHMS line (**Khliehriat (MePTCL) – DP, Z1, R-Y-B & NEIGRIHMS – Not furnished)** tripped. Due to tripping of these elements, there was loss of load in Khliehriat area (including Lumshnong) of Meghalaya System and loss of generation from Myndtu Leshka HPP. System was restored progressively by 15:48 Hrs.

Load loss: 70 MW in Meghalaya
Generation Loss: 35 MW in Meghalaya (Leshka)

b. **At 1043 Hrs on 23.05.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1 : **Khliehriat (PG) - DP, Z-III, R-E & Khliehriat (MePTCL)- Not furnished** & Line II : **Khliehriat (PG) - DP, Z-II, R-E & Khliehriat (MePTCL)- Not furnished),** 132 kV Khliehriat (PG) – Khandong I line **(Khliehriat (PG) - No tripping & Khandong (NEEPCO) - Earth Fault)** line tripped. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya.

Load loss: 57 MW in Meghalaya

c. **At 1425 Hrs on 23.05.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(**Line 1: **Khliehriat (PG) - DP, Z-III, B-E & Khliehriat (MePTCL) - Not furnished)** & Line 2: **Khliehriat (PG) - DP, Z-II, Y-E & Khliehriat (MePTCL) - Not furnished)**. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya.

Load loss: 15 MW in Meghalaya

d. **At 0336 Hrs on 29.05.15,** 132 kV Khliehriat (MePTCL) – Lumshong line **(Khliehriat(MePTCL) - DP,Z-III,R-Y-B & Lumshong - Hand tripped)** line tripped. This resulted tripping of Unit 3 of Myndtu Leshka HPP of Meghalaya and Units 1 and 2 of Khandong due to heavy jerk. There were Low Frequency Oscillations (LFOs) of 1.2 Hz and 2.4 Hz modes in the system having poor or negative damping. Oscillations were observed in Leshka, Khandong, Kopili and Kopili St-II units.

Load loss: 24 MW in Meghalaya
Generation Loss: 84 MW [44 MW in Leshka and 40 MW Khandong)

e. **At 0757 Hrs on 29.05.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished** & Line 2 : **Khliehriat (PG) - DP, Z-II, R-Y-B & Khliehriat (MePTCL)- Not furnished)** tripped. Due to tripping of these elements, there

was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and loss of entire generation of Leshka HPP on Under-voltage.

Load loss: 73 MW in Meghalaya
Generation Loss: 105 MW in Meghalaya (Leshka)

f. **At 2255 Hrs on 31.05.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-B-E & Khliehriat (MePTCL)- Not furnished** & Line 2 : **Khliehriat (PG) - DP, Z-II, R-B-E & Khliehriat (MePTCL)- Not furnished)** tripped. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya, loss of entire generation of Leshka HPP on Undervoltage and loss of entire generation of Umiam StIV. There was Low Frequency Oscillations (LFOs) of poor/negative damped modes around 1.2 Hz and 2.4 Hz only. Oscillations were observed in Leshka, Khandong, Kopili and Kopili St-II units.

Load loss: 73 MW in Meghalaya
Generation Loss: 105 MW in Meghalaya (Leshka and Umiam St- IV)

Category as per CEA Standards: GD-I

W.e.f. 01.06.15 to 08.06.15

i. **At 1857 Hrs on 01.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line I: **Khliehriat (PG) - DP, Z-II, R-Y-E & Khliehriat (MePTCL) - Not furnished** and Line II: **Khliehriat (PG) - DP, Z-III, R-Y-E & Khliehriat (MePTCL)- Not furnished)**. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP.

Load loss: 88 MW in Meghalaya
Generation Loss: 122 MW in Meghalaya (Leshka)

ii. **At 2356 Hrs on 01.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(**Line 1: **Khliehriat (PG) - Not furnished & Khliehriat (MePTCL) - Not furnished** and Line 2: **Khliehriat (PG) - Not furnished & Khliehriat (MePTCL) - Not furnished)**. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP.

Load loss: 49 MW in Meghalaya
Generation Loss: 122 MW in Meghalaya (Leshka)

iii. **At 2248 Hrs on 05.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL) - Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL) - Not furnished)**. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP.

Load loss: 67 MW in Meghalaya
Generation Loss: 114 MW in Meghalaya (Leshka)

iv. **At 1816 Hrs on 06.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1 : **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL) - Not furnished** and Line 2 : **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished)**. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP.

Load loss: 111 MW in Meghalaya
Generation Loss: 67 MW in Meghalaya (Leshka)

v. **At 0056 Hrs on 08.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished)** tripped. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP. 132 kV Khandong – Khliehriat (PG) I also tripped **(Khandong – Not furnished & Khliehriat(PG) – Not furnished).**

Load loss: 39 MW in Meghalaya
Generation Loss: 121 MW in Meghalaya (Leshka)

vi. **At 2222 Hrs on 08.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-II, R-Y-B &**

Khliehriat (MePTCL)- Not furnished). Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP.

Load loss: 58 MW in Meghalaya
Generation Loss: 121 MW in Meghalaya (Leshka)

vii. **At 2317 Hrs on 08.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished)** tripped. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP. 132 kV Khandong – Khliehriat (PG) I also tripped **(Khandong – Not furnished & Khliehriat(PG) – Over-current).**

Load loss: 112 MW in Meghalaya
Generation Loss: 67 MW in Meghalaya (Leshka)

viii. **At 0318 Hrs on 09.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1: **Khliehriat (PG) - DP, Z-III, R-Y-B & Khliehriat (MePTCL)- Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-II, R-Y-B & Khliehriat (MePTCL)- Not furnished)** tripped. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP. 132 kV Khandong – Khliehriat (PG) I also tripped **(Khandong – Not furnished & Khliehriat(PG) – Earth Fault).**

Load loss: 77 MW in Meghalaya
Generation Loss: 44 MW in Meghalaya (Leshka)

ix. **At 0508 Hrs on 09.06.15,** 132 kV Khliehriat (PG) - Khliehriat (MePTCL) I & II lines tripped **(** Line 1: **Khliehriat (PG) - DP, Z-III, Y-B-E & Khliehriat (MePTCL)- Not furnished** and Line 2: **Khliehriat (PG) - DP, Z-II, Y-B-E & Khliehriat (MePTCL)- Not furnished)** tripped. Due to tripping of these elements, there was loss of load in Khliehriat (including Lumshnong) area of Meghalaya and generation loss in Leshka HEP. 132 kV Khandong –

Khliehriat (PG) I also tripped **(Khandong – Not furnished & Khliehriat(PG) – Earth Fault).**

Load loss: 75 MW in Meghalaya

Generation Loss: 38 MW in Meghalaya (Leshka)

Category as per CEA Standards: GD-I (for events from Sl. No. a. to ix)

x. **At 0056 Hrs on 08.06.15,** 132 kV Khandong – Khliehriat (PG) I tripped **(Khandong – Not furnished & Khliehriat(PG) – Not furnished).**

Analysis of events:

Due to tripping of these elements, power supply to Khliehriat (including Lumshnong) area of Meghalaya was interrupted repeatedly. It is suspected that there may be un-cleared fault in Meghalaya system or delayed fault clearance. As a result, several transmission lines tripped. In most of the cases, Leshka machines tripped and in some of the case, machines of Umiam St IV & Khandong tripped.

The un-cleared faults may create oscillations in the system. It was observed that there was oscillation of machines of Leshka along with machines of Khandong. As a result, machines of Leshka and machines of Khandong tripped. Even after tripping of these machines, the oscillations in the system was continued and observed between machines of Kopili and machines of Kopili Stg-II until the mode damping improves. Oscillations were more prominent in Active power/Frequency rather than in Voltage. It thus suggests a lack of system stability as a whole. To address this issue, PSS (Power System Stabilizers) may be installed in Leshka Power Station to enhance stability of the system.

DR output at both ends of all lines tripped required for proper analysis of the events.

Deliberation in the Meeting:

DGM (SO-II), NERLDC informed that six nos. grid disturbances occurred during the month of May15 and nine nos. grid disturbances occurred from 01.06.15 to 08.06.15 i.e occurrence of one grid disturbance per day. They informed that these disturbances occurred due to persistence fault in the Meghalaya System. The matter is very serious and they requested the sub-committee to take the matter to the concerned authority.

The Sub-committee expressed concerned about the frequent tripping of 132 kV Khliehriat – Khliehriat I & II lines and occurrences of oscillation due to delayed fault clearance and requested them to look into the matter seriously.

DGM (AM), NERTS informed that as directed by the Sub-committee a joint visit was carried out by NERTS,, POWERGRID along with MePTCL on 26.03.2014 and subsequently on 27.06.2014. He said that suggestions and preventive measures to be taken for rectification of system deficiencies were sent to MePTCL with a copy to NERPC. He requested MePTCL to adhere to the suggestions given to them.

MePTCL informed that many disturbances occurred due to delayed fault clearance of 33 kV lines of MePDCL. MePTCL stated that sub-stations of MePTCL will be renovated after getting the funds from PSDF.

DGM (AM), NERTS reiterated that the problem is mainly due to earthing problem as observed during the joint visit above and unless earthing is improved R&U will not help in reducing frequent tripping.

SE, SLDC informed that the copy of joint visit above was not received by them and requested to send to them once again.

SE(O) informed that copy of joint visit is available with NERPC and the same will be forwarded to them. He requested Meghalaya to carry out the preventive measures of earthing at the earliest. Meghalaya agreed.

DGM (SO-II), NERLDC stated that many of tripping of transmission & distribution lines occurred due to vegetation problem. Tripping of transmission & distribution lines can be reduced if bush/jungle cutting done regularly. It was observed that number of tripping of transmission & distribution lines increases during the period of monsoon.

The Sub-committee suggested that recommendation adopted earlier should be carried out by all the constituents especially before every onset of monsoon. The earlier recommendations have to be complied before R&U of sub-stations as given below:

a. Testing of all existing relays and schemes within 2 months by all constituents to assess the healthiness of existing protective relays.

b. Review of relay settings based on history of tripping.

c. Availability of Distance Protection scheme.

d. Attempts would be made to avoid any tripping on account of vegetation growth, which is frequent in NER.

e. Single Phase / Three phase Auto Reclose Scheme of transmission lines of voltage level 132 kV and above under List of Important Grid Elements of NER are to be adopted, wherever available. The status of implementation will be monitored in monthly OCC/PCC meetings.

All constituents agreed to carry out the above suggestion regularly.

The Sub-committee noted as above.

Action: NERPC, Meghalaya

ii. <u>Disturbance in AGTPP, Palatana and Tripura power system</u>

a. At 1526 Hrs on 29.05.15, due to tripping of 132 kV Agartala – Dhalabil line, 132 kV Baramura – Jirania line, 132 kV AGTPP - Agartala I line **(AGTPP - DP, Z-III, R-E & Agartala - No tripping)** & 132 kV AGTPP - Agartala II line **(AGTPP- DP, Z-III, R-E & Agartala - No tripping)**, power supply to Tripura system was interrupted and all running units of AGTPP tripped (**No information from AGTPP regarding unit tripping)**. 132 kV Palatana - Surajmani Nagar line & 132 kV Palatana – Udaipur line also tripped, Due to tripping of 132 kV Palatana - Surajmani Nagar line & 132 kV Palatana – Udaipur line, Palatana Module II tripped **(Due to tripping of Gas Booster Compressor)**. Tripping of Palatana machines triggered SPS I at Silchar with load relief of 70 MW at South Assam.

Generation loss: 469 MW [Palatana = 335 MW, AGTPP = 76 MW]
Load Loss: 70 MW in Tripura

Category as per CEA Standards: GD-II

Analysis of events:

Due to tripping of all outgoing feeders of AGTPP, all the running units of AGTPP tripped. Due to tripping of 132 kV Palatana – Udaipur line and 132 kV Palatana – Surjamaninagar line, auxiliary system of Palatana Module II failed and subsequently Gas Booster Compressor (GBC) of Palatana Module II tripped.

In this event on 29-May-2015, the 400/132 kV, 125 MVA ICT at Palatana was out of service. Since supply to Auxiliaries of Palatana units are taken from 132 kV Grid of Tripura, outage of 132 kV Palatana – Udaipur S/C and 132 kV Palatana – Surjamaninagar S/C led to failure of supply to Auxiliary system of Palatana units and hence tripping of Palatana units. If another 400/132 kV ICT at Palatana were in place, this type of incident could have been averted. This transformer would also ensure enhanced reliability of supply and also satisfied the N-1 contingency criteria as specified in CEA's Manual on Transmission Planning Criteria, Jan'13.

As an alternative arrangement, in such cases, if UATs at Palatana are of sufficient capacity, the Auxiliary supply failure would not have occurred. OTPC, Palatana may explore the provision of enhancement of UAT to sufficient capacity.

DR output at both ends required for proper analysis of the events.

Deliberation in the Meeting:

Since no representative from Tripura was present, the Sub-committee suggested to discuss the issue in the 110th OCC meeting.

The Sub-committee noted as above.

iii. Disturbance in Manipur system

a. At **1658 Hrs on 01.05.15**, due to tripping of 132 kV Imphal(PG) - Imphal I & II lines (Line I: **(Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished &** Line II **: Imphal (PG) - Earth fault & Imphal (MSPCL) -Not furnished)**, power supply to Imphal (Capital) area of Manipur interrupted.

Load loss: 63 MW in Manipur.

b. At **0906 Hrs on 12.05.15**, due to tripping of 132 kV Loktak- Ningthoukhong line **(Loktak - Earth Fault & Ningthoukhong - Not furnished)** & 132 kV Ningthoukhong - Imphal (PG) line **(Ningthoukhong - Not furnished &**

Imphal (PG) - Earth Fault), power supply to Ningthoukong area of Manipur interrupted.

Load loss: 28 MW in Manipur.

c. At **1124 Hrs on 19.05.15**, due to tripping of 132 kV Imphal (PG) - Imphal (MSPCL) I & II lines **(**Line I: **Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished** and Line II **Imphal (PG) - Earth fault & Imphal (MSPCL) – Not furnished),** power supply to Imphal (Capital) area of Manipur interrupted.

Load loss: 76 MW in Manipur.

d. At **0137 Hrs on 21.05.15**, due to tripping of 132 kV Imphal (PG) - Imphal (MSPCL) I & II lines **(**Line I : **Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished)** & Line II: **Imphal (PG)- Earth fault & Imphal (MSPCL)-Not furnished),** power supply to Imphal (Capital) area of Manipur interrupted.

Load loss: 30 MW in Manipur.

e. At **1414 Hrs on 23.05.15**, due to tripping of 132 kV Imphal (PG) - Imphal (MSPCL) I & II lines **(**Line1: **Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished)** & Line II: **Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished),** power supply to Imphal (Capital) area of Manipur interrupted.

Load loss: 40 MW in Manipur.

f. At **1714 Hrs on 23.05.15**, due to tripping of 132 kV Imphal (PG) - Imphal (MSPCL) I & II lines **(**Line 1: **Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished** & Line 2: **Imphal (PG) - Earth fault & Imphal (MSPCL) - Not furnished),** power supply to Imphal (Capital) area of Manipur interrupted.

Load loss: 44 MW in Manipur.

Category as per CEA Standards: GD-I

Analysis of events:

It is suspected that there may be fault in MSPCL system in these cases. DR output at both ends of all lines tripped required for proper analysis of the events.

Deliberation in the Meeting:

Manipur representative informed that tripping was mainly occurred due to lightning & thundering and stated that frequent tripping will be looked into by Manipur.

DGM (SO-II), NERLDC informed that there was no improvement in Manipur System in the matter of grid disturbances. Grid Disturbances in Manipur System occurred due to non clearance of fault at 33 kV lines of MSPCL/ persisted fault in 33 kV lines of MSPCL. They have to check relay setting of these elements & to adopt proper relay setting so that fault may be cleared within specified time.

The Sub-committee suggested that recommendation adopted earlier should be carried out by all the constituents especially before every onset of monsoon. The earlier recommendations have to be complied before R&U of sub-stations as given below:

f. Testing of all existing relays and schemes within 2 months by all constituents to assess the healthiness of existing protective relays.

g. Review of relay settings based on history of tripping.

h. Availability of Distance Protection scheme.

i. Attempts would be made to avoid any tripping on account of vegetation growth, which is frequent in NER.

j. Single Phase / Three phase Auto Reclose Scheme of transmission lines of voltage level 132 kV and above under List of Important Grid Elements of NER are to be adopted, wherever available. The status of implementation will be monitored in monthly OCC/PCC meetings.

All constituents agreed to carry out the above suggestion regularly.

The Sub-committee noted as above.

Action: All 7 NER States

iv. Disturbance in Arunachal Pradesh and Gohpur area of Assam

a. At 1138 Hrs on 18.05.15, due to tripping of 400 kV Balipara - Ranganadi I **(Balipara (PG) – DP, Z-II, Y-B-E & Ranganadi (NEEPCO) – DP, Z-I, Y-B-E)**, power supply to Ziro & Capital area of Arunachal Pradesh and Gohpur area of Assam interrupted. There was also generation loss in Ranganadi HEP. Power was extended to these areas through 400 kV Balipara- Ranganadi II at 1210 Hrs on 18.05.15. **400 kV Balipara- Ranganadi II was kept open w.e.f 0006 Hrs on 18.05.15 due to control bus voltage at Ranganadi.**

Load loss: 60 MW in Arunachal Pradesh & Assam
Generation Loss: 110 MW at Ranganadi (NEEPCO)

Category as per CEA Standards: GD-II

b. At 0008 Hrs on 25.05.15, due to tripping of 400 kV Balipara- Ranganadi I & II lines **(** Line 1: **Balipara(PG) – Overvoltage & Ranganadi (NEEPCO) – Overvoltage** & Line 2 : **Balipara (PG) – Overvoltage & Ranganadi (NEEPCO) – Overvoltage)** lines, power supply to Ziro & Capital area of Arunachal Pradesh and Gohpur area of Assam interrupted.

Load loss: 60 MW in Arunachal Pradesh & Assam

Category as per CEA Standards: GD-I

Analysis of Events:

DR outputs have been received from Ranganadi of above events. DR output from Balipara (PG) has been received for the tripping of 400 kV Balipara – Ranganadi I on 18th May 2015. DR output from Balipara (PG) in respect of tripping of lines on 25-May-2015 was not received.

Information from DR pertaining to 18th May 2015 tripping:

From the DR of Main-I at Balipara pertaining to 18th May 2015 case, a maximum L-L voltage of 407 kV (RMS) can be observed while the extremism was at 575 kV.

From the DR of Main-II at Balipara pertaining to 18th May 2015 incident, a maximum L-L voltage at around 407 kV (RMS) for duration of 287 milli-seconds could be observed and the maximum instantaneous extremism was 575 kV.

From the DR of Main-I at Ranganadi pertaining to the 18th May 2015 incident, a maximum L-L voltage of around 417 kV (RMS) for duration of 888 milli-seconds could be observed and the maximum instantaneous extremism was 592 kV. Also, from the DR, Main-2 operated signal is high (Main-II DR was, however, not furnished to NERLDC).

Information from DR pertaining to 25th May 2015 tripping:

From the DR of Main-I at Ranganadi pertaining to the 25th May 2015 incident, a maximum L-L voltage of around 445 kV (RMS) for a prolonged duration could be observed and the maximum instantaneous extremism was 630 kV. However, from the DR there is no operation of Circuit Breaker / Line opening that could be observed.

DR files before or after the incident would be required, and from both ends of the line for proper analysis. It is not clear when CB opening took place.

Deliberation in the Meeting:

After detailed deliberation, it was found that above incident occurred due to co-ordination problem.

The Sub-committee requested all the constituents to look into the matter seriously and about such incidence in future.

ADDITIONAL AGENDA

A.1 Reactor at Byrnihat:

DGM (AM), NERTS also informed that no action has been taken by Meghalaya regarding repairing of faulty reactor at Byrnihat. He mentioned that offer given by CGL to them is almost expired and requested them to look into the matter at the earliest to avail the benefit offered to them.

Meghalaya representative stated that he will take up the matter with their management and will inform to POWERGRID soon.

The Sub-committee requested NERPC to take up the matter with concerned officer of Me. PTCL at Byrnihat to find out the status of reactor.

Action: NERPC

DGM (SO-II), NERLDC informed that SCADA data from Byrnihat & Azara is not reported regularly. He requested POWERGRID to look into the matter.

DGM (AM), NERTS informed that he will look into the matter and informed the status to NERLDC accordingly.

The Sub-committee noted as above.

Action: NERTS, POWERGRID

A.2 Multiple tripping of elements at 220kV Salakati (PG):

DGM (SO-II), NERLDC informed that at around 23:23 Hrs on 12th June, 2015, there was tripping of all connected elements to 220kVs Salakati (PG) sub-station, resulting in blackout of the sub-station.

He informed that elements tripped are as below:

a. 220kV Salakati – Birpara I&II (Inter-Regional Lines)
b. 220kV Salakati - BTPS I&II
c. 400/220kV, 315 MVA ICT at Bongaigoan (PG)/Salakati (PG)
d. 132kV Salakati - Gelephu

He stated that this is very serious tripping considering that it resulted in outage of one in-feed point of NER grid completely and NER grid remained connected to rest of all India grid through only 400kV Bongaigoan (PG) sub-station. The 220kV Birpara – Salakati II line also failed to charge at the 1st attempt taken at Birpara end and tripped on SOTF, indicating persisting fault in the line. He requested POWERGRID to furnish the details of tripping viz. DR, EL, Relay Indication (along with lengths of Distance Protection Relay etc.

DGM (AM), NERTS informed that he will look into the matter and furnished the report to NERLDC soon.

After detailed deliberation, the Sub-committee requested NERTS, POWERGRID to submit the report within one week time.

Action: NERTS, POWERGRID

A.3 Monitoring of 400kV Voltage:

DGM (SO-II), NERLDC informed that as per Fees & Charges of RLDC and other related matters Regulations, 2015, Report on Voltage Deviation Index of all 400 kV bus(s) is to be sent Hon'ble CERC regularly.

The Sub-committee noted as above.

Action: All Power Utilities

A.4 List of critical sub-stations in NER:

SE(O) informed that CEA held the 1st meeting of the grid committee on 22.05.2015 under Chairmanship of Member (GO&D), CEA and it was decided that NERPC has to prepare a list of 15 critical sub-stations of 132 kV voltage level and above in consultation with NERLDC and forward the same to CEA and NLDC (POSOCO) immediately. He requested NERLDC to help NERPC in finalization of above critical sub-stations. NERLDC agreed.

The Sub-committee noted as above.

Action: NERPC/NERLDC

Date and Venue of next PCC

It is proposed to hold the 35th PCC meeting of NERPC in the second week of July, 2015. The exact venue will be intimated in due course.

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Annexure-I

List of Participants in the 34th PCC Meetings held on 16/06/2015

SN	Name & Designation	Organization	Contact No.
	No Representatives	**Ar. Pradesh**	
1.	Sh. B.C. Borah, AGM, SLDC	Assam	09435119248
2.	Sh. G.K. Bhuyan, AGM	Assam	09854015601
3.	Sh. Tenchan Woleng, Manager, MSPCL	Manipur	08974138850
4.	Sh. G.T. Sharma, Manager, MSPCL	Manipur	
5.	Sh. Roshan Oinam, Manager	Manipur	09863895218
6.	Sh. A.G. Tham, AE, MRT	Meghalaya	09774664034
7.	Sh. S. Saha, AE, PLCC	Meghalaya	09436112798
	No Representatives	**Mizoram**	
8.	Sh. A. Jakhalu, E.E (Trans)	Nagaland	09436002696
	No Representatives	**Tripura**	
9.	Sh. P. Kanungo, DGM (AM)	PGCIL	09436335250
10.	Sh. A. Mallick, DGM (SO-II)	NERLDC	09436302720
11.	Sh. Rahul Chakrabarti, Sr. Engr. (SO-II)	NERLDC	09402507543
12.	Sh. Joypal Roy, Sr. Manager (E/M)	NEEPCO	09435577726
13.	Sh. S. Chakraborty, Manager (O&M)	NTPC	09435322591
14.	Sh. Th. Tuankhanlal, AM (Elect)	NHPC	09436848069
	No Representatives	**ENICL**	
	No Representatives	**OTPC**	
15.	Sh. P.K. Mishra, Member Secretary	NERPC	09968380242
16.	Sh. B. Lyngkhoi, Director/S.E (O)	NERPC	09436163419
17.	Sh. S. Mukherjee, AEE	NERPC	08794277306
18.	Sh. Shaishav Ranjan, A.E	NERPC	08794276168

Annexure – A.7

Rs. In Crore.

State	Name of Entity	Status	Funding Sought by Entity	Quantum of funding approved by Appraisal Committee (AC)	Quantum of funding approved by Monitoring Committee (MC)
Ar. Pradesh	DoP, AP	DPR submitted to CEA/NLDC- under examination of CEA – now it will be taken up in next meeting of the techno-economic sub-group	33.45	-	-
Assam	AEGCL	Scheme already approved by Monitoring Committee – MoP sanctioned awaited	382.48	299.37	299.37
Manipur	MSPCL	DPR submitted to CEA/NLDC- under examination of CEA – now it will be taken up in next meeting of the techno-economic sub-group	66.58	-	-
Meghalaya	Me. PTCL	Scheme already approved by Appraisal Committee & approval by Monitoring Committee is awaited	102.8	69.19 and recommended to MC	-
	Me. PGCL	DPR submitted to CEA/NLDC- under examination of CEA – now it will be taken up in next meeting of the techno-economic sub-group	48.16	-	-
Mizoram	DoP, Mizoram	Revised DPR submitted to CEA/NLDC- under examination of CEA – now it will be taken up in next meeting of the techno-economic sub-group	31.38	-	-
Nagaland	DoP, Nagaland	Scheme already approved by Monitoring Committee – MoP sanctioned awaited	39.96	39.96	39.96
Tripura	TSECL	Revised DPR submitted to CEA/NLDC- under examination of CEA – now it will be taken up in next meeting of the techno-economic sub-group	34.26		

Annexure I

132 kV Transmission Line Protection Details

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
1. Owner of Line : POWERGRID													

Note : 1) Main-I Protection indicates Distance Protection

2) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical

3) List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

Annexure I

220 kV Transmission Line Protection Details

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
1. Owner of Line :																

Note 1) Main-I Protection indicates Distance Protection

2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection

3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical

4) List of inbuilt features of Numerical Relays are also to be furnished alongwith

Annexure I

400 kV Transmission Line Protection Details

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
1. Owner of Line : POWERGRID																

Note 1) Main-I Protection indicates Distance Protection

2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection

3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical

4) List of inbuilt features of Numerical Relays are also to be furnished alongwith

Annexure I

Transformer Protection Details

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
1. Owner of Transformer :																
1		LV side														
		HV side														
2		LV side														
		HV side														
3		LV side														
		HV side														
4		LV side														
		HV side														
5		LV side														
		HV side														
6		LV side														
		HV side														
7		LV side														
		HV side														
8		LV side														
		HV side														
9		LV side														
		HV side														
10		LV side														
		HV side														
11		LV side														
		HV side														
12		LV side														
		HV side														
13		LV side														
		HV side														
14		LV side														
		HV side														
15		LV side														
		HV side														

Note : 1. REF : Restricted Earth Fault, 2. WTI : Winding Temperature Indicator., 3. OTI : Oil Temperature Indicator)
4. MOG : Magnetic Oil Gauge, 5. OSR : Oil Surge Relay, 6. OLTC : On Load Tap Changer
7. PRD : Pressure Relieve Device, 8. SA : Surge Arrestor
9. List of inbuilt features of Numerical Relays are also to be furnished

Annexure I

Reactor Protection Details

Sl. No.	Name of Line Reactor/ Bus Reactor/ Tertiary Reactor	Differential Protection exists (Yes/No)	REF Protection exists (Yes/No)	Definite Time Over Current Protection exists (Yes/No)	Earth Fault Protection exists (Yes/No)	Buchholz Operation exists (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	SA exists (Yes/No)
1. Owner of Reactor :										

Note : 1. REF : Restricted Earth Fault, 2. WTI : Winding Temperature Indicator., 3. OTI : Oil Temperature Indicator)
4. MOG : Magnetic Oil Gauge, 5. SA : Surge Arrestor
6. List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

Annexure I

Bus Bar & Local Breaker Backup(LBB) Protection Details

Sl.No.	Name of Bus Bar	Bus Bar Protection exists (Yes/No)	LBB Protection exists (Yes/No)
1. Owner of Bus Bar/LBB			

Note : 1. List of inbuilt features of Numerical Relays are also to be furnished alongwith this

Annexure -A.9 (I)

Bus Coupler Protection Details

Sl.No.	Name of Bus Coupler	Non directional O/C Protection exists (Yes/No)	Non directional E/F Protection exists (Yes/No)
1. Owner of Bus Coupler			

Note : 1. List of inbuilt features of Numerical Relays are also to be furnished alongwith this

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
1. Owner of Line/End: Assam, AEGCL													
1	Balipara-Depota	132	Balipara	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Depota	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
2	Balipara-Ghoramari	132	Balipara	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Ghoramari	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
3	Depota-Ghoramari	132	Depota	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Ghoramari	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
4	Balipara- Gohpur	132	Balipara	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Gohpur	Yes (REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
5	Barnagar-Dhaligaon	132	Barnagar	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Dhaligaon	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
6	Barnagar-Rangia	132	Barnagar	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rangia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
7	B.Chariali-Depota	132	B.Chariali	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Depota	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
8	B.Chariali-Gohpur	132	B.Chariali	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Gohpur	Yes(SEL321)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
9	Depota-Rowta I	132	Depota	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rowta I	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
10	Depota-Rowta II	132	Depota	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rowta II	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
11	Dhaligaon-APM	132	Dhaligaon	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			APM	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
12	Dhaligaon-BRPL	132	Dhaligaon	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			BRPL	NoT KNoWN									
13	Dhaligaon-Gosaigaon	132	Dhaligaon	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Gossaigaon	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
14	Dhaligaon-Nailbari	132	Dhaligaon	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Nalbari	Yes (REL 670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
15	BTPS (Salakati)-Dhaligaon I	132	BTPS (Salakati)	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Dhaligaon I	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
16	BTPS (Salakati)-Dhaligaon II	132	BTPS (Salakati)	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Dhaligaon II	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
17	Dhaligaon-Salakati I	132	Dhaligaon										
			Salakati I										

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
18	Dhaligaon-Salakati II	132	Dhaligaon										
			Salakati II										
19	Dibrugarh-Moran	132	Dibrugarh										
			Moran										
20	Dibrugarh-Behiating	132	Dibrugarh	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Behiating	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
21	Moran-Behiating	132	Moran	Yes (GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Behiating	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
22	Dibrugarh-Tinsukia	132	Dibrugarh	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Tinsukia	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
23	Garmur-Bokakhat	132	Garmur	Yes (7SA61 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Bokakhat	Yes (GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
24	Gohpur-North Lakhimpur I	132	Gohpur	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			North Lakhimpur I	Yes (D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
25	Gohpur-North Lakhimpur II	132	Gohpur	Yes (D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			North Lakhimpur II	Yes (D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
26	Dimapur (PG) - Bokajan	132	Dimapur (PG)	PGCIL	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Bokajan	Yes (P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
27	Golaghat-Mariani	132	Golaghat	Yes (GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Mariani	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
28	Golaghat-Bokajan	132	Golaghat	Yes (GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
		132	Bokajan	Yes (7SA52 SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
29	Gossaingaon-Gauripur	132	Gossaigaon	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Gauripur	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
30	Haflong - Lower Haflong	132	Haflong		Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Lower Haflong		Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
31	Kahilipara-Chandrapur	132	Kahilipara										
			Chandrapur										
32	CTPS - Jagiroad (Bagjhap)	132	CTPS	Yes(D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Jagiroad (Bagjhap)	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
33	Jagiroad (Bagjhap) - HPC, Jagiroad	132	Jagiroad (Bagjhap)	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			HPC, Jagiroad	NoT KNoWN									
34	Nazira - Jorhat	132	Nazira	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Jorhat	Yes(D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
35	Kahilipara-Narengi	132	Kahilipara	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Narengi	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
36	Kahilipara-Rangia	132	Kahilipara	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rangia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
37	Kahilipara-Sarusajai I	132	Kahilipara	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sarusajai I	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
38	Kahilipara-Sarusajai II	132	Kahilipara	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sarusajai II	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
39	Kahilipara-Sarusajai III	132	Kahilipara	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sarusajai III	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
40	Kahilipara-Sarusajai IV	132	Kahilipara	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sarusajai IV	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
41	Kahilipara-Sisugram	132	Kahilipara	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sisugram	Yes(RAZOA ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
42	Dullavcherra - Dharmanagar	132	Dullavcherra	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Dharmanagar	NoT KNoWN	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
43	Lakwa-Mariani	132	Lakwa	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Mariani	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
44	Lakwa-Moran	132	Lakwa	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Moran	Yes(GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
45	Srikona - Panchgram(Old)	132	Srikona	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Panchgram(Old)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
46	Panchgram - Panchgram(Old)	132	Panchgram	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Panchgram(Old)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
47	NTPS - LTPS (Maidela)	132	NTPS	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			LTPS (Maidela)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
48	NTPS - Sonari	132	NTPS	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sonari	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
49	Sonari- LTPS (Maidela)	132	Sonari	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			LTPS (Maidela)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
50	Lakwa-Namrup I	132	Lakwa	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Namrup I	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
51	Lakwa-Namrup II	132	Lakwa	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Namrup II	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
52	Lakwa-Nazira	132	Lakwa	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Nazira	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
53	Mariani-Garmur I	132	Mariani	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Garmur I	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
54	Mariani-Garmur II	132	Mariani	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Garmur II	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
55	Nalbari-Rangia	132	Nalbari	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rangia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
56	Namrup-Tinsukia	132	Namrup	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Tinsukia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
57	Nazira-Betbari	132	Nazira	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Betbari	Yes(GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
58	North Lakhimpur-Dhemaji	132	North Lakhimpur	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Dhemaji	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
59	North Lakhimpur- Majuli	132	North Lakhimpur	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Majuli	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
60	Narengi- Chandrapur	132	Narengi	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Chandrapur	Yes(D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
61	Pailapool-Srikona	132	Pailapool	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Srikona	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
62	Panchgram-Dullavchera	132	Panchgram	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Dullavcherra	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
63	Panchgram-HPL	132	Panchgram	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			HPL	NoT KNoWN									
64	Panchgram-Srikona	132	Panchgram	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Srikona	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
65	Rangia (Chirakhundi) - Nalbari (Sariahatali)	132	Rangia (Chirakhundi)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Nalbari (Sariahatali)	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
66	Rangia-Rowta	132	Rangia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rowta	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
67	Rangia-Sipajhar	132	Rangia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sipajhar	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
68	Rangia-Sisugram	132	Rangia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Sisugram	Yes(RAZOA ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
69	Samaguri- B.Chariali	132	Samaguri	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			B.Chariali	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
70	Samaguri- Khalaigaon	132	Samaguri	Yes(P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Khalaigaon	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
71	Samaguri-S.Dev Nagar I	132	Samaguri	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			S.Dev Nagar I	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
72	Diphu-S.DevNagar	132	Diphu	Yes(GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			S.Dev Nagar	Yes(P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
73	Sipajhar-Rowta	132	Sipajahar	Yes(REL670 ABB)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Rowta	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
74	Tinsukia-Margherita I	132	Tinsukia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Margherita I	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
75	Tinsukia-Margherita II	132	Tinsukia	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Margherita II	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
76	Nalkata-Gohpur I	132	Nalkata										
			Gohpur I										
77	Nalkata-Gohpur II	132	Nalkata										
			Gohpur II										
78	Dispur-KHP	132	Dispur	Yes(P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			KHP	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
79	Dispur-Chandrapur	132	Dispur	Yes(P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Chandrapur	Yes(D60 GE)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
80	Bokajan-Dimapur	132	Bokajan										
			Dimapur										
81	Chandrapur-Bagjap	132	Chandrapur										
			Bagjap										
82	LTPS (Maidela) - Nazira I	132	LTPS (Maidela)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Nazira I	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
83	LTPS (Maidela) - Nazira II	132	LTPS (Maidela)	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Nazira II	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
84	Sankardev Nagar (Lanka) - Diphu	132	Sankardev Nagar (Lanka)	Yes(P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Diphu	Yes(GRZ-100 TOSHIBA)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
85	Sankardev Nagar (Lanka) - TELCOM	132	Sankardev Nagar (Lanka)	Yes(P442 MICOM)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			TELCOM	Not KNown	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
2. Owner of Line/End: MSPCL (Manipur)													
1	Ningthoukhong - Churanchandpur I	132	Ningthoukhong	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Churanchandpur	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
2	Ningthoukhong - Churanchandpur II	132	Ningthoukhong	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Churanchandpur	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
3	Rengpang - Jiribam	132	Rengpang	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Jiribam(Manipur)	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
4	Imphal(Manipur) - Karong	132	Imphal(Manipur)	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Karong	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
5	Imphal(Manipur) - Yaingangpokpi	132	Imphal(Manipur)	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Yaingangpokpi	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
6	Yaingangpokpi - Kongba	132	Yaingangpokpi	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Kongba	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
7	Kongba - Kakching	132	Kongba	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Kakching	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
8	Kakching - Churanchandpur	132	Kakching	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Churanchandpur	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
3. Owner of Line/End: Meghalaya, MePTCL													
1	Umiam St IV (Nongkhyllem) - Umtru I	132	Umiam St IV (Nongkhyllem)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
			Umtru	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
2	Umiam St IV (Nongkhyllem) - Umtru II	132	Umiam St IV (Nongkhyllem)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
			Umtru	Yes, Toshiba make GRZ100, Numerical	Yes, Directional CDD, EE make	No	Yes, GRZ100 Relay	Yes, GRZ100 Relay	No	1	Yes, GRZ100 Relay	Yes, GRZ100 Relay	Yes, GRZ100 Relay
3	Umiam St III (Kyrdemkulai) - Umtru I	132	Umiam St III (Kyrdemkulai)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
			Umtru	Yes, Areva make P442, Numerical	Yes, Directional JNP096, JVS make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
4	Umiam St III (Kyrdemkulai) - Umtru II	132	Umiam St III (Kyrdemkulai)	Yes, Toshiba make GRZ100, Numerical	Yes, Directional P127, Areva make	No	Yes, GRZ100 Relay	Yes, GRZ100 Relay	No	1	Yes, GRZ100 & P127 Relay	Yes, GRZ100 & P127 Relay	Yes, GRZ100 Relay
			Umtru	Yes, Areva make P442, Numerical	Yes, Directional JNP096, JVS make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
5	Umiam St III (Kyrdemkulai) - Umiam St I (Sumer) I	132	Umiam St III (Kyrdemkulai)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
			Umiam St I (Sumer)	Yes, Areva make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
6	Umiam St III (Kyrdemkulai) - Umiam St I (Sumer) II	132	Umiam St III (Kyrdemkulai)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
			Umiam St I (Sumer)	Yes, Areva make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
7	EPIP II - Umtru I	132	EPIP II	No	No	No	No	No	No	0	No	No	No
			Umtru	No	Yes, Directional IDMTL, ER make	No	No	No	No	0	No	No	No
8	EPIP II - Umtru II	132	EPIP II	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Umtru	No	Yes, Directional JNP060, JVS make	No	No	No	No	0	No	No	No
9	EPIP II - EPIP I (I)	132	EPIP II	No	No	No	No	No	No	0	No	No	No
			EPIP I	No	No	No	No	No	No	0	No	No	No
10	EPIP II - EPIP I (II)	132	EPIP II	No	No	No	No	No	No	0	No	No	No
			EPIP I	No	No	No	No	No	No	0	No	No	No
11	Khliehriat - Myntdu Leshka I	132	Khliehriat	Yes, ABB make REL670, Numerical	Yes, Directional REX521,ABB make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & REX521 Relay	Yes, REL670 & REX521 Relay	Yes, REL670 Relay
			Myntdu Leshka	Yes, ABB make REL670, Numerical	Yes, Directional REX521,ABB make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & REX521 Relay	Yes, REL670 & REX521 Relay	Yes, REL670 Relay
12	Khliehriat - Myntdu Leshka II	132	Khliehriat	Yes, ABB make REL670, Numerical	Yes, Directional REX521,ABB make	No	Yes	Yes	No	1	Yes, REL670 & REX521 Relay	Yes, REL670 & REX521 Relay	Yes
			Myntdu Leshka	Yes, ABB make REL670, Numerical	Yes, Directional REX521,ABB make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & REX521 Relay	Yes, REL670 & REX521 Relay	Yes, REL670 Relay

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
13	Killing - EPIP II (I)	132	Killing	Yes, ABB make REL670, Numerical	Yes, Areva make P442, Numerical	No	Yes, REL670, P442 Relay	Yes, REL670, P442 Relay	No	1	Yes, REL670, P442 Relay	Yes, REL670, P442 Relay	Yes, REL670, P442 Relay
			EPIP II	Yes, Areva make P442, Numerical	Yes, Directional P127, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
14	Killing - EPIP II (II)	132	Killing	Yes, ABB make REL670, Numerical	Yes, Areva make P442, Numerical	No	Yes, REL670, P442 Relay	Yes, REL670, P442 Relay	No	1	Yes, REL670, P442 Relay	Yes, REL670, P442 Relay	Yes, REL670, P442 Relay
			EPIP II	Yes, Areva make P442, Numerical	Yes, Directional P127, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
15	Umiam St I (Sumer) - Mawngap I	132	Umiam St I (Sumer										
			Mawngap	Yes, Alstom make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
16	Umiam St I (Sumer) - Mawngap II	132	Umiam St I (Sumer										
			Mawngap	Yes, Alstom make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
17	Mawlai - Mawngap I	132	Mawlai	Yes, Areva make P442, Numerical	Yes, Directional P127 Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
			Mawngap	Yes, Alstom make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
18	Nongstoin - Mawngap	132	Nongstoin	No	No	No	No	0	No	No	No		
			Mawngap	Yes, Alstom make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
19	Nongstoin - Nangalbibra	132	Nongstoin	Yes, Areva make P442, Numerical	Yes, Directional P127, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
			Nangalbibra	Yes, Areva make P442, Numerical	Yes, Directional P127, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
20	Khliehriat - NEHU	132	Khliehriat	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
			NEHU	Yes, Areva make P442, Numerical	Yes, Directional P127 Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
21	Khliehriat - NEIGRIHMS	132	Khliehriat	Yes, ABB make REL670, Numerical	Yes, Directional CDD, EE make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 Relay	Yes, REL670 Relay	Yes, REL670 Relay
			NEIGRIHMS	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
22	NEIGRIHMS - NEHU	132	NEIGRIHMS	No	Yes, Directional CDD, EE make	No	No	No	No	0	No	No	No
			NEHU	Yes, EE make RR3V, EM	Yes, Directional P127 Areva make	No	No	No	No	1	Yes, P127 Relay	Yes, P127 Relay	No
23	Nangalbibra - Rongkhon (Tura)	132	Nangalbibra	Yes, Areva make P442, Numerical	Yes, Directional P127, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
			Rongkhon (Tura)	No	Yes, Directional P127, Areva make	No	No	No	No	0	Yes, P127 Relay	Yes, P127 Relay	No

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
24	Lumshnong - Khliehriat	132	Lumshnong	No	Yes, Directional IDMTL, ER make	No	No	No	No	0	No	No	No
			Khliehriat	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
25	Sohra (Cherrapunjee) - Mawlai	132	Sohra (Cherrapunjee)										
			Mawlai	Yes, Areva make P442, Numerical	Yes, Directional P127 Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
26	Umiam St I (Sumer) - Umiam	132	Umiam St I (Sumer)	Yes, Areva make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
			Umiam	Yes, Toshiba make GRZ100, numerical	Yes, Directional JNP066, JVS make	No	Yes, GRZ100 Relay	Yes, GRZ100 Relay	No	1	Yes, GRZ 100 Relay	Yes, GRZ 100 Relay	Yes, GRZ100 Relay
27	Umiam - NEHU	132	Umiam	No	Yes, Directional JNP066, JVS make	No	No	No	No	0	No	No	No
			NEHU	Yes, EE make RR3V, EM	Yes, Directional P127 Areva make	No	No	No	No	1	Yes, P127 Relay	Yes, P127 Relay	No
28	Umiam St I (Sumer) - Mawlai	132	Umiam St I (Sumer)	Yes, Areva make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
			Mawlai	Yes, Areva make P442, Numerical	Yes, Directional P127 Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P127 Relay	Yes, P442 & P127 Relay	Yes, P442 Relay
29	Umiam St III (Kyrdemkulai) - Umiam St IV - I (Nongkhyllem)	132	Umiam St III (Kyrdemkulai)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
			Umiam St IV (Nongkhyllem)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
30	Umiam St III (Kyrdemkulai) - Umiam St IV - II (Nongkhyllem)	132	Umiam St III (Kyrdemkulai)	Yes, Toshiba make GRZ100, Numerical	Yes, Directional JNP053, JVS make	No	Yes, GRZ100 Relay	Yes, GRZ100 Relay	No	1	Yes, GRZ100 & P127 Relay	Yes, GRZ100 & P127 Relay	Yes, GRZ100 Relay
			Umiam St IV (Nongkhyllem)	Yes, ABB make REL670, Numerical	Yes, Directional P127, Areva make	No	Yes, REL670 Relay	Yes, REL670 Relay	No	1	Yes, REL670 & P127 Relay	Yes, REL670 & P127 Relay	Yes, REL670 Relay
31	Mawlai - NEHU	132	Mawlai	No	Yes, Directional P127 Areva make	No	No	No	No	0	Yes, P127 Relay	Yes, P127 Relay	No
			NEHU	Yes, EE make RR3V, EM	Yes, Directional P127 Areva make	No	No	No	No	1	Yes, P127 Relay	Yes, P127 Relay	No
32	Umiam St I (Sumer) - Umiam St II (Umsumer)	132	Umiam St I (Sumer)	Yes, Areva make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay
			Umiam St II (Umsumer)	No	Digital GRD 130,	No	No	No	No	0	Yes, Digital GRD 130 Relay	Yes, Digital GRD 130 Relay	No
33	EPIP II - Trishul	132	EPIP II	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Trishul										
34	EPIP II - Nalari	132	EPIP II	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Nalari										
35	EPIP I - Shyam Century	132	EPIP I	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Shyam Century										
36	EPIP I - Maithan	132	EPIP I	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Maithan										
37	EPIP I - Sai Prakash	132	EPIP I	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Sai Prakash										
38	EPIP I - Greystone/Nezone	132	EPIP I	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			Greystone/Nezone										
39	EPIP I - Megha Carbides	132	EPIP I										

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
39	LILO of Megha Carbides	132	Megha Carbides										
40	Lumshnong - CMCL	132	Lumshnong	No	Yes, Directional CDD, ER make	No	No	No	No	0	No	No	No
			CMCL										
41	Lumshnong - MCL	132	Lumshnong	No	Yes, Directional JNC069, JVS make	No	No	No	No	0	No	No	No
			MCL										
42	Lumshnong - Adhunik Cement	132	Lumshnong	No	Yes, Directional JNC069, JVS make	No	No	No	No	0	No	No	No
			Adhunik Cement										
43	Lumshnong - Hill Cement	132	Lumshnong	No	Yes, Directional JNC069, JVS make	No	No	No	No	0	No	No	No
			Hill Cement										
44	Lumshnong - JUD Cement	132	Lumshnong	No	Yes, Directional JNC069, JVS make	No	No	No	No	0	No	No	No
			JUD Cement										
45	Lumshnong - GVIL Cement	132	Lumshnong										
			GVIL Cement										
46	MPL (Meghalaya Power Limited) - Lumnsnong	132	MPL (Meghalaya Power Limited)										
			Lumshnong	No	Yes, Directional P127 Areva make	No	No	No	No	0	No	No	No
47	Sohra (Cherrapunjee) - Mawngap	132	Sohra (Cherrapunjee)	No	Yes, Directional P127, Areva make	No	No	No	No	0	Yes, P127 Relay	Yes, P127 Relay	No
			Mawngap	Yes, Alstom make P442, Numerical	Yes, Directional P141, Areva make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 & P141Relay	Yes, P442 & P141Relay	Yes, P442 Relay

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
4. Owner of Line/End: P&E, Mizoram													
1	Bairabi - Kolasib	132	Bairabi	Micom P430A	Yes	No	No	No	No	4	No	No	No
			Kolasib	No	No	No	No	No	No		No	No	No
2	Zuangtui (Zemabawk) - Bukpui (Serchhip)	132	Zuangtui (Zemabawk)	No	No	No	No	No	No		No	No	No
			Bukpui (Serchhip)	No	No	No	No	No	No		No	No	No
3	Bukpui (Serchhip) - Khawiva (Lunglei)	132	Bukpui (Serchhip)	No	No	No	No	No	No		No	No	No
			Khawiva (Lunglei)	No	No	No	No	No	No		No	No	No
4	Zuangtui (Zemabawk) - Saitual	132	Zuangtui (Zemabawk)	No	Yes (EM)	No	No	No	No		No	No	No
			Saitual	No	Yes (EM)	No	No	No	No		No	No	No
5	Saitual - Khawzawl	132	Saitual	No	Yes (EM)	No	No	No	No		No	No	No
			Khawzawl	No	No	No	No	No	No		No	No	No
5. Owner of Line/End: NEEPCO													
1	Khandong - Kopili -I	132	Khandong										
			Kopili										
2	Khandong - Kopili - II	132	Khandong	Yes, REL 670	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Kopili	Yes, REL 670	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
6. Owner of Line/End: POWERGRID													
1	Badarpur- Jiribam	132	Badarpur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Jiribam (PG)	Yes, 7SA513	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
2	Aizawl-Kumarghat	132	Aizawl (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Kumarghat (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
3	Badarpur - Khliehriat	132	Badarpur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Khliehriat (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
4	Badarpur-Kumarghat	132	Badarpur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Kumarghat (PG)	Yes, 7SA513	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
5	Dimapur - Imphal	132	Dimapur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Imphal (PG)	Yes, 7SA513	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
6	Jiribam - Aizawl	132	Jiribam (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Aizawl (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
7	Jiribam-Haflong	132	Jiribam (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Haflong (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
8	Silchar- Badarpur-1	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Badarpur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
9	Silchar- Badarpur-2	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Badarpur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
10	Silchar- Imphal-1	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Imphal (PG)										
11	Silchar- Imphal-2	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Imphal (PG)										
12	Silchar- Melriat-1	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Melriat (PG)										
13	Silchar- Melriat-2	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Melriat (PG)										

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
7. Owner of Line/End : TSECL													
1	Grid-Rokhia-I	132	Grid	No	Yes	No	No	No	No	No	No	No	No
			Rokhia	No	Yes	No	No	No	No	No	No	No	No
2	Grid-Rokhia-II	132	Grid	No	No	No	No	No	No	No	No	No	No
			Rokhia	No	No	No	No	No	No	No	No	No	No
3	Grid-Dhalabil	132	Grid	No	No	No	No	No	No	No	No	No	No
			Dhalabil	No	No	No	No	No	No	No	No	No	No
4	Dhalabil-Garodtilla	132	Dhalabil	No	No	No	No	No	No	No	No	No	No
			Garodtilla	No	No	No	No	No	No	No	No	No	No
5	Garodtilla-PKBari	132	Garodtilla	No	No	No	No	No	No	No	No	No	No
			PKBari	No	No	No	No	No	No	No	No	No	No
6	Garodtilla-Ambassa	132	Garodtilla	No	No	No	No	No	No	No	No	No	No
			Ambassa	No	No	No	No	No	No	No	No	No	No
7	Grid-Bodhjungnagar	132	Grid	No	No	No	No	No	No	No	No	No	No
			Bodhjungnagar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
8	Bodhjungnagar-Jirania	132	Bodhjungnagar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			Jirania	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
9	Jirania-Baramura	132	Jirania	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			Baramura	No	No	No	No	No	No	No	No	No	No
10	Baramura-Gamaitilla	132	Baramura	No	No	No	No	No	No	No	No	No	No
			Gamaitilla	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
11	Gamaitilla-Ambassa	132	Gamaitilla	No	No	No	No	No	No	No	No	No	No
			Ambassa	No	No	No	No	No	No	No	No	No	No
12	Ambassa-PKBari	132	Ambassa	No	No	No	No	No	No	No	No	No	No
			PKBari	No	No	No	No	No	No	No	No	No	No

132 kV Transmission Line Protection Details

Annexure-A.8 (II)

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
13	Bodhjungnagar-SMNagar	132	Bodhjungnagar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			SMNagar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
14	SMNagar-Grid	132	SMNagar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			Grid	No	No	No	No	No	No	No	No	No	No
15	PKBari-Gournagar	132	PKBari	No	No	No	No	No	No	No	No	No	No
			Gournagar	No	No	No	No	No	No	No	No	No	No
16	PKBari-Missiontilla	132	PKBari	No	No	No	No	No	No	No	No	No	No
			Missiontilla	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No

Note : 1) Main-I Protection indicates Distance Protection
2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection
3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical
4) List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
1. Owner of End : Assam & Meghalaya													
1	Kahilipara-Umtru I	132	Kahilipara	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Umtru	Yes, Directional JNP096, JVS make	No	Yes, GRZ100 Relay	Yes, GRZ100 Relay	No	1	Yes, GRZ100 Relay	Yes, GRZ100 Relay	Yes, GRZ100 Relay	
2	Kahilipara-Umtru II	132	Kahilipara	Yes (7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Umtru	Yes, Directional JNP096, JVS make	No	Yes, GRZ100 Relay	Yes, GRZ100 Relay	No	1	Yes, GRZ100 Relay	Yes, GRZ100 Relay	Yes, GRZ100 Relay	
3	Panchgram-Khliehriat	132	Panchgram	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Khliehriat	NoT KNoWN									
4	Panchgram-Lumshnong	132	Panchgram	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Lumshnong	Yes, Areva make P442, Numerical	Non directional CDG, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
5	Sarusajai-Umtru	132	Sarusajai	Yes(THR ER)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Umtru	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
6	Sarusajai-Umiam Stg IV	132	Sarusajai	Yes(THR ER)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Umiam Stg IV	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
7	Agia - Nangalbibra	132	Agia										
			Nangalbibra	No	Yes, Directional P127, Areva make	No	No	No	No	0	Yes, P127 Relay	Yes P127 Relay	No

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
2. Owner of End : Assam & POWERGRID													
1	Mokokchung-Mariani	132	Mokokchung (PG)	Not KNown									
			Mariani	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
2	Pailapool-Jiribam(PG)	132	Pailapool	Yes(7SA SIEMENS)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
			Jiribam(PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
3	Dimapur (PG) - Bokajan	132	Dimapur(PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Bokajan	Yes(THR ER)	Yes (IDMTL)	No	No	Yes	Yes	1	Yes	Yes	Yes
4	Badarpur (PG) - Badarpur		Badarpur (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Badarpur	Yes, MICOM	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
5	Balipara (PG)- Gohpur		Balipara (PG)	Yes, 7SA522	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Gohpur										
6	Gohpur - Nirjuli		Gohpur										
			Nirjuli (PG)	Yes, MICOM	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
7	Haflong (PG)- Haflong		Haflong (PG)	Yes, P442	Yes, P141	Yes	Yes		Yes		Yes	Yes	
			Haflong										
8	Silchar (PG)- Hailakandi I		Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Hailakandi										
9	Silchar (PG)- Hailakandi II		Silchar (PG)	Yes, MICOM	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Hailakandi										
10	Silchar (PG)- Srikona I		Silchar (PG)	Yes, MICOM P543	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
			Srikona										
11	Silchar (PG)- Srikona II		Silchar (PG)	Yes, MICOM P543	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Srikona										
3. Owner of End : Manipur & POWERGRID													
1	Imphal(Manipur) - Imphal(PG) I	132	Imphal (Manipur)	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Imphal(PG)	Yes, O/C	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
2	Imphal(Manipur) - Imphal(PG) II	132	Imphal (Manipur)	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
			Imphal(PG)	Yes, P543 (Differencial)	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
3	Imphal(PG) - Ningthoukhong	132	Imphal(PG)										
			Ningthoukhong	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
4	Jiribam (PG) - Jiribam (Manipur)	132	Jiribam (PG)										
			Jiribam (Manipur)	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
5	Jiribam (PG) - Rengpang	132	Jiribam (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Rengpang										
4. Owner of End : Manipur & NHPC													
1	Loktak - Rengpang	132	Loktak	Yes, Numerical MICOM P442	Yes, (EM relay in addition to Numerical Relay)	Feature exists in SF6 breaker & Numerical Relay	No	Yes	Yes	1 core each	Yes	Yes	Yes
			Rengpang	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No
2	Loktak - Ningthoukhong	132	Loktak	Yes, Numerical MICOM P442	Yes, (EM relay in addition to Numerical Relay)	Feature exists in SF6 breaker & Numerical Relay	No	Yes	Yes	1 core each	Yes	Yes	Yes
			Ningthoukhong	Yes	Yes	Yes	No	No	Yes	4 & 3	No	No	No

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
5. Owner of End : MePTCL & POWERGRID													
1	Khliehriat - Khliehriat (Meghalaya) I	132	Khliehriat (Meghalaya)	Yes, Areva make P442, Numerical	Yes, Directional CDD, EE make	No	Yes, P442 Relay	Yes, P442 Relay	No	1	Yes, P442 Relay	Yes, P442 Relay	Yes, P442 Relay
			Khliehriat (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
2	Khliehriat - Khliehriat (Meghalaya) II	132	Khliehriat (Meghalaya)	No	Yes, Directional P127 Areva make	No	No	No	No	0	Yes, P127 Relay	Yes, P127 Relay	No
			Khliehriat (PG)										
6. Owner of End: P&E, Mizoram & POWERGRID													
1	Badarpur - Kolasib	132	Badarpur (PG)	Yes, MICOM P442	Yes, O/C & E/F	Yes	Yes		Yes		Yes	Yes	
			Kolasib	Yes, 7SA513	Yes, O/C & E/F	Yes	Yes		Yes		Yes	Yes	
2	Kolasib - Aizwal	132	Kolasib	Yes, 7SA513	Yes, O/C & E/F	Yes	Yes		Yes		Yes	Yes	
			Aizwal (PG)	Yes, 7SA513	Yes, O/C & E/F	Yes	Yes		Yes		Yes	Yes	
3	Aizwal - Luangmual	132	Aizwal (PG)										
			Luangmual										
4	Zuangtui (Zemabawk) - Aizwal I	132	Zuangtui (Zemabawk)	No	No	No	No	No	No		No	No	No
			Aizwal (PG)	Yes, 7SA513	Yes, O/C & E/F	Yes	Yes		Yes		Yes	Yes	
5	Zuangtui (Zemabawk) - Aizwal II	132	Zuangtui (Zemabawk)	No	No	No	No	No	No		No	No	No
			Aizwal (PG)	Yes, REL 670	Yes, O/C & E/F	Yes	Yes		Yes		Yes	Yes	

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
7. Owner of End: NEEPCO & POWERGRID													
1	Ranganadi-Nirjuli	132	Rangandi	Semi Numerical, EPAC 3000, Make-Alstom	Yes	Yes (Three Phase)	No	Yes	No	Core-1 of CT & CVT are used for Main-1	No	No	No
			Nirjuli (PG)	Yes, MICOM	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
2	Ranganadi-Ziro	132	Rangandi	Semi Numerical, EPAC 3000, Make-Alstom	Yes	Yes (Three Phase)	No	Yes	No	Core-1 of CT & CVT are used for Main-1	No	No	No
			Ziro (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
3	AGTPP- Kumarghat	132	AGTPP	OPTIMHO (LFZP111S10053E) Make: GEC ALSTOM	No, Directional Inverse type –CDD relay exists	Facility exists but not in service	Yes	Yes	Yes	Core-1 of CT & CVT are used for Main-1	No	No	No
			Kumarghat (PG)	Yes, 7SA513	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
4	Balipara-Khupi	132	Balipara (PG)	Yes, SEL311C	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Khupi										
5	Doyang - Dimapur-I	132	Doyang	Static relay-REL-100, ABB Make	Relay-2TJM-12 (Easun Reyrole)		Yes	No	Yes		Yes		
			Dimapur(PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
6	Doyang - Dimapur-II	132	Doyang	Static relay-REL-100, ABB Make	Relay-2TJM-12 (Easun Reyrole)		Yes	No	Yes		Yes		
			Dimapur(PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
7	Khandong - Haflong	132	Khandong										
			Haflong (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
8	Khandong - Khliehriat-I	132	Khandong										
			Khliehriat (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
9	Khandong - Khliehriat-II	132	Khandong	Yes, 7SA513	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Khliehriat (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
8. Owner of End: NEEPCO & TSECL													
1	132 kV AGTPP-Agartala I	132 kV	AGTPP	OPTIMHO (LFZP111S10053E) Make: GEC ALSTOM	No, Directional Inverse type –CDD relay exists	Facility exists but not in service	Yes	Yes	Yes	Core-1 of CT & CVT are used for Main-1	No	No	No
			Agartala	OPTIMHO		Yes	Yes		Yes		No	No	
2	132 kV AGTPP-Agartala II	132 kV	AGTPP	OPTIMHO (LFZP111S10053E) Make: GEC ALSTOM	No, Directional Inverse type –CDD relay exists	Facility exists but not in service	Yes	Yes	Yes	Core-1 of CT & CVT are used for Main-1	No	No	No
			Agartala	OPTIMHO		Yes	Yes				No	No	

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
9. Owner of End : POWERGRID & NHPC													
1	Loktak - Imphal II	132	Loktak	Yes, Numerical MICOM P442	Yes, (EM relay in addition to Numerical Relay)	Feature exists in SF6 breaker & Numerical Relay will be implemented by Jan'15	Yes	Yes	Yes	1 core each	Yes	Yes	Yes
			Imphal (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
2	Loktak - Jiribam II	132	Loktak	Yes, Numerical MICOM P442	Yes, (EM relay in addition to Numerical Relay)	Feature exists in SF6 breaker & Numerical Relay will be implemented by Jan'15	Feature exists and can be added when required	Yes	Yes	1 core each	Yes	Yes	Yes
			Jiribam (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
10. Owner of End : POWERGRID & DoP, Nagaland													
1	Dimapur (PG)-Kohima	132	Dimapur(PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Kohima										
2	Dimapur (PG)-Dimapur (State)	132	Dimapur(PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Dimapur										
11. Owner of End : POWERGRID & Gov. of Bhutan													
1	Salakti-Gelephu	132	Salakati (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Gelephu										

132 kV Transmission Line Protection Details

Annexure-II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details							Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) Over-Current & Earth Fault Relay exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes / No)	Carrier aided Inter-tripping exists (Yes / No)	Power Swing Blocking Feature exists (Yes / No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Disturbance Recorder exists (Yes / No)	Event Logger / Sequential Event Recorder exists (Yes / No)	Fault Locator exists (Yes / No)
12. Owner of End : POWERGRID & TSECL													
1	Silchar-P.K.Bari-1	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			P.K. Bari										
2	Silchar- P.K.Bari-2	132	Silchar (PG)	Yes, MICOM P442	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			P.K. Bari										
13. Owner of End : POWERGRID & DoP, Arunachal Pradesh													
1	Ziro-Daporijo	132	Ziro (PG)	Yes, SEL 311C	Yes, O/C & EF	Yes	Yes		Yes		Yes	Yes	
			Daporijo										
14. Owner of End : NEEPCO & DoP, Nagaland													
1	Doyang- Mokokchung	132	Doyang	Static relay-REL-100, ABB Make	Relay-2TJM-12 (Easun Reyrole)		Yes	No	Yes		Yes		
			Mokokchung										
2	Doyang- Kohima	132	Doyang	Static relay-REL-100, ABB Make	Relay-2TJM-12 (Easun Reyrole)		Yes	No	Yes		Yes		
			Kohima										
15. Owner of End : NEEPCO & TSECL													
1	Missiontilla-ASEB	132	Missiontilla	No	No	No	No	No	No	No	No	No	No
			ASEB										
2	Banduar- Palatana	132	Banduar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			Palatana										
3	Banduar- Monarchak	132	Banduar	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			Monarchak										
4	Rokhia-Monarchak	132	Rokhia	Yes	Yes	No	No	Yes	No	3 & 2-Core	No	No	No
			Monarchak										

Note : **1) Main-I Protection indicates Distance Protection**
2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection
3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical
4) List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

220 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
1. Owner of Line : Assam, AEGCL																
1	Agia- BTPS I	220	Agia	Yes(SEL321 SEL)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			BTPS I	Yes(D60 GE)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
2	Agia- BTPS II	220	Agia	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			BTPS II	Yes(D60 GE)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
3	Azara-Sarusajai I	220	Azara	Yes(REL670 ABB)	Yes(REL650 ABB)	Yes(IDMT)	Yes	Yes(1-PH)	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Sarusajai I	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	Yes	Yes	Yes	1	1	Yes	Yes	Yes
4	Azara-Sarusajai II	220	Azara	Yes(REL670 ABB)	Yes(REL650 ABB)	Yes(IDMT)	Yes	Yes(1-PH)	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Sarusajai II	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	Yes	Yes	Yes	1	1	Yes	Yes	Yes
5	Boko-Azara	220	Boko	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Azara	Yes(REL670 ABB)	Yes(REL650 ABB)	Yes(IDMT)	Yes	Yes(1-PH)	Yes	Yes	Yes	1	1	Yes	Yes	Yes
6	Agia-Azara	220	Agia	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Azara	Yes(REL670 ABB)	Yes(REL650 ABB)	Yes(IDMT)	Yes	Yes(1-PH)	Yes	Yes	Yes	1	1	Yes	Yes	Yes
7	Agia- Salakati I	220	Agia													
			Salakati I													
8	Agia- Salakati II	220	Agia													
			Salakati II													
9	Agia-Sarusajai	220	Agia													
			Sarusajai													
10	Boko-Agia	220	Boko	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Agia	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
11	Boko-Sarusajai	220	Boko				No									
			Sarusajai				No									

220 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
12	Langpi- Sarusajai I	220	Langpi	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Sarusajai I	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
13	Langpi- Sarusajai II	220	Langpi	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Sarusajai II	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
14	CMCL - Karbi Langpi	220	CMCL	Not KNown												
			Karbi Langpi	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
15	Sarusajai - CMCL	220	Sarusajai	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			CMCL	Not KNown												
16	Mariani-Samaguri I	220	Mariani													
			Samaguri I													
17	Mariani-Samaguri II	220	Mariani	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Samaguri II	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
18	Salakati-Harigaon I	220	Salakari	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Harigaon I	Not KNown												
19	Salakati-Harigaon II	220	Salakari	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Harigaon II	Not KNown												
20	Samaguri-Balipara	220	Samaguri	Yes(7SA52 SIEMENS)	Yes(P442 MICOM)	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Balipara	PGCIL	PGCIL	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
21	Samaguri-Sarusajai I	220	Samaguri													
			Sarusajai I													
22	Samaguri - Jawahar Nagar	220	Samaguri	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Jawahar Nagar	Yes(L-PRO ER)	Yes(L-PRO ER)	Yes(IDMT)	No	Yes(1-PH)	Yes	Yes	Yes	1	1	Yes	Yes	Yes

220 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
23	Jawahar Nagar - Sarusajai	220	Jawahar Nagar	Yes(L-PRO ER)	Yes(L-PRO ER)	Yes(IDMT)	No	Yes(1-PH)	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Sarusajai	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	Yes	Yes	Yes	1	1	Yes	Yes	Yes
24	Samaguri-Sarusajai II	220	Samaguri	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Sarusajai II	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
25	Tinsukia-AGBPP I	220	Tinsukia	Yes(7SA SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			AGBPP I	Yes(SEL-321 SWITZER)	Yes(7SA SIEMENS)	Yes(IDMT)	No	Yes(1-PH)	No	Yes	Yes	1	1	Yes	Yes	Yes
26	Tinsukia-AGBPP II	220	Tinsukia	Yes(SEL-321 SWITZER)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			AGBPP II	Yes(SEL-321 SWITZER)	Yes(7SA SIEMENS)	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
27	Tinsukia-Namrup I	220	Tinsukia	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Namrup I	Yes(7SA61 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
28	Tinsukia-Namrup II	220	Tinsukia	Yes(7SA52 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Namrup II	Yes(7SA61 SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes		Yes
2. Owner of Line/End: Meghalaya, MePTCL																
1	Misa - Killing (Byrnihat) I	220	Misa													
			Killing (Byrnihat)	Yes, ABB make REL670, Numerical	Yes, Areva make P442, Numerical	Yes	Yes	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes	1	1	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay
2	Misa - Killing (Byrnihat) II	220	Misa													
			Killing (Byrnihat)	Yes, ABB make REL670, Numerical	Yes, Areva make P442, Numerical	Yes	Yes	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes	1	1	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay

220 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
3. Owner of Line/End: POWERGRID																
1	Misa - Dimapur I	220	Misa (PG)	Yes, MICOM P442	Yes, 7SA513			Yes	Yes		Yes			Yes	Yes	
			Dimapur (PG)	Yes, MICOM P442	Yes, 7SA513			Yes	Yes		Yes			Yes	Yes	
2	Misa - Dimapur II	220	Misa (PG)	Yes, MICOM P442	Yes, 7SA513			Yes	Yes		Yes			Yes	Yes	
			Dimapur (PG)	Yes, MICOM P442	Yes, 7SA513			Yes	Yes		Yes			Yes	Yes	
3	Salakti - Birpara I	220	Salakati (PG)	Yes, MICOM P442	Yes, 7SA522			Yes	Yes		Yes			Yes	Yes	
			Birpara (PG)													
4	Salakti - Birpara II	220	Salakati (PG)	Yes, MICOM P442	Yes, 7SA522			Yes	Yes		Yes			Yes	Yes	
			Birpara (PG)													
5	Misa - Mariani (PG)	220	Misa (PG)	Yes, SIEMENS 7SA522	Yes, MICOM P442			Yes	Yes		Yes			Yes	Yes	
			Mariani (PG)	Yes, MICOM P444	Yes, REL 670			Yes	Yes		Yes			Yes	Yes	

Note 1) Main-I Protection indicates Distance Protection
2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection
3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical
4) List of inbuilt features of Numerical Relays are also to be furnished alongwith this

220 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
1. Owner of End : Assam, AEGCL & POWERGRID																
1	Mariani-Samaguri I	220	Mariani (PG)													
			Samaguri													
2	Mariani-Samaguri II	220	Mariani (PG)	Yes (7SA52 SIEMENS)	No	Yes (IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Samaguri	Yes (7SA52 SIEMENS)	No	Yes (IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
3	Samaguri-Balipara	220	Samaguri	Yes (7SA52 SIEMENS)	Yes(P442 MICOM)	Yes (IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			Balipara (PG)	Yes, MICOM P442	Yes, 7SA513			Yes	Yes		Yes			Yes	Yes	
4	Misa-Samaguri I	220	Misa (PG)	Yes, MICOM	Yes, SIMENS 7SA522			Yes	Yes		Yes			Yes	Yes	
			Samaguri	Yes, MICOM	Yes, 7SA522			Yes	Yes		Yes			Yes	Yes	
5	Misa-Samaguri II	220	Misa (PG)	Yes, MICOM	Yes, SIMENS 7SA522			Yes	Yes		Yes			Yes	Yes	
			Samaguri	Yes, MICOM	Yes, 7SA522			Yes	Yes		Yes			Yes	Yes	
6	Salakti - BTPS I	220	Salakati (PG)	Yes, MICOM P442	Yes, 7SA522			Yes	Yes		Yes			Yes	Yes	
			BTPS													
7	Salakti - BTPS II	220	Salakati (PG)	Yes, MICOM P442	Yes, 7SA522			Yes	Yes		Yes			Yes	Yes	
			BTPS													
8	Misa - Mariani	220	Misa (PG)	Yes, SIEMENS 7SA522	Yes, MICOM P442			Yes	Yes		Yes			Yes	Yes	
			Mariani													
2. Owner of End : Assam, AEGCL & NEEPCO																
1	Tinsukia-AGBPP I	220	Tinsukia	Yes(7SA SIEMENS)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			AGBPP I	Yes(SEL-321 EASUN REY)	Yes(SI PROTECH SIEMENS)	Yes(IDMT)	No	Yes(1-PH)	Yes	Yes	Yes	2	3	Yes	Yes	Yes
2	Tinsukia-AGBPP II	220	Tinsukia	Yes(SEL-321 SWITZER)	No	Yes(IDMT)	No	No	No	Yes	Yes	1	1	Yes	Yes	Yes
			AGBPP II	Yes(SEL-321 EASUN)	-	Yes(IDMT)	No	Yes	Yes	Yes	Yes	2	-	Yes	Yes	Yes
3	220 kV AGBPP - Mariani	220	AGBPP	Yes (P442 ALSTOM)	Yes (P443 ALSTOM)	Yes	No	Yes	Yes	Yes	Yes	1	2	Yes	Yes	Yes
			Mariani													

220 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes/No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
3. Owner of End: Meghalaya, MePTCL & POWERGRID																
1	Misa - Killing (Byrnihat) I	220	Misa (PG)													
			Killing (Byrnihat)	Yes, ABB make REL670, Numerical	Yes, Areva make P442, Numerical	Yes	Yes	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes	1	1	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay
2	Misa - Killing (Byrnihat) II	220	Misa (PG)													
			Killing (Byrnihat)	Yes, ABB make REL670, Numerical	Yes, Areva make P442, Numerical	Yes	Yes	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes	1	1	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay	Yes, REL670 & P442 Relay
4. Owner of End: POWERGRID & NEEPCO																
1	220 kV AGBPP - Mariani(PG)	220	AGBPP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	2	Yes	Yes	Yes
			Mariani (PG)	Yes, MICOM P444	Yes, REL 670		Yes	Yes	Yes		Yes			Yes	Yes	
5. Owner of End: DoP,Arunachal Pradesh & NEEPCO																
1	220 kV AGBPP - Deoamli	220	AGBPP	EPAC 3000 ALSTOM	SHPM 101 ALSTOM	No	No	No	No	Yes	Yes	1	2	Yes	Yes	Yes
			Deomali													
6. Owner of End: POWERGRID & NEEPCO																
1	Misa - Kopili I	220	Misa (PG)	Yes, SIMENS 7SA522	Yes, MICOM P442			Yes	Yes		Yes			Yes	Yes	
			Kopili													
2	Misa - Kopili II	220	Misa (PG)	Yes, SIMENS 7SA522	Yes, MICOM P442			Yes	Yes		Yes			Yes	Yes	
			Kopili													
3	Misa - Kopili III	220	Misa (PG)	Yes, 7SA513	Yes, MICOM P442			Yes	Yes		Yes			Yes	Yes	
			Kopili													

Note 1) Main-I Protection indicates Distance Protection

2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection

3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical

4) List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

400 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
1. Owner of Line : NETC																
1	Silchar - Azara	400	Azara	Yes (REL670 ABB)	Yes (REL670 ABB)	Yes	Yes	Yes	Yes	Yes	Yes	1	1	Yes	Yes	Yes
			Silchar (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
2	Silchar - Killing (Byrnihat)	400	Silchar (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Killing (Byrnihat)													
3	Palatana- Silchar I	400	Palatana													
			Silchar (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
4	Palatana- Silchar II	400	Palatana													
			Silchar (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
5	Killing- Bongaigaon	400	Killing (Byrnihat)													
			Bongaigaon (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
6	Azara- Bongaigaon	400	Azara													
			Bongaigaon (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	

400 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
2. Owner of Line : POWERGRID																
1	Bongaigaon- Binaguri I	400	Bongaigaon (PG)	Yes, MICOM P442	Yes, SIEMENS 7SA522		Yes	Yes	Yes		Yes			Yes	Yes	
			Binaguri (PG)													
2	Bongaigaon- Binaguri II	400	Bongaigaon (PG)	Yes, MICOM P442	Yes, SIEMENS 7SA522		Yes	Yes	Yes		Yes			Yes	Yes	
			Binaguri (PG)													
3	Bongaigaon- Binaguri III	400	Bongaigaon (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Binaguri (PG)													
4	Bongaigaon- Binaguri IV	400	Bongaigaon (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Binaguri (PG)													
5	Bongaigaon- Balipara I	400	Bongaigaon (PG)	Yes, MICOM P444	Yes, 7SA513		Yes	Yes	Yes		Yes			Yes	Yes	
			Balipara (PG)	Yes, MICOM P442	Yes, SIEMENS 7SA522		Yes	Yes	Yes		Yes			Yes	Yes	
6	Bongaigaon- Balipara II	400	Bongaigaon (PG)	Yes, MICOM P444	Yes, 7SA513		Yes	Yes	Yes		Yes			Yes	Yes	
			Balipara (PG)	Yes, MICOM P442	Yes, SIEMENS 7SA522		Yes	Yes	Yes		Yes			Yes	Yes	

400 kV Transmission Line Protection Details

Annexure II

Sl. No.	Name of Line	Charged Voltage in kV	End specified for Protection	Protection Details										Data Recording System Details		
				Main I Protection exists (Type of Relay and Make) (Yes/No)	Main II Protection exists (Type of Relay and Make) (Yes/No)	Directional Instantaneous Definite Minimum Time(IDMT) type Earth Fault Relay exists (Yes/No)	Two stage Over-Voltage Protection exists (Yes/No)	Auto Reclosing (Single Phase / Three Phase) exists (Yes/No)	Carrier aided Inter-tripping exists (Yes/No)	Power Swing Blocking Feature exists (Yes/No)	Pole Discrepancy Relay exists (Yes / No)	Number of Core used for CT & VT, used for Main I	Number of Core used for CT & VT, used for Main II	Disturbance Recorder exists (Yes/No)	Event Logger / Sequential Event Recorder exists (Yes/No)	Fault Locator exists (Yes/No)
7	Bongaigaon- Balipara III	400	Bongaigaon (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Balipara (PG)	Yes, MICOM P442	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
8	Bongaigaon- Balipara IV	400	Bongaigaon (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Balipara (PG)	Yes, MICOM P442	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
9	Balipara- Ranganadi I	400	Balipara (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Ranganadi	Yes, MICOM P442, ALSTOM	Yes, PD571, ALSTOM	No	Yes	Yes (Single Phase)	Yes	Yes	Yes	1	1 & 2	No	No	No
10	Balipara- Ranganadi II	400	Balipara (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Ranganadi	Yes, MICOM P442, ALSTOM	Yes, PD571, ALSTOM	No	Yes	Yes (Single Phase)	Yes	Yes	Yes	1	1 & 2	No	No	No
11	Balipara- Misa I	400	Balipara (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Misa (PG)	Yes, SIEMENS 7SA522	Yes, MICOM P442		Yes	Yes	Yes		Yes			Yes	Yes	
12	Balipara- MIsa II	400	Balipara (PG)	Yes, MICOM P444	Yes, REL670		Yes	Yes	Yes		Yes			Yes	Yes	
			Misa (PG)	Yes, SIEMENS 7SA522	Yes, MICOM P442		Yes	Yes	Yes		Yes			Yes	Yes	

Note 1) Main-I Protection indicates Distance Protection
2) Main-II Protection indicates one of Distance Protection / Directional Comparison Protection / Phase Segregated Line Differential protection
3) Type of Relay indicates it's operational mechanism - Numerical / Static / Electro-mechanical
4) List of inbuilt features of Numerical Relays are also to be furnished alongwith this

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
1. Owner of Transformer : Assam, AEGCL																
1	400/220 kV Azara (Mirza) 2x315 MVA ICTs I & II	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	220/132 kV 1x100 MVA Agia ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	220/132 kV 1x50 MVA Agia ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
3	220/132 kV 1x150 MVA Balipara ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
4	220/132 kV 1x50 MVA Boko ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
5	220/132 kV 2x80 MVA BTPS ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	220/132 kV 1x160 MVA BTPS ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
6	220/132 kV 2x100 MVA Mariani ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
7	220/132 kV 2x50 NTPS ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
8	220/132 kV 3x50 MVA Samaguri ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
9	220/132 kV 3x100 MVA Sarusajai ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
10	220/132 kV 2x50 MVA Tinsukia ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
11	220/33 kV 2x50 MVA GIS (Jawaharnagar) ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
12	132/33 kV 1x40 MVA Agia ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	132/33 kV 1X12.5 MVA Agia ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
13	132/33 kV 1X12.5 MVA APM (Ashok Paper Mill)	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	132/33 kV 1X16 MVA APM (Ashok Paper Mill) ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
14	132/33 kV 2X25 MVA Barnagar ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
15	132/33 kV 2X16 MVA Biswanath Chariali ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
16	132/33 kV 2X16 MVA Bokakhat ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
17	132/33 kV 1X16 MVA Bokajan ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
18	132/33 kV 2X40 MVA Boko	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
18	ICTs	HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
19	132/33 kV 1X16 MVA BTPS ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
20	132/33 kV 1X16 MVA Chandrapur (CTPS) ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	132/33 kV 1X30 MVA Chandrapur (CTPS) ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
21	132/33 kV 2X31.5 MVA Depota ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
22	132/33 kV 2X25 MVA Dhaligaon ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
23	132/33 kV 2X16 MVA Dhemaji ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
24	132/33 kV 2X31.5 MVA Dibrugarh ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
25	132/33 kV 2X16 MVA Diphu ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
26	132/33 kV 3X3.5 MVA Dullavcherra ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
27	132/33 kV 1X25 MVA Garmur ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
28	132/33 kV 2X16 MVA Gauripur ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
29	132/33 kV 1X16 MVA Ghoramari ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
30	132/33 kV 1X16 MVA Gohpur ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
31	132/33 kV 1X10 MVA Gohpur ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
32	132/33 kV 2X25 MVA Golaghat ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
33	132/33 kV 2X16 MVA Gossaigaon (Joyma) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
34	132/33 kV 2X10 MVA Haflong ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
35	132/33 kV 2X16 MVA Jagiroad (Baghjap) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
36	132/33 kV 2X25 MVA Jorhat (Garmur) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
37	132/33 kV 1X16 MVA Jorhat (Garmur) ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
38	132/33 kV 1X31.5 MVA Kahilipara ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
39	132/33 kV 2X30 MVA Kahilipara ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
40	132/33 kV 2X10 MVA Ledo (Margherita) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
41	132/33 kV 2X7.5 MVA LTPS ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
42	132/33 kV 4X5.5 MVA Majuli (Single Phase) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
43	132/33 kV 2X16 MVA Moran ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
44	132/33 kV 2X16 MVA Nalbari ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
45	132/33 kV 2X25 MVA Narengi ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
46	132/33 kV 2X25 MVA Nazira (Gargaon) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
47	132/33 kV 2X10 MVA North Lakhimpur (Nalkata) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
48	132/33 kV 1X31.5 MVA NTPS ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
49	132/33 kV 3X10 MVA Pailapool ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
50	132/33 kV 2X25 MVA Panchgram New ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
51	132/33 kV 2X10 MVA Panchgram Old ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
52	132/33 kV 2X25 MVA Rangia ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
53	132/33 kV 2X25 MVA Rowta ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
54	132/33 kV 2X25 MVA Samaguri ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
55	132/33 kV 1X16 MVA Sankar Dev Nagar (Lanka)	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
56	132/33 kV 3X31.5 MVA Sarusajai ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
57	132/33 kV 2X16 MVA Sibsagar ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
58	132/33 kV 2X16 MVA Sipajhar ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
59	132/33 kV 2X31.5 MVA Sishugram (Amingaon) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
60	132/33 kV 1x40 MVA Sishugram (Amingaon) ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
61	132/33 kV 2X25 MVA Srikona ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
62	132/33 kV 2X25 MVA Khaloigaon ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
63	132/33 kV 2X25 MVA Sonari ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
64	132/33 kV 2X40 MVA Behaiting ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
65	132/66 kV 2X20 MVA Mariani ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
66	132/66 kV 2X25 MVA NTPS ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
67	132/66 kV 1X20 MVA NTPS ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
68	132/66 kV 3X20 MVA Tinsukia ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
69	132/11 kV 2X16 MVA Dispur ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
70	132/11 kV 2X10 MVA Kahilipara ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
71	66/33 kV 3X5 MVA Bokajan ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
72	66/33 kV 2X5 MVA Diphu ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
73	66/33 kV 2X10 MVA Golaghat ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
74	66/33 kV 1X6.3 MVA Golaghat ICT	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
75	66/33 kV 2X16 MVA Mariani ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
76	66/33 kV 2X16 MVA Nazira (Gargaon) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
77	66/33 kV 3X10 MVA NTPS ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
78	66/33 kV 3X10 MVA Rupai (Doomdooma) ICTs	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
79	66/33 kV 3x20 MVA Tinsukia ICTS	LV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
		HV side	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
2. Owner of Transformer : MSPCL, Manipur																
1	132/33 kV Churachandpur (Kheljang) 1x20 MVA	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Churachandpur (Kheljang) 1x20 MVA	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
2	132/33 kV Jiribam 1x20 MVA Transformer	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
3	132/33 kV Kakching 1x20 MVA Transformer I	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Kakching 1x20 MVA Transformer II	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
4	132/33 kV Karong 1x20 MVA Transformer I	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Karong 1x20 MVA Transformer II	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
5	132/33 kV Ningthoukong 1x20 MVA Transformer I	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Ningthoukong 1x12.5 MVA Transformer II	LV side														
		HV side														
6	132/33 kV Rengpang 1x12.5 MVA Transformer	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
7	132/33 kV Yaingangpokpi1x20 MVA	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side		No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Yaingangpokpi 1x20 MVA Transformer-II	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
8	132/33 kV Yurembam 1x20 MVA Transformer I	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes		No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Yurembam 1x20 MVA Transformer II	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Yurembam 1x20 MVA Transformer III	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
9	132/33 kV Kongba1x20 MVA Transformer-I	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
	132/33 kV Kongba1x20 MVA Transformer-II	LV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No
		HV side	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	No

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
3. Owner of Transformer : Meghalaya, MePTCL																
	400/220 kV Killing(Byrnihat) 1x315 MVA Transformer I	LV side														
		HV side														
	400/220 kV Killing(Byrnihat) 1x315 MVA Transformer II	LV side														
		HV side														
1	220/132 kV Killing(Byrnihat) 1x160 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional REX ABB make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional REX ABB make	No		Yes					Yes		
	220/132 kV Killing(Byrnihat) 1x160 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional REX ABB make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional REX ABB make	No		Yes					Yes		
2	132/33 kV Cherrapunjee (Sohra) 1x12.5 MVA Transformer	LV side	No	No	No	Non directional CDG, EE make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		
3	132/33 kV EPIP I 1x20 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV EPIP I 1x20 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
4	132/33 kV EPIP II 1x50 MVA Transformer	LV side	Yes, Toshiba make, GRT100, Numerical	No	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV EPIP II 1x20 MVA Transformer	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
5	132/33 kV Khliehriat 1x20 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		
	132/33 kV Khliehriat 1x20 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
6	132/33/11 kV Lumshnong 1x10 MVA Transformer	LV side 11 kV	No	No	No	Non directional CDG, EE make	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
		LV side 33 kV				Non directional JRC 059,JVS make	No		Yes					Yes		
		HV side				Non directional P122 Areva make	No		Yes					Yes		
7	132/33 kV Mawlai 1x20 MVA Transformer I	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Mawlai 1x20 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Mawlai 1x20 MVA Transformer III	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
8	132/33 kV Nangalbibra 1x12.5 MVA Transformer I	LV side	Yes, EE make, Static type	No	No	Non directional P122 Areva make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Nangalbibra 1x12.5 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
9	132/33 kV NEHU 1x20 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV NEHU 1x20 MVA Transformer II	LV side	Yes, EE make, Static type	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		
10	132/33 kV Nongstoin 1x12.5 MVA Transformer	LV side	Yes, Areva make, P632, Numerical	Yes	Yes	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
11	132/33 kV Rongkhon (Tura) 1x20 MVA Transformer I	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Rongkhon (Tura) 1x20 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Rongkhon (Tura) 1x5 MVA Transformer I	LV side	Yes, EE make, Static type	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Rongkhon (Tura) 1x5 MVA Transformer II	LV side	Yes, EE make, Static type	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Rongkhon (Tura) 1x5 MVA Transformer III	LV side	Yes, EE make, Static type	Yes	No	Non directional CDG, EE make	No	Yes	Yes	Yes	Np	No	Yes	Yes	No	Yes
		HV side				Non directional, CDG EE make	No		Yes					Yes		
12	132/33 kV Umiam 1x20 MVA Transformer I	LV side	Yes, Toshiba make, GRT100, Numerical	Yes	No	Non directional JNC066, JVS make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional JNC066, JVS make	No		Yes					Yes		
	132/33 kV Umiam 1x20 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P141 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
13	132/33/11 kV NEIGRIHMS 1x10 MVA Transformer I	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33/11 kV NEIGRIHMS 1x10 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
14	132/33 kV Mawngap 1x20 MVA Transformer I	LV side	Yes, Areva make, P632, Numerical	Yes	No	Yes, Directional P141, Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Yes, Directional P141, Areva make	No		Yes					Yes		
	132/33 kV Mawngap 1x20 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Yes, Directional P141, Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Yes, Directional P141, Areva make	No		Yes					Yes		
15	132/33 kV Umiam Stg I 1x10.6 MVA Transformer I	LV side	Yes, Areva make, P632, Numerical	Yes	No	Yes, Directional P141, Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Yes, Directional P141, Areva make	No		Yes					Yes		
	132/33 kV Umiam Stg I 1x10.6 MVA Transformer II	LV side	Yes, Areva make, P632, Numerical	Yes	No	Yes, Directional P141, Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Yes, Directional P141, Areva make	No		Yes					Yes		
	132/33 kV Umiam Stg I 1x10.6 MVA Transformer III	LV side	Yes, Areva make, P632, Numerical	Yes	No	Yes, Directional P141, Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Yes, Directional P141, Areva make	No		Yes					Yes		
	132/33 kV Umiam Stg I 1x10.6 MVA Transformer IV	LV side	Yes, Areva make, P632, Numerical	Yes	No	Yes, Directional P141, Areva make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Yes, Directional P141, Areva make	No		Yes					Yes		
16	132/33 kV Umiam Stg II 1x10.5 MVA Transformer I	LV side	Digital M-3311, Beckwith Electric Co.	Yes	No	Beckwith Electric Co.	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Beckwith Electric Co.	No		Yes					Yes		
	132/33 kV Umiam Stg II 1x10.5 MVA Transformer II	LV side	Digital M-3311, Beckwith Electric Co.	Yes	No	Beckwith Electric Co.	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Beckwith Electric Co.	No		Yes					Yes		
17	132/33 kV Umiam Stg III 1x37.5 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional CDG, EE make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		
	132/33 kV Umiam Stg III 1x37.5 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional CDG, EE make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
18	132/33 kV Umiam Stg IV 1x37.5 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional CDG, EE make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		
	132/33 kV Umiam Stg IV 1x37.5 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional CDG, EE make	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes
		HV side				Non directional CDG, EE make	No		Yes					Yes		
19	132/33 kV Umtru 1x7.5 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
	132/33 kV Umtru 1x7.5 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	No	Non directional P122 Areva make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional P122 Areva make	No		Yes					Yes		
20	132/33 kV Leshka 1x45 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional REX ABB make	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes
		HV side				Non directional REX ABB make	No		Yes					Yes		
	132/33 kV Leshka 1x45 MVA Transformer II	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional REX ABB make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional REX ABB make	No		Yes					Yes		
	132/33 kV Leshka 1x45 MVA Transformer III	LV side	Yes, ABB make, RET670,	Yes	Yes	Non directional REX	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional REX ABB make	No		Yes					Yes		
	132/33 kV Leshka 1x45 MVA Transformer I	LV side	Yes, ABB make, RET670, Numerical	Yes	Yes	Non directional REX ABB make	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
		HV side				Non directional REX ABB make	No		Yes					Yes		
4. Owner of Transformer : P&E, Mizoram																
1	132/33 kV Bairabi, 3.15 MVA Transformer	LV side														
		HV side														
	132/11 kV Bairabi, 15 MVA Transformer 1	LV side														
		HV side														
	132/11 kV Bairabi, 15 MVA Transformer 2	LV side														
		HV side														

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
2	132/66 kV Kolasib (Bawktlang) 12.5 MVA	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No
	132/33 kV Kolasib (Bawktlang) 12.5 MVA	LV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No
	66/33 kV Kolasib (Bawktlang) 6.3 MVA	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
3	132/33 kV Serchip (Bukpui) 12.5 MVA Transformer I	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
	132/33 kV Serchip (Bukpui) 6.3 MVA Transformer II	LV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No
4	132/33 kV Lunglei (Khawiva) 12.5 MVA Transformers I	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
	132/33 kV Lunglei (Khawiva) 12.5 MVA Transformers II	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
5	132/33 kV Khawzawl 12.5 MVA Transformers I	LV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
6	132/33 kV Luangmual, 12.5 MVA Transformers I	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
	132/33 kV Luangmual, 12.5 MVA Transformers II	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
	132/33 kV Luangmual, 12.5 MVA Transformers III	LV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
7	132/33 kV Saitual 1x6.3 MVA Transformer	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No
8	132/33 kV Zemabawk (Zuangtui) 12.5 MVA	LV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No
	132/33 kV Zemabawk (Zuangtui) 12.5 MVA	LV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
5. Owner of Transformer : NEEPCO																
1	53 MVA, 11 kV/132 kV Generator Transformer at Ranganadi	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side		No												
2	400 kV/132 kV, 120 MVA ICT-I at Ranganadi	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (Neutral Displacement Protection)	No
		HV side		No												
3	400 kV/132 kV, 120 MVA ICT-II at Ranganadi	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (Neutral Displacemen	No
		HV side		No												
4	11/220 kV, 50 MVA Generator Transformer 1 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
5	11/220 kV, 50 MVA Generator Transformer 2 at	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
5	Generator Transformer 2 at AGBPP	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
6	11/220 kV, 50 MVA Generator Transformer 3 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
7	11/220 kV, 50 MVA Generator Transformer 4 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
8	11/220 kV, 50 MVA Generator Transformer 5 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
9	11/220 kV, 50 MVA Generator Transformer 6 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
10	11/220 kV, 50 MVA Generator Transformer 7 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
11	11/220 kV, 50 MVA Generator Transformer 8 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
12	11/220 kV, 50 MVA Generator Transformer 9 at AGBPP	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes			
13	11/132 kV, 3x12.5(37.5) MVA Generator Transformer 1 at AGTPP	LV side	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
14	11/132 kV, 3x12.5(37.5) MVA Generator Transformer 2 at AGTPP	LV side	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
15	11/132 kV, 3x12.5(37.5) MVA Generator Transformer 3 at AGTPP	LV side	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
16	11/132 kV, 3x12.5(37.5) MVA Generator Transformer 4 at AGTPP	LV side	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
		HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No
6. Owner of Transformer : NHPC																
1	11/132 kV, Generator Transformer at Loktak	LV side	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes
		HV side														

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
7. Owner of Transformer : POWERGRID																
1	400/220kV, 315 MVA ICT at Bongaigaon	LV side HV side	Yes, P643			Yes										
2	400/220kV, 315 MVA ICT at Balipara	LV side HV side	Yes, P643			Yes										
3	220/132, 50 MVA ICT 1 at Balipara (NEEPCO asset)	LV side HV side	Yes, Duo-Bias-M			Yes										
4	220/132, 50 MVA ICT2 at Balipara (AEGCL asset)	LV side HV side	Yes, Duo-Bias-M			Yes										
5	400/220kV, 315 MVA ICT 1 at Misa	LV side HV side	Yes, P643			Yes										
6	400/220kV, 315 MVA ICT 2 at Misa	LV side HV side	Yes, P633			P127										
5	400/220kV, 200 MVA ICT 1 at Silchar	LV side HV side	Yes, P633			Yes										
6	400/220kV, 200 MVA ICT 2 at Silchar	LV side HV side	Yes, P633			P127										
7	220/132kV, 50 MVA ICT 1 at Salakati	LV side HV side	Yes, P643			Yes										
8	220/132kV, 50 MVA ICT 2 at Salakati	LV side HV side	Yes, Duo-Bias-M/PC 05770			Yes										
9	220/132kV, 100 MVA ICT 1 at Dimapur	LV side HV side	Yes, DTH-31			Yes										
10	220/132kV, 100 MVA ICT 2 at Dimapur	LV side HV side	Yes, RET670			Yes										
11	132/33 kV, 15 MVA ICT at Ziro	LV side HV side	Yes, P643			Yes										
12	132/33 kV, 5 MVA ICT at Kumarghat	LV side HV side	Yes, DTH			Yes										
13	132/33 kV, 16 MVA ICT at Nirjuli	LV side HV side	Yes, P643			Yes										
14	132/33 kV, 10 MVA ICT at Nirjuli	LV side HV side	Yes, P643			Yes										
15	220/132 kV, 160 MVA ICT at Kopili	LV side HV side	Yes, RET670			Yes										
16	132/33 kV, 50 MVA ICT 1 at Imphal	LV side HV side	Yes, P632			P127										
17	132/33 kV, 50 MVA ICT 2 at Imphal	LV side HV side	Yes, P632			P127										

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
8. Owner of Transformer : TSECL																
1	Budhjungnagar	25 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		25 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
2	Jirania	15 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
3	Gamaitila	15 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
4	Ambassa	25 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		7.5/2.5/5	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes at
		MVA	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	tertiary
5	P K Bari	15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
6	Kailashahar	15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		7.5/2.5/5	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes at
		MVA	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	tertiary
		7.5/2.5/5	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes at
		MVA	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	tertiary
7	Missiontilla	7.5/2.5/5	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes at
		MVA	HV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	tertiary
		7.5/2.5/5	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes at
		MVA	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	tertiary
		7.5/2.5/5	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes at
		MVA	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	tertiary
		25 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
8	Kamalpur	10 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		10 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
9	Dhalabil	15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		7.5 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No

Transformer Protection Details

Annexure II

Sl. No.	Name of Transformer	LV side/ HV side	Differential Protection exits (Yes/No)	Over Fluxing Protection exits (Yes/No)	REF Protection exists (Yes/No)	Directional Over Current Protection exits (Yes/No)	Impedance Protection exists (Yes/No)	Buchholz Operation exits (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	OSR for OLTC exists (Yes/No)	PRD exists (Yes/No)	SA exists (Yes/No)	Tertiary Winding Protection exists (Yes/No)	Overload Alarm exists (Yes/No)
10	Udaipur	15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
11	Surjyamaninagar	50 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		50 MVA	LV side	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
12	Grid, 79 Tilla	25 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/11 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		15 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No
		25 MVA	LV side	Yes	No	No	No	No	No	No	No	No	No	No	Yes	No
		132/33 KV	HV side	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No

Note : 1. REF : Restricted Earth Fault, 2. WTI : Winding Temperature Indicator., 3. OTI : Oil Temperature Indicator)

4. MOG : Magnetic Oil Gauge, 5. OSR : Oil Surge Relay, 6. OLTC : On Load Tap Changer

7. PRD : Pressure Relieve Device, 8. SA : Surge Arrestor 9. List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

Reactor Protection Details

Annexure II

Sl. No.	Name of Line Reactor/ Bus Reactor/ Tertiary Reactor	Differential Protection exists (Yes/No)	REF Protection exists (Yes/No)	Definite Time Over Current Protection exists (Yes/No)	Earth Fault Protection exists (Yes/No)	Buchholz Operation exists (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	SA exists (Yes/No)
1. Owner of Reactor : Assam, AEGCL										
1	400 kV Silchar - Azara (Mirza) line reactor of 63 MVAR at Azara (Mirza) end	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Bus Reactor of 63 MVAR at Azara (Mirza)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Bus Reactor I & II of 12.5 MVAR at Mariani	REACTOR NOT IN OPERATION								
4	Bus Reactor I & II of 12.5 MVAR at Samaguri	REACTOR NOT IN OPERATION								
5	Bus Reactor I & II of 12.5 MVAR at Mariani	REACTOR NOT IN OPERATION								
2. Owner of Reactor/ Capacitor Bank : Meghalaya, MePTCL										
1	63 MVAR Bus Reactor at Killing (Byrnihat)									
2	132KV Capacitor Bank at Mawlai	No	No	Yes	Yes	No	No	No	No	Yes
3	132KV Capacitor Bank at EPIP I	No	No	Yes	Yes	No	No	No	No	Yes
4	132KV Capacitor Bank at EPIP II	No	No	Yes	Yes	No	No	No	No	Yes

Reactor Protection Details

Annexure II

Sl. No.	Name of Line Reactor/ Bus Reactor/ Tertiary Reactor	Differential Protection exists (Yes/No)	REF Protection exists (Yes/No)	Definite Time Over Current Protection exists (Yes/No)	Earth Fault Protection exists (Yes/No)	Buchholz Operation exists (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	SA exists (Yes/No)
3. Owner of Reactor :NEEPCO										
1	50 MVAR line Reactor -I in 400 kV Balipara-RHEP I at Ranganadi end	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
2	50 MVAR line Reactor -II in 400 kV Balipara-RHEP II at Ranganadi end	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
4. Owner of BUS Reactors :POWERGRID										
1	50 MVAR 400 kV Bus Reactor-I at Bongaigaon SS	Yes, Differential (CAG)								
2	50 MVAR 400kV Bus Reactor-II at Bongaigaon SS	Yes, Differential (CAG)								
3	80 MVAR 400 kV Bus Reactor-3 at Bongaigaon SS	Yes, Differential (CAG)								
4	80 MVAR 400kV Bus Reactor-4 at Bongaigaon SS	Yes, Differential (CAG)								
5	50 MVAR 400kV Bus Reactor-1 Balipara SS	Yes, Differential (CAG)								
6	80 MVAR 400kV Bus Reactor-2 Balipara SS	Yes, Differential (CAG)								
7	50 MVAR 400kV Bus Reactor Misa SS	Yes, Differential (CAG)								

Reactor Protection Details										Annexure II
Sl. No.	**Name of Line Reactor/ Bus Reactor/ Tertiary Reactor**	**Differential Protection exists (Yes/No)**	**REF Protection exists (Yes/No)**	**Definite Time Over Current Protection exists (Yes/No)**	**Earth Fault Protection exists (Yes/No)**	**Buchholz Operation exists (Yes/No)**	**WTI Protection exists (Yes/No)**	**OTI Protection exists (Yes/No)**	**MOG with low oil level alarm exists (Yes/No)**	**SA exists (Yes/No)**
8	63 MVAR 400kV Bus Reactor-1 Sichar SS	Yes, Differential (CAG)								
9	63 MVAR 400kV Bus Reactor-2 Sichar SS	Yes, Differential (P633)								
10	20 MVAR 220 kV Bus Reactor at Mariani SS	Yes, Differential (P632)								
11	20 MVAR 132kV Bus Reactor Kumarghat SS	Yes, Differential (CAG)								
12	20 MVAR 132kV Bus Reactor Aizwal SS	Yes, Differential (CAG)								
13	20 MVAR 132kV Bus Reactor Imphal SS	Yes, Differential (P633)								
14	20 MVAR 132kV Bus Reactor Ziro SS	Yes, Differential (P633)								
15	25 MVAR 33kV Reactor-Misa	Yes, Differential (CAG)								
16	25 MVAR 33kV Reactor-Balipara	Yes, Differential (CAG)								

Reactor Protection Details										Annexure II
Sl. No.	**Name of Line Reactor/ Bus Reactor/ Tertiary Reactor**	**Differential Protection exists (Yes/No)**	**REF Protection exists (Yes/No)**	**Definite Time Over Current Protection exists (Yes/No)**	**Earth Fault Protection exists (Yes/No)**	**Buchholz Operation exists (Yes/No)**	**WTI Protection exists (Yes/No)**	**OTI Protection exists (Yes/No)**	**MOG with low oil level alarm exists (Yes/No)**	**SA exists (Yes/No)**
17	25 MVAR 33kV Reactor-Bongaiagaon	Yes, Differential (CAG)								
5. Owner of Line Reactors: POWERGRID										
1	50 MVAR 400 KV D/C Misa-Kathalguri	Yes , Differential (CAG)								
2	50 MVAR 400 KV D/C Misa-Mariani	Yes, Differential (CAG)								
3	63/50 MVAR 400 KV D/C Balipara-Bongaigaon-I	Yes, Differential (CAG34AF71A)								
4	63/50 MVAR 400 KV D/C Balipara-Bongaigaon-II	Yes, Differential (CAG34AF71A)								
5	63 MVAR 400 KV D/C Balipara-Bongaigaon-3	Yes, Differential (CAG34AF71A)								
6	63 MVAR 400 KV D/C Balipara-Bongaigaon-4	Yes, Differential (CAG34AF71A)								
7	50 MVAR 400KV D/C Balipara-Ranganadi-I	Yes, Differential (DTH31)								

Reactor Protection Details										Annexure II
Sl. No.	**Name of Line Reactor/ Bus Reactor/ Tertiary Reactor**	**Differential Protection exists (Yes/No)**	**REF Protection exists (Yes/No)**	**Definite Time Over Current Protection exists (Yes/No)**	**Earth Fault Protection exists (Yes/No)**	**Buchholz Operation exists (Yes/No)**	**WTI Protection exists (Yes/No)**	**OTI Protection exists (Yes/No)**	**MOG with low oil level alarm exists (Yes/No)**	**SA exists (Yes/No)**
8	50 MVAR 400KV D/C Balipara-Ranganadi-II	Yes, Differential (DTH31)								
9	63 MVAR 400kV Bongaigaon-Siliguri - I	Yes, Differential (CAG3471)								
10	63 MVAR 400kV Bongaigaon-Siliguri - II	Yes, Differential (CAG3471)								
11	63 MVAR 400kV Bongaigaon-Azara	Yes, Differential (CAG3471)								
12	63 MVAR 400kV Bongaigaon-Byrnihat	Yes, Differential (CAG3471)								
13	50 MVAR 400kV SilChar-Azara	Yes, Differential (CAG3471)								
14	50 MVAR 400kV Sichar-Byrnihat	Yes, Differential (CAG3471)								
13	50 MVAR 400kV SilChar-Pallatana-1	Yes, Differential (P633)								
14	50 MVAR 400kV SilChar-Pallatana-1	Yes, Differential (P633)								

Reactor Protection Details — Annexure II

Sl. No.	Name of Line Reactor/ Bus Reactor/ Tertiary Reactor	Differential Protection exists (Yes/No)	REF Protection exists (Yes/No)	Definite Time Over Current Protection exists (Yes/No)	Earth Fault Protection exists (Yes/No)	Buchholz Operation exists (Yes/No)	WTI Protection exists (Yes/No)	OTI Protection exists (Yes/No)	MOG with low oil level alarm exists (Yes/No)	SA exists (Yes/No)

Note : 1. REF : Restricted Earth Fault, 2. WTI : Winding Temperature Indicator., 3. OTI : Oil Temperature Indicator)

4. MOG : Magnetic Oil Gauge, 5. SA : Surge Arrestor

6. List of inbuilt features of Numerical Relays are also to be furnished alongwith this format

Annexure II

Bus Bar & Local Breaker Backup(LBB) Protection Details

Sl.No.	Name of Substation	Voltage level	Bus Bar Protection exists (Yes/No)	LBB Protection exists (Yes/No)
1. Owner of Bus Bar: MSPCL, Manipur				
1	Churachandpur	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
2	Jiribam	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
3	Kakching	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
4	Karong	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
5	Ningthoukong	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
6	Rengpang	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
7	Yaingangpokpi	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
8	Yurembam.	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
9	Kongba	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
2. Owner of Bus Bar: MePTCL, Meghalaya				
1	Mawlai	132 kV Bus Bar	No	No
2	NEHU	132 kV Bus Bar	No	No
3	NEIGRIHMS	132 kV Bus Bar	No	No
4	Khliehriat	132 kV Bus Bar	No	No
5	Lumshnong	132 kV Bus Bar	No	No
6	Umiam	132 kV Bus Bar	No	No
7	Mawphlang	132 kV Bus Bar	No	No
8	Cherra	132 kV Bus Bar	No	No
9	Nongstoin	132 kV Bus Bar	No	No
10	Nangal	132 kV Bus Bar	No	No
11	Rongkhon	132 kV Bus Bar	No	No
12	EPIP-I	132 kV Bus Bar	No	No
13	EPIP-II	132 kV Bus Bar	No	No
14	Stage-I PH	132 kV Bus Bar	No	No
15	Stage-II PH	132 kV Bus Bar	No	No
16	Stage-III PH	132 kV Bus Bar	No	No
17	Stage-IV PH	132 kV Bus Bar	No	No
18	Umtru PH	132 kV Bus Bar	No	No
19	Leshka PH	132 kV Bus Bar	No	No

Bus Bar & Local Breaker Backup(LBB) Protection Details

Sl.No.	Name of Substation	Voltage level	Bus Bar Protection exists (Yes/No)	LBB Protection exists (Yes/No)
20	Killing	132 kV Bus Bar	Yes	No
		220 kV Bus Bar	Yes	No
3. Owner of Bus Bar: P&E, Mizoram				
1	Kolasib	132 kV Bus Bar	No	No
		66 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
2	Luangmual	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
3	Lunglei	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
4	Serchip	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
5	Saitul	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
6	Zemabawk	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
7	Bairabi	132 kV Bus Bar	Yes (EM)	No
		33 kV Bus Bar	No	No
8	Khawzawl	132 kV Bus Bar	No	No
		33 kV Bus Bar	No	No
4. Owner of Bus Bar: NEEPCO				
1	Ranganadi	400 kV Bus Bar	Yes	Yes
		132 kV Bus Bar	Yes	Yes
2	AGBPP	220 kV Bus Bar	Yes	Yes
3	AGTPP	132 kV Bus Bar	Yes	Yes
5. Owner of Bus Bar: NHPC				
1	Loktak	132 kV Bus Bar	Yes	Yes
6. Owner of Bus Bar: POWEWRGRID				
1	Aizawl	132 kV Bus Bar	Yes	Yes
2	Badarpur	132 kV Bus Bar		Yes
3	Balipara	400 kV Bus Bar	Yes	Yes
		220 kV Bus Bar	Yes	Yes
4	Bongaigaon	400 kV Bus Bar	Yes	Yes
5	Biswanath Chariali			
6	Dimapur	220 kV Bus Bar	Yes	Yes
		132 kV Bus Bar		Yes
7	Haflong	132 kV Bus Bar		Yes
8	Imphal	132 kV Bus Bar		Yes
9	Jiribam	132 kV Bus Bar		Yes
10	Khliehriat	132 kV Bus Bar		Yes
11	Kumarghat	132 kV Bus Bar		Yes
12	Mariani	220 kV Bus Bar	Yes	Yes
13	Melriat	132 kV Bus Bar		

Bus Bar & Local Breaker Backup(LBB) Protection Details				
Sl.No.	**Name of Substation**	**Voltage level**	**Bus Bar Protection exists (Yes/No)**	**LBB Protection exists (Yes/No)**
14	Misa	400 kV Bus Bar	Yes	Yes
		220 kV Bus Bar	Yes	Yes
15	Mokokchung	220 kV Bus Bar		
		132 kV Bus Bar		
16	Namsai	132 kV Bus Bar		
17	Nirjuli	132 kV Bus Bar		Yes
18	Roing	132 kV Bus Bar		
19	Salakati	220 kV Bus Bar	Yes	Yes
20	Silchar	400 kV Bus Bar	Yes	Yes
		132 kV Bus Bar	Yes	Yes
21	Tezu	132 kV Bus Bar		
22	Ziro	132kV Bus Bar		Yes

Annexure -A.9 (II)

Bus Coupler Protection Details

Sl.No.	Name of Substation	Voltage level	Non directional O/C Protection exists (Yes/No)	Non directional E/F Protection exists (Yes/No)
1. Owner of Bus Coupler: MSPCL, Manipur				
1	Churachandpur	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
2	Jiribam	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
3	Kakching	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
4	Karong	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
5	Ningthoukong	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
6	Rengpang	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
7	Yaingangpokpi	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
8	Yurembam.	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
9	Kongba	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
2. Owner of Bus Coupler: MePTCL, Meghalaya				
1	Mawlai	132 kV Bus Coupler	No	No
2	NEHU	132 kV Bus Coupler	Yes	Yes
3	NEIGRIHMS	132 kV Bus Coupler	No	No
4	Khliehriat	132 kV Bus Coupler	No	No
5	Lumshnong	132 kV Bus Coupler	No	No
6	Umiam	132 kV Bus Coupler	No	No
7	Mawphlang	132 kV Bus Coupler	Yes	Yes
8	Cherra	132 kV Bus Coupler	No	No
9	Nongstoin	132 kV Bus Coupler	No	No
10	Nangal	132 kV Bus Coupler	No	No
11	Rongkhon	132 kV Bus Coupler	No	No
12	EPIP-I	132 kV Bus Coupler	No	No
13	EPIP-II	132 kV Bus Coupler	No	No
14	Stage-I PH	132 kV Bus Coupler	Yes	Yes
15	Stage-II PH	132 kV Bus Coupler	Yes	Yes
16	Stage-III PH	132 kV Bus Coupler	Yes	Yes
17	Stage-IV PH	132 kV Bus Coupler	Yes	Yes
18	Umtru PH	132 kV Bus Coupler	No	No

Bus Coupler Protection Details

Sl.No.	Name of Substation	Voltage level	Non directional O/C Protection exists (Yes/No)	Non directional E/F Protection exists (Yes/No)
19	Leshka PH	132 kV Bus Coupler	Yes	Yes
20	Killing	132 kV Bus Coupler	Yes	Yes
		220 kV Bus Coupler	Yes	Yes
3. Owner of Bus Coupler: P&E, Mizoram				
1	Kolasib	132 kV Bus Coupler	Yes	Yes
		66 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
2	Luangmual	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
3	Lunglei	132 kV Bus Coupler	Yes	Yes
		33 kV Bus Coupler	No	No
4	Serchip	132 kV Bus Coupler	Yes	Yes
		33 kV Bus Coupler	No	No
5	Saitul	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
6	Zemabawk	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
7	Bairabi	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
8	Khawzawl	132 kV Bus Coupler	No	No
		33 kV Bus Coupler	No	No
4. Owner of Bus Coupler: NEEPCO				
1	Ranganadi	400 kV Bus Coupler	Buscoupler Backup Protection (50/51A,B,C)	Buscoupler Backup Protection (50/51N)
		132 kV Bus Coupler	Directional O/C Protection	Directional E/F Protection
2	AGBPP	220 kV Bus Bar	Yes	Yes
3	AGTPP	132 kV Bus Bar	Yes	Yes
5. Owner of Bus Coupler: NHPC				
1	Loktak	132 kV Bus Coupler	Yes	Yes