North Eastern Regional Power Committee

Agenda
For
28th PCC Sub-Committee Meeting

Time of meeting : 14:00 Hrs.

Date of meeting : 5th & 6th December, 2014

Venue : "Hotel Acacia", Dimapur.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 27th MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

The minutes of 27th meeting of Protection Sub-committee held on 12th November, 2014 at Guwahati were circulated vide letter No. NERPC/SE (O)/PCC/2014/2918-2953 dated 19h November, 2014.

No observations or comments were received from the constituents. The Sub-committee may discuss & confirm minutes of 27th PCCM of NERPC.

ITEMS FOR DISCUSSION

A.1 Implementation of 3-phase Auto Reclosure Scheme in all lines connected to 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 connected to Kopili and Khandong HEP of NEEPCO. The lists of such lines are:

a) 132kV Khliehriat – Khandong # 1
b) 132kV Khliehriat – Khandong # 2
c) 132kV Haflong – Khandong
d) 132kV Kopili – Khandong # 1
e) 132kV Kopili – Khandong # 2

During 27th PCC meeting, NEEPCO representative stated that 3-phase auto-reclosure scheme is expected to be implemented by December 2014 in the following line: -

a) 132kV Khliehriat –Khandong #1
b) 132kV Khandong – Haflong
c) 132kV Kopili – Khandong # 1

DGM, NERTS informed that 3phase auto-reclosure scheme is already implemented in132kV Kopili – Khandong # 2 and 132kV Khliehriat–Khandong#2.

NEEPCO may intimate the latest status and committee may like to discuss.

A.2 Implementation of 3-Phase Auto Reclosure Scheme of Radially fed 132kV Lines connected to Ranganadi HEP:

At present, the power flows to Nirjuli, Gohpur and Ziro radially 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 27th PCC meeting, NEEPCO representative stated that drawings for implementing Auto-reclosure schemes in the above lines been finalized. Joint meeting with ED (O&M) and Design cell is expected by 18th November, 2014 for clearance and the same may be expected to be implemented by November, 2014.

POWERGRID informed that 3P Dead Line Charging of 132kV Nirjuli – Gohpur Line at Nirjuli has already been implemented.

NEEPCO may intimate the latest status and committee may like to discuss.

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

As per para no 27 of CERC order in Petition No. 220/MP/2012 on 21.02.14,the deficiencies, if any, in Category-A (the deficiencies which can be corrected without any procurement) shall be rectified by the concerned STU and CTU within 2 months of issue of the order and compliance report in this regard shall be submitted to NERPC. **All deficiencies of Category-B (deficiencies involving procurement of equipment) shall be rectified within 6 months of issue of the order**. In this regard, reasons of non-availability of fund or delay in procurement process shall not be accepted. The procurement and implementation is to be completed by each STU using their own fund which can be reimbursed through a common request of funding through PSDF forwarded through NERPC as per procedure recently approved by Government of India.

During 26th PCC meeting, DGM, POWERGRID informed that issue of implementation of Bus Bar protection system at Dimapur S/S as recommended under category-B has already been taken up. Target Completion : January, 2015

Constituents of NER are requested to intimate the status of rectification of protection deficiencies under Category A & Category B.

During 27th PCC meeting, SE(O) requested the Constituents of NER to intimate the status of rectification of protection deficiencies under Category A & Category B. He requested the constituents to furnish the data below:

i. the rectification of protection deficiencies under Category A already done

ii. the rectification of protection deficiencies under Category A required to be done

iii. the rectification of protection deficiencies under Category B already done by procuring equipment with own investment

iv. the rectification of protection deficiencies under Category B required to be done with huge investment in procuring equipment

It was agreed that the above actions initiated by NER constituents may be highlighted in the coming CERC hearing on 27.11.2014

A.4 Implementation of Auto Reclosure Scheme in 132kV Jiribam (PG) - Loktak and 132kV Imphal (PG) – Loktak Line:

The external Auto Reclose Relay Type VARM and MGA are already obsolete and without service support from OEM. At Loktak HEP, the AR Relay Type VARM and MGA of 132kV Jiribam (PG) and 132kV Imphal (PG) are not tested since 2008 and so healthiness could not be ensured. Further, during March'14 NHPC has installed Numerical DPR Type P442 of M/S Alstom Make in the said feeders. Further, the Old / Obsolete CBs are already replaced with SF6 CB. Hence, Auto Reclosure Scheme may be implemented in 132kV Jiribam (PG) - Loktak and 132kV Imphal (PG) – Loktak Line immediately by activating internal Auto Reclosure of Numerical DPR to avoid use of obsolete Auto Reclose Relay Type VARM and MGA.

During 27th PCC meeting, NHPC representative stated that procurement of control cable is under process and SPAR will be implemented within January, 2015. Day time shutdown will be sought accordingly for implementation of the same.

NHPC may kindly intimate the status.

A.5 Removal of Obsolete DPR Type THR-3 and SSRR3V from 132kV Jiribam (PG) and 132kV Imphal (PG) Feeder:

As per the existing practice, the protection scheme for 132kV Lines is Single Main and Backup Protection. During March'14 NHPC has already installed Numerical DPR Type P442 of M/S Alstom Make in 132kV Jiribam (PG) and 132kV Imphal (PG) feeders. However, the obsolete DPRs viz. THR-3 and SSRR3V of 132kV Jiribam (PG) and 132kV Imphal (PG) feeders have not been disconnected from the scheme which is unsafe so far as reliable protection is concerned considering the

probability of mal-operation of the obsolete relays. There are instances of undesirable tripping of 132kV Jiribam (PG) – Loktak Line on account of mal-operation of old DPR at Loktak HEP. NHPC should disconnect the Old and Obsolete DPRs immediately.

NHPC representative informed that the relays have been replaced for the above feeders and old relays will be removed soon. Old and obsolete relays of bays and transformers will also be removed soon.

NHPC may kindly intimate the status.

A.6 Rectification of CT Switching relays of 220kV Bus Bar Protection Scheme at 400/220kV Balipara Sub Station by AEGCL:

The 220kV Bus Bar Protection Scheme at 400/220kV Balipara Sub Station operated on 28.09.2014 during operation of Bus Transfer Scheme. On investigation it was found that the CT Switching Relay contact of 50MVA ICT Bay was not operating for Zone – B. Matter was referred to AEGCL for necessary rectification.

During 27th PCC meeting, AEGCL representative stated that installation of relay is expected to be completed by November 2014.

AEGCL may kindly intimate the current status.

A.7 Standardization of Disturbance Recorder Channels:

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.

A list of typical signals (Analog / Binary) that are required to facilitate post-event analysis, may be finalized after discussion among constituents of NER. It is also felt necessary to finalise the nomenclature being used for Analog / Binary channels in order to enable easy comprehension.

Extracts from CBIP's Manual on Protection of Generators, GT, Transformers and Networks, is attached as **Annexure A-11** for reference.

Members may deliberate

A.8 Third Party 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.

Last Protection audit of NER was carried out w.e.f Nov12 to Mar13. It is now required to carry out third party protection audit along with independent audit of Fault Recording Instruments.

Members may deliberate

A.9 System Protection System (SPS):

Due to commissioning of 400 kV Silchar-Azara S/C, System Protection Schemes (SPS) associated with tripping of Palatana needs to be modified.

SPS 3 (Tripping of 400 kV Silchar- Byrnihat line (with generation from OTPC's plant at Palatana)) and **SPS 4 (Tripping of 400 KV Silchar –Byrnihat line (without generation from OTPC's plant at Palatana))** need to be modified to include 400 kV Silchar-Azara tripping case.

Members may deliberate

A.10 Issues related to protection and relay setting co-ordination:

As per section 5.2.l of IEGC, provision of protections and relay settings shall be co-ordinated periodically throughout the Regional Grid, as per plan to be separately finalized by the Protection sub-committee of the RPC.

It has been observed that number of multiple elements tripping increases. It is required to review Protection and relay setting co-ordination to minimize multiple elements tripping.

During 27th PCC meeting, Members agreed to send the details of bus fault level and back-up relay settings for 132 kV and 220 kV lines. The data will further be reviewed by PCC forum for finalizing the protection schemes.

Committee may like to discuss.

A.11 Grid Incidences during November, 2014:

The following numbers of Grid Disturbances (GD) occurred during the period **w.e.f 27th October, 2014 to 23rd November, 2014** :-

Sl No	Control Area	Grid Disturbance in nos	
		Nov'14 (till 23rd)	Jan'14 to Nov'14(till 23rd)
1	Palatana	0	8
2	AGBPP	0	6
3	AGTPP	1	10
4	Ranganadi	0	1
5	Kopili	0	2
6	Khandong	0	5
7	Doyang	0	2
8	Loktak	0	6
9	Arunachal Pradesh	5	15
10	Assam	2	40
11	Manipur	4	49
12	Meghalaya	0	16
13	Mizoram	0	14
14	Nagaland	4	22
15	Tripura	1	15

Sl No	Category of GD	Grid Disturbance in nos	
		Nov'14 (till 23rd)	Jan'14 to Nov'14(till 23rd)
1	GD 1	13	119
2	GD 2	0	14
3	GD 3	0	2
4	GD 4	0	3
5	GD 5	0	2
	Total	**13**	**140**

This is for information to the members. Remedial actions are to taken by the concerned power utilities of NER

A.12 <u>Root cause analysis of tripping of multiple elements</u>:

i. At **1148 Hrs on 28.10.14**, AGBPP Unit 5 tripped on reverse power protection. It was reported that 220 kV AGBPP- Mariani (PG) S/C tripped **(AGBPP-LBB operation & Mariani(PG)- Not furnished)** and 220 kV AGBPP- Tinsukia I also tripped **(AGBPP-LBB operation & Tinsukia- Not furnished)**. AGBPP Unit 1, 3, 7 & 8 also tripped. At 1153 Hrs AGBPP Unit 2, 4 & 6 tripped.

Category as per CEA Standards: GI-II

<u>Analysis of events:</u>

AGBPP Unit 5 tripped just after synchronization due to reverse power protection operation. Subsequently several elements connected to 220 kV AGBPP bus tripped due to operation of LBB relay. 220 kV Bus Coupler tripped separating Bus-I & Bus-II. 220 kV AGBPP - Mariani(PG), 220 kV

AGBPP - Tinsukia I, AGBPP U-1,3,7 & 8 tripped due to tripping of Bus I. At 1153 Hrs Power supply to Gas Compressor water supply system failed and all running GC tripped due to high engine jacket water temperature. AGBPP U-2, 4 & 6 tripped immediately due to low fuel gas pressure. LBB relay operation must have occurred due to non-operation of breaker in one / more elements connected to 220 kV AGBPP bus. It is to be investigated further.

NEEPCO, AEGCL and POWERGRID may elaborate.

ii. At **2035 Hrs on 06.11.14**, 132 kV Dimapur (PG) – Kohima tripped **(Dimapur (PG) – Dir. Over-current & Kohima- Not furnished)** and 132 kV Imphal (PG) - Imphal (MSPCL) I & II line also tripped **(Imphal (PG)- Earth Fault & Imphal(MSPCL)- Not furnished)**.

Due to tripping of these elements, there was Load loss of 81 MW in Manipur & 16 MW in Nagaland.

Category as per CEA Standards: GD-I

Analysis of events:

132 kV Dimapur (PG) – Kohima (Nagaland) S/C supplies radial load to Kohima area of Nagaland, while 132 kV Imphal (PG) – Imphal (MSPCL) I & II lines supply radial loads in Capital area of Manipur. Relay flag details at Imphal (MSPCL) was not furnished. Since the two lines are feeding different radial sections of load, it appears that two separate faults/incident existed in those radial sections. It is to be investigated further.

POWERGRID, Nagaland and MSPCL may elaborate.

iii. At 1102 Hrs on 16.11.14, 132 kV Imphal (PG) - Imphal (MSPCL) I line tripped **(Imphal (PG)-Not furnished & Imphal (MSPCL)- Earth Fault)** and 132 kV Imphal (PG) - Imphal (MSPCL) II line also tripped **(Imphal (PG)-Not furnished & Imphal (MSPCL)- Earth Fault)**.

Due to tripping of these elements, there was Load loss of 53 MW in Manipur.

Category as per CEA Standards: GD-I

Analysis of events:

132 kV Imphal (PG) – Imphal (MSPCL) I and II lines supply radial loads in Capital area of Manipur system. Relay flag details at Imphal (PG) was not furnished. It is suspected that fault was in 132 kV Imphal (PG) – Imphal (MSPCL) section, or downstream feeders in MSPCL system. Directional feature of relays at Imphal (MSPCL) end may be checked. The incident

needs further investigation after furnishing of relay details by POWERGRID.

POWERGRID and MSPCL may elaborate.

iv. At 1608 Hrs on 22.11.14, 132 kV Agartala- AGTPP I & II lines tripped(**Agartala-Earth Fault & AGTPP- Dir. Earth Fault)**, 132 kV Agartala- Rokhia I tripped (**Agartala-No Tripping & Rokhia- Earth Fault)**, 132 kV Agartala- Rokhia II tripped (**Agartala-Earth Fault & Rokhia- Earth Fault)** and 132 kV Agartala- Dhalabil tripped **(Agartala- Earth Fault & Dhalabil- No Tripping)**. 132 kV AGTPP- Kumarghat was already under shutdown from 1051 Hrs on 22.11.14. AGTPP Unit 1, 2 & 3 tripped due to loss of evacuation path.

Due to tripping of these elements, there was loss of 57 MW generation of AGTPP and load loss of 20 MW in Tripura.

Category as per CEA Standards: GD-I

Analysis of events:

Tripping of 132 kV AGTPP – Agartala I and II on Dir.E/F from both ends of the line indicates fault in these lines. Also, 132 kV Rokhia – Agartala II tripped on both ends of the line on Dir. E/F. It is suspected that there was some fault in 132 kV AGTPP – Agartala D/C section. It is to be investigated where fault persisted in the system and whether Directional E/F feature in elements of TSECL system operated properly.

NEEPCO and TSECL may elaborate.

Any other item:

Date and Venue of next PCC

It is proposed to hold the 29th PCC meeting of NERPC on second week of January, 2015. The exact venue will be intimated in due course.

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