North Eastern Regional Power Committee

MINUTES OF SYSTEM STUDIES (SS) MEETING

Date : 16/06/2015 (Tuesday)

Time : 14:00 hrs

Venue : "Hotel Nandan", Guwahati.

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

Shri P.K. Mishra, Member Secretary, NERPC requested Shri B. Lyngkhoi, Director/SE(O) to continue & take up the System Studies Agenda.

1. Review of SPS II & SPS IV related to Palatana GBPP, OTPC after commissioning of Palatana Module II

SE(O) informed that out of the four (4) System Protection Scheme (SPS) associated with generating Unit-1 (363.3MW) of OTPC at Palatana, two (2) SPS have already been implemented:

SPS II (implemented w.e.f 23.02.15):

In case of tripping of 400 kV Palatana- Silchar D/C lines (with Module I generation of Palatana, OTPC), load will be disconnected by tripping of the following elements:

132 kV Silchar - Srikona D/C
132 kV Silchar - Panchgram
132 kV Badarpur - Panchgram
132 kV Silchar - Dullavcherra - Dharmanagar

And Generation of Palatana, OTPC will be reduced to around 20 MW excluding their auxiliary consumption.

During 5th SS meeting, OTPC representative informed that they are planning different scheme in place of SPS-II above, since reduction of generation to 20 MW is not possible.

NERLDC stated that 400/132 kV, 125 MVA ICT at Palatana should be tripped under SPS II for safe, secure & reliable operation of the grid.

After detailed deliberation, the Sub-committee requested OTPC to give the detail presentation about the scheme proposed by them in the next meeting for further discussion. OTPC agreed.

SPS IV (implemented w.e.f 14.09.13):

In case of tripping of 400 kV Silchar – Byrnihat & 400 kV Silchar- Azra lines (without generation of Palatana, OTPC), load will disconnected by tripping of the following elements:

132 kV Silchar - Srikona D/C
132 kV Silchar - Panchgram
132 kV Badarpur - Panchgram
132 kV Silchar – Dullavcherra - Dharmanagar

OTPC & POWERGRID informed that above scheme has already been implemented by them.

During 5th SS meeting, OPTC informed that there are 132/6.6 kV, 2x25 MVA Station Transformers, 2x750 kVA DG, 15.5/6.6 kV, 2x16 MVA UAT at Palatana, OTPC. They have also informed that around 13 MW power are required for each module of Palatana.

NERLDC stated that at present, auxiliary power required for Paltana machines are received from Station Transformers and in turn the Station Transformers get power from 132 kV Bus of Palatana. For reliable power supply of Palatana machines, another 400/132 kV ICT at Palatana is required. It will also satisfy N-1 Criteria of Transmission Planning, Jan13 of CEA.

NERLDC also stated that UAT capacity is to be enhanced for supply of auxiliary power to Paltana machines. OTPC was requested to bring detailed scheme of auxiliary power supply to Palatana machines in the next System Study sub Committee meeting.

Deliberation of the sub-Committee

Since no representative from OTPC was present, the status could not be updated.

The Sub-committee requested NERPC to take up the matter with OTPC to give the detail presentation about the scheme proposed by them in the next meeting for further discussion.

2. SPS based load disconnection in case of tripping of 400/220 kV, 315 MVA ICT at Bongaigaon

In case of tripping of 400 kV Bongaigaon – Azara & 400 kV Bongaigaon –Byrnihat lines, 400/220 kV, 315 MVA ICT at Bongaigaon may be overloaded and tripped at peak hours. In case of tripping of this ICT, Capital area, Dhaligaon area of Assam & Nangalbibra area of Meghalaya & North Bengal & Bhutan system may be collapsed.

To safe, secure & reliable operation of these areas of NER, SPS is to be designed for load disconnection in these areas.

Assam stated that Dhaligaon load needs to be kept in radial mode and Bhutan load through 132 kV Rangia – Deothang S/C must not be affected.

During the 5th SS meeting, Assam agreed to above scheme as suggested and the same would be implemented by first week of June, 2015.

Deliberation of the sub-Committee

Assam informed that above scheme as suggested is agreeable to them and the work would be implemented by 21.06.2015. Necessary shutdown for carrying out the above work has been proposed already. The status will be intimated in the next meeting.

3. SPS based generation reduction of AGTPP in case of tripping of 132 kV AGTPP – Kumarghat line

It has been observed from study results that after commissioning of Palatana 2nd Module, Monarchak Unit I & II and AGTPP Unit 5 & 6, 132 kV AGTPP – Kumarghat, 132 kV Monarchak – Udaipur, 132 kV Baramura – Teliamura & 132 kV Teliamura-Ambassa lines will be highly loaded.

In case of tripping of 132 kV AGTPP - Kumarghat line, following lines will be overloaded:-

1. 132 kV Monarchak - Udaipur : 72 MW
2. 132 kV Dhalabil - Agartala : 84 MW
3. 132 kV Dhalabil - Kamalpur : 79 MW
4. 132 kV Baramura - Teliamura : 88 MW
5. 132 kV Teliamura - Ambassa : 86 MW
6. 132 kV PK Bari - Kumarghat : 92 MW

7. 132 kV PK Bari - Ambassa : 81 MW
8. 132 kV PK Bari - Kamalpur : 76 MW

During 5th SS meeting, DGM (SO-II), NERLDC requested to implement the above SPS with 32 MW generation reduction of AGTPP before commissioning of STG 5 or STG 6.

NEEPCO once again informed that above scheme would be implemented soon and the status will be intimated in the next meeting.

Deliberation of the sub-Committee

NEEPCO once again informed that above scheme would be implemented by 25.06.2015 i.e. before synchronization of STG –I and the status will be intimated in the next meeting.

The Sub-committee noted as above.

4. SPS at Silchar.

During meeting held on 06.04.2015, DGM (SO-II), NERLDC informed that Silchar is very important station in Southern Assam part of NER Grid and after termination of 132 kV Silchar – Imphal (PG) D/C lines, loading of 2x200 MVA, 400/132 kV Silchar ICTs has increased and persistent violation of N-1 condition was observed during peak hours. In case of overloading & tripping of any ICTs at Silchar during peak hours, there may be cascade tripping of transmission elements of this part of NER and grid disturbance may occur in this part of NER. As more 132 kV lines from 132 kV Silchar (PG) substation are expected to connect load centers in Tripura, Mizoram, the loading of Silchar ICTs are expected to increase further.

He suggested to have one more SPS at Silchar and that the current SPS based load shedding associated with SPS related to Palatana unit tripping may be extended to Silchar substation such that load is disconnected automatically in case of tripping of any ICT at Silchar.

The Sub-committee requested NERLDC to carry out the system study and so that the proposed SPS at Silchar can be discussed further.

DGM (AM), NERTS informed that above scheme would be implemented within May, 2015.

During 5th SS Meeting, Manager (AM), NERTS informed that he will confirm about the current status and the same will be intimated to NERPC/NERLDC.

Deliberation of the sub-Committee

DGM (AM), NERTS informed that Alsthom engineers is expecting to arrive at site shortly and the work is likely to be completed soon. The current status and the same will be intimated to NERPC/NERLDC.

The Sub-committee noted as above.

5. Installation of Reactor at Rangandai HEP.

During 4th SS meeting, DGM (SO-II), NERLDC informed that on several occasions NER grid experiencing very high voltage condition during off-peak hours resulting in opening of numbers of 400 kV circuits to contain over voltage especially at RHEP. 400 kV Balipara- RHEP D/C link is operated through single circuit only in most of the time sacrificing reliability of the system. Similar is the condition in other corridors including IR link. To address the problem, conversion of line reactors as Bus reactors for 400 kV Bongaigaon-Balipara D/C line and installation of additional bus reactors at Balipara have been proposed.

In addition to this, one bus reactor of at least 50 MVAR capacity is required to be installed at RHEP so that over voltage problem can be solved

During 5th SS Meeting, SE(O) informed that communication from NEEPCO on the above issue has been received and after examining thoroughly by them, they have suggested the possibilities which is reproduced as below:

1. **Option-1**:- Possibility for installation of bus reactor at 400 kV/ 132kV switchyard has been examined. As per the preliminary study under present site condition, there is a possibility to accommodate one reactor at 400kV switchyard by way of extension of bus towards hill side. However, it will require cutting/ leveling of hillock, providing protection wall, diversion of road, drains, fencing etc.
2. **Option-2**:- RHEP units cannot be run in synchronous condenser mode because provision for the same is not available in the present scheme and lots of modifications including piping works shall be necessitated.

3. **Option-3**:-Loading of bus reactor in Tertiary of ICTs is also not feasible; because those are very old ICTs and had failed also earlier and put in service after repairing.
4. NEEPCO is assisting the grid operator to counter the over voltage problem at RHEP by way of putting the 400 kV line reactor at bus whenever required. However, I would like to inform you that this operation is done through isolators as switching breakers are not available. The then Member Secretary, GM, NERLDC, POWERGRID representatives visited the site in 2007 and was dropped and necessary modification was done at Balipara. The operation through isolators in present scenario involves risks for the operators and detrimental to the equipment like isolators as well. Probably, the present arrangement is not lat all advisable.

Sr. Manager, NEEPCO stated that if the forum agrees for option-1 detail study shall be done and cost estimate & work schedule shall be prepared.

After detailed deliberation, Member Secretary suggested NEEPCO to work out the tentative estimate for above cost and intimate in next PCC meeting so that the matter can be taken up for funding from PSDF since the matter is for the benefit of the region. All embers agreed to the proposal.

Deliberation of the sub-Committee

DGM (AM), NERTS stated that the installation of new reactor will take more than two years meanwhile many ongoing projects will get commissioned and so, the requirement of reactor may be reviewed. DGM (SO-2), NERLDC informed that the reactor will be required in long term also. Accordingly, DGM (AM), NERTS stated that in such case the matter may taken up to next standing committee meeting for necessary approval. However, in such case, NEEPCO has to inform the availability of space for installation of reactor.

Further, it was also discussed that for immediate measure to contain overvoltage NEEPCO should carry switching operation of existing Reactors.

The Sub-committee noted as above.

6. Implementation of islanding scheme in NER

During the 94thOCC meeting, the committee had decided the following islanding scheme and associated frequencies levels for creation of islands in NER:

SN	Islanding Scheme	Lines required to be opened	UFR Location	Implementing Agency
1	**<u>ISLAND AT 48.80 Hz with 500 ms delay:</u>** Island comprising of generating units of AGBPP (Gas), NTPS (Gas) & LTPS (Gas) and loads of Upper Assam system & Deomali area (Ar. Pradesh) **[Total Generation: 380-400MW and load: 200MW (off peak)-300MW (peak)]**	(a) 220 kV New Mariani (PG) – AGBPP	UFR-1 [At New Mariani (PG)]	**PGCIL**
		(b) 220 kV Mariani – Misa	UFR-2 [At Mariani, Samaguri of AEGCL]	**AEGCL**
		(c) 220 kV Mariani – Samaguri		
		(d) 132 kV Mokukchung – Mariani		
		(e) 132 kV Dimapur (PG) – Bokajan	UFR-3 [At Dimapur (PG)]	**PGCIL**
		(f) Generators to be desynchronized for reduction of generation [if Generation > Load in the islanded pocket]		
		(g) De-synchronization / isolation of one GT and one ST from each of two modules of AGBPP, which are in operation, leading to reduction of generation of about 80-90 MW [i.e each module will contribute to reduction of about 40-45 MW (GT:30MW+ST:15MW)].	At AGBPP [UFRs of line bays & Generator to be used]	**NEEPCO**
		(h) Lines required to be opened for load shedding of 30MW (off-peak) and 50MW (peak) [if load > generation in the islanded pocket]		
		(i) 132kV Tinsukia – Ledo S/C line (at 48.7Hz instantaneous).	UFR [At Tinsukia]	**AEGCL**
		(j) 66kV Tinsukia – Rupai S/C line (at 48.6Hz instantaneous)		**AEGCL**
		(k) 132kV Jorhat – Bokakhat line (at 48.5Hz instantaneous)	UFR [At Jorahat / Bokakhat]	**AEGCL**
2	**<u>ISLAND AT 48.80 Hz with 500 ms delay :</u>** Island comprising of generating units of AGTPP (Gas),	132 kV Palatana – Udaipur	UFR-1 [At Palatana]	**OTPC**
		132 kV Palatana – Surjamani Nagar		

	generating units at Baramura (Gas), Rokhia (Gas) & Gumati (Hydro) and loads of Tripura system & Dullavcherra area (Assam) **[Total Generation: 150-160MW and load: 110MW (off-peak) &170-180MW (peak)]**	132 kV Silchar – Dullavcherra	UFR-2 [At Silchar]	**PGCIL**
		132 kV AGTPP – Kumarghat	UFR-3 [At Kumarghat]	**PGCIL**
		132 kV P K Bari – Kumarghat		
3	**ISLAND AT 47.90 Hz:** Isolation of NER from NEW grid at ER-NER boundary with rest of the generation and load of NER	To be decided after system study		

During meeting held on 06.04.2015, the Sub-committee put in record that because of the successful operation of Islanding – I, restoration of the grid in NER was carried out at the earliest during the major grid incidence occurred on 23.02.2015. However, Islanding scheme –II was not operated.

NERLDC enquired whether associated lines pertaining to Islanding –II tripped and any UFRs operated during the above incidence.

DGM (AM), NERTS informed that on that particular day i.e. 23.02.2015, the 132 kV Silchar-Dullavcherra line was in open condition and the other lines i.e. 132 kV R.C. Nagar – Dullavcherra and 132 kV P.K. Bari line tripped on UFRs. Moreover, he requested NERLDC to check the event through PMU if frequency touches 48.50 Hz and also the duration. He suggested to reset the frequency setting from 48.5 Hz to 48.8 Hz. and the committee agreed to the same.

During the 4th SS meeting, the Sub-committee decided to set both the Islanding Scheme I & II at 48.80 Hz. Necessary action has to be carried out by concerned utilities at the earliest.

During 5th SS meeting, Manager (AM), NERTS informed that resetting of frequency from 48.5 Hz to 48.8 Hz with 500 ms delay in Islanding Scheme – II have been completed by them.

OTPC informed that that resetting of frequency from 48.5 Hz to 48.8 Hz with 500 ms delay in Islanding Scheme – II will be completed by May, 2015. The status will be intimated in next meeting.

Deliberation of the sub-Committee

Since no representative from OTPC was present, the status could not be updated.

The Sub-committee requested NERPC to take up the matter with OTPC so that the above scheme can be completed at the earliest.

7. Assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) by SLDC on respective Inter-State Transmission Corridor

SLDCs of NER are requested to assess the above on monthly basis, 5 months in advance (eg: TTC/TRM/ATC for the month of November to be calculated by 15th of July), for further assessment of TTC, ATC and TRM of NER–ER corridor, group of control areas, individual control areas with the region and state-control-area to state-control-area by NERLDC, if required.

SLDCs are also requested to send study results for Peak (Export & Import) & Off Peak (Export & Import) along with assumptions in details and 6 nos sav case files (Base Case for Peak & Off Peak, Off Peak & Peak Export & Off Peak & Peak Import) to NERLDC by 15th of the month for the fifth month. All India sav case files have been sent to SLDCs. SLDCs are requested to use this sav case files while computing TTC, ATC & TRM for their state control area.

The latest .sav case files of Off Peak & Peak Cases have been mailed to SLDCs of NER on **8th June, 2015**.

The study results for assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) have not been received from any SLDC of NER.

NERLDC have assessed TTC of each control area of NER for Nov15 and has been emailed to SLDCs of NER. States may check the TTC of their control areas as computed by NERLDC and issue comments, if any as TTC, ATC & TRM figures of States control area and group of control areas may be uploaded in NLDC website, if required.

Deliberation of the sub-Committee

NERLDC have requested to depute at least one officer from each SLDC of NER for conducting system study of their control areas. He also requested to send study results for fifth month by 15th of the month.

NERLDC stated that TTC/ATC data are being assessed by them on behalf of states and requested them to check the data and give their comments at the earliest. Import TTC of states under peak & off peak scenarios for Nov15 assessed by NERLDC are as follows:

Sl. No	State	OFF-PEAK CASE		PEAK CASE	
		Contingency	Total Transfer Capability	Contingency	Total Transfer Capability
1	Arunachal Pradesh	N-1 of 132/33 kV, 2x16 MVA Transformers at Deomali	165	N-1 of 132/33 kV, 2x16 MVA Transformers at Deomali	165
2	Assam	N-1 of 220/132 kV, 3x100 MVA transformers at Sarusajai	1175	N-1 of 220/132 kV, 3x100 MVA transformers at Sarusajai	1295
3	Manipur	N-1 of 132 kV Imphal (PG) - Imphal D/C	260	N-1 of 132 kV Imphal (PG) - Imphal D/C	260
4	Meghalaya	N-1 of 132 kV Killing-Epip II D/C	250	N-1 of 132 kV Killing-Epip II D/C	250
5	Mizoram	N-1 of 132/33kV, 12.5 MVA transformer at Luangmual/Zimabawk/Serchip/Lunglei	98	N-1 of 132/33kV, 12.5 MVA transformer at Luangmual/Zimabawk/Serchip/Lunglei	98
6	Nagaland	N-1 of 132/66 kV, 25 MVA tranformer at Mokochung	97	N-1 of 132/66 kV, 25 MVA tranformer at Mokochung	97
7	Tripura	N-1 of 132 kV Palatana - Udaipur S/C	130	N-1 of 132 kV Palatana - Udaipur S/C	126

If no comments are received by 15th July, 2015, the above figures will be treated as final figure & it will be used for transaction for the market.

The Sub-committee suggested to take up the matter in coming 110th OCC meeting to be held on the next day and requested to intimate the name of the persons who will do system study for their control areas by next meeting.

8. Training Program on uses of PSS/E

NERLDC demonstrated the usage of PSS/E software in the meeting for benefit of all constituents as part of Capacity Building for system studies after this meeting and also same was also done after 4th & 5th System Studies Meeting.

It was stressed upon by NERLDC that using PSS/E software for conducting system studies would be beneficial for all constituents of NER Grid. The need for accurate load-generation forecast as well as intimation regarding changes in power system network to NERLDC was stressed upon.

NERLDC displayed the basic files (SAV and SLD) required for running a load flow solution in PSSE. In network data, NERLDC used to model upto 132 kV LV network of the region. For purposes like computation of State control area wise TTC, NERLDC is modelling upto 33 kV/11 kV LV level also. NERLDC is emailing to all the constituents those files every month and requested them to check for the network data (like Transformer rating, Transmission lines, Reactors, Capacitors etc.) and send updated files & information regarding new elements to NERLDC. All Constituents agreed.

NERLDC demonstrated the basic load-flow procedure in PSSE, opening the files, making network changes, making load-generation changes, performing simulations and saving appropriately. NERLDC also demonstrated the procedure for computation of Total Transfer Capability (TTC) of NER Grid as well as of state-control areas.

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Annexure-I

List of Participants in the 6th System Studies Meeting 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