

MINUTES OF SYSTEM STUDIES (SS) MEETING

Date : 19/05/2015 (Tuesday)

Time : 14:00 hrs

Venue : "Hotel Pragati Manor", 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 I, SPS II, SPS III & SPS IV related to Palatana GBPP, OTPC after commissioning of Palatana Module II

The following four (4) System Protection Scheme (SPS) associated with generating Unit-1 (363.3MW) of OTPC at Palatana has been implemented:

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

In case of tripping of Module I 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

During 4th System Studies Meeting, OTPC informed that SPS I-was implemented by them on 19.04.15 in case of tripping of Module I & Module II. NERLDC informed that SPS I will be reviewed once the plant is generating to full capacity. At present, OTPC is generating around 500 MW.

For kind information only.

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 4th SS meeting, DGM (SO-I), NERLDC informed that after tripping of 400 kV Silchar – Palatana I & II lines on 23.02.2015, SPS – II did not operate as planned for load relief.

Further, NERLDC has requested to trip 400/132 kV, 125 MVA ICT at Palatana immediately after tripping of 400 kV Palatana – Silchar I & II lines for safe , secure and reliable operation of Tripura system.

After detailed deliberation, the Sub-committee requested OTPC to implement the SPS-II as per system requirement. The Sub-committee also requested OTPC to enhance capacity of station transformer for adequate supply of auxiliary power to the modules at the earliest. Further, the SPS-II would be reviewed again, once the plant is generating full capacity.

OTPC agreed to implement the SPS-II, but stated that installation of adequate ICT may take some time.

Deliberation of the sub-Committee

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 this 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 III (implemented w.e.f 23.02.15):

In case of tripping of 400 kV Silchar - Byrnihat & 400 kV Silchar - Azara lines (with Module I generation of Palatana, OTPC), Generation of Palatana, OTPC will be reduced to around 200 MW.

During 4th SS meeting, NERLDC has informed that SPS III was not operated after tripping of 400 kV Silchar – Byrnihat line & 400 kV Silchar – Azara line on 21.04.15. The matter is very serious. It is suspected that SPS III is not yet implemented by OTPC.

OTPC informed that the scheme has already been implemented.

For kind information only.

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

During 4th SS meeting, OTPC & POWERGRID informed that above scheme has already been implemented by them.

Deliberation of the sub-Committee

OTPC 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.

The Sub-committee noted as above.

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 – Deothead S/C must not be affected.

During the 4th SS meeting, Assam agreed to above scheme as suggested and the same would be implemented by 15.05.2015.

Deliberation of the sub-Committee

Assam informed that above scheme as suggested is agreeable to them and the work would be implemented by first week of June. 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 4th SS meeting, NEEPCO had agreed to implement the SPS within April, 2015.

Deliberation of the sub-Committee

DGM (SO-II), NERLDC requested to implement the above SPS with load relief of 32 MW 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.

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.

Deliberation of the sub-Committee

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

The Sub-committee noted as above.

5. SPS requirement of States

NER states may review the critical loading within their system and the vulnerability of important load centers[if any] and propose SPS scheme so that the same can be implemented in a coordinated manner under the aegis of NERPC to ensure power supply to important load centers during contingencies and also integrity of NER grid is maintained.

During meeting held on 06.04.2015, DGM (SO-I), NERLDC briefed about the importance of SPS in respect of each state to review the critical loading within their system and the vulnerability of important load centers[if any] and therefore requested constituents to look into the matter for the benefit of the system in NER.

EE, Me.ECL informed that one SPS has been implemented by them on 132 kV Umtru – ICPS I & II. He informed that the current status would be intimated to NERPC/NERLDC at the earliest.

During 4th SS meeting, EE, Me.ECL informed that one SPS has been implemented by them on 132 kV Killing to EPIP – II will be implemented by May, 2015.

Deliberation of the sub-Committee

EE, Me.ECL informed that one more SPS for 132 kV Leshka -Khliehriat has been planned and the status will be intimated to NERPC/NERLDC.

AGM, AEGCL also informed that implementations of some SPS are under progress and the status will be intimated to NERPC/NERLDC accordingly.

The Sub-committee requested Assam & Meghalaya to submit the list of SPS with detailed scheme and the quantum of load relief to NERPC/NERLDC.

6. Installation of Reactor at Rangandai HEP.

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 meeting on 06.04.2015, SE(O), NERPC informed that the issue regarding installation of reactor at Ranganadi has been discussed in last 107th OCC meeting and the Sub-committee has requested NERPC to write to NEEPCO to enquire about the feasibility to counter the high voltage problem at Ranganadi end.

1. Possibility of installation of Bus Reactor either at 400 kV or 132 kV RHEP Switchyards
2. Possibility of running of machine in synchronous condenser mode during lean hydro period
3. Possibility of installation of Tertiary reactors if Tertiary winding is available in ICTs at RHEP.

During 4th SS meeting, SE(O) informed that NERPC has already written to NEEPCO as per request by the Sub-committee on above points the reply is awaited.

It was decided that 50 MVAR Line Reactor of 400 kV Balipara – Ranganadi line is to be taken into Bus Reactor when the line was kept open as high voltage is observing at their end.

Deliberation of the sub-Committee

SE(O) informed that communication from NEEPCO on the above issue has been received and after examining thoroughly 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 at 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 members agreed to the proposal.

The Sub-committee noted as above.

7. 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	ISLAND AT 48.80 Hz with 500 ms delay: 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	UFR-3 [At Dimapur (PG)]	PGCIL
		(e) 132 kV Dimapur (PG) – Bokajan		
		(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 Jorhat / Bokakhat]	AEGCL
2	ISLAND AT 48.80 Hz with 500 ms delay : Island comprising of generating units of AGTPP (Gas), generating units at Baramura (Gas), Rokhia (Gas) & Gumati (Hydro) and loads of Tripura system & Dullavcherra area (Assam) [Total Generation: 150-160MW and load: 110MW (off-peak) & 170-180MW (peak)]	132 kV Palatana – Udaipur	UFR-1 [At Palatana]	OTPC
		132 kV Palatana – Surjamani Nagar		
		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.

Deliberation of the sub-Committee

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.

The Sub-committee noted as above.

Annexure-IList of Participants in the 5th System Studies Meeting on 19/05/2015

SN	Name & Designation	Organization	Contact No.
	No Representatives	Ar. Pradesh	
1.	Sh. B.C. Borah, AGM, SLDC	Assam	09435119248
2.	Sh. N. Patir, Dy. Mgr	Assam	09707380294
3.	Sh. G.K. Bhuyan, AGM	Assam	09854015601
4.	Sh. S.P. Singh, Manager, MSPCL	Manipur	09612152014
5.	Sh. Th. Sushanta Singh, Dy. Mgr, MSPCL	Manipur	09862448363
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. M. Madhavanand, Manager (AM)	PGCIL	09436335250
10.	Sh. A. Mallick, DGM (SO-II)	NERLDC	09436302720
11.	Sh. Rahul Chakrabarti, Sr. Engr. (SO-II)	NERLDC	09402507543
12.	Sh. Tanya Taji, Sr.Manager	NEEPCO	09436042053
13.	Sh. B. Goswami, Sr. Manager (E/M)	NEEPCO	09436163983
14.	Sh. J. Bhattacharya, AGM (EMD)	NTPC	09435720036
	No Representatives	ENICL	
15.	Sh. S. Medhi, Dy. Manager (AM)	NHPC	09435534564
16.	Sh. Tapash Karmakar, Asst.Mgr. (E)	OTPC	09435239314
17.	Sh. P.K. Mishra, Member Secretary	NERPC	09968380242
18.	Sh. B. Lyngkhoi, Director/S.E (O)	NERPC	09436163419
19.	Sh. S.M. Jha, E.E	NERPC	08731845175
20.	Sh. S. Mukherjee, AEE	NERPC	08794277306
21.	Sh. Shaishav Ranjan, A.E	NERPC	08794276168