Agenda of 7th System Studies Meeting in NER

Date: 14.07.2015. Venue: Hotel Pragati Manor, Guwahati

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

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 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.

OTPC may kindly intimate the current status.

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.

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.

As Palatana is now generating more than 500 MW, SPS I, SPS II & SPS III associated with Palatana, OTPC are to be redesigned:-

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

In case of tripping of Module I & II of Palatana, OTPC, load disconnection is to be enhanced.

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

In case of tripping of 400 kV Silchar – Byrnihat & 400 kV Silchar- Azra lines (without generation of Palatana, OTPC), load disconnection is to be enhanced.

Study results carried out by NERLDC is attached in ***Annexure -1.***

Members may like to discuss.

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.

During 6th SS meeting, 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.

Assam may kindly intimate the current status.

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 6th SS meeting, 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.

NEEPCO may kindly intimate the current status

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.

During 6th SS meeting, 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.

NERTS may kindly intimate the current status

5. Installation of Reactor at Ranganadi 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

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.

During 6th SS meeting, 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.

NEEPCO may kindly intimate the current status.

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	**ISLAND AT 48.80 Hz with 5 Sec 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		
		(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	At AGBPP [UFRs of	**NEEPCO**

		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)].	line bays & Generator to be used]	
		(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 48.50 Hz with 5 Sec delay :</u>** 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	**<u>ISLAND AT 47.90 Hz:</u>** 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		

After detailed deliberation, the 4th SS 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.

OTPC may kindly intimate the current status.

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.

8. Enhancement of Transformation capacity of 400/132kV Silchar S/S:

It has been observed that 400/132 kV, 2x200 MVA ICTs at Silchar is highly loaded at peak hours. In case of tripping of any one ICTs, other ICT will be overloaded and may trip subsequently. Due to tripping of both the ICTs, Southern Part of NER may collapse.

To safe, secure & reliable operation of Southern Part of NER, the transformation capacity of 400/132 kV Silchar substation is to be enhanced.

Study results carried out by NERLDC is attached in ***Annexure -8.***

Committee may like to discuss.

9. Requirement of new lines for evacuation of power from 4x21 + 2x25.5 MW AGTPP:

NERLDC informed that it has been observed that critical lines of Tripura System & lines of POWERGRID in this area will be highly loaded in case of tripping of any critical line in this area & these lines may trip subsequently resulting total collapse of Tripura System.

To address this issue, 132 kV D/C lines from AGTPP to P K Bari are required for safe, secure & reliable operation of the grid.

Study results carried out by NERLDC is attached in ***Annexure-9.***

10. Load-ability of 132kV Lumshnong – Panchgram Line:

NERLDC informed that it has been observed from system study that 132 kV Badarpur – Khliehriat line will be highly loaded in case of 700 MW Palatana generation. To reduce the loading of 132 kV Badarpur – Khliehriat line, 132 kV Lumnsnong – Panchgram Line is to be connected in loop. However, it has been seen that loading of 132 kV Lumshnong – Panchgram Line will be around 80 MW in case of tripping of 132 kV 132 kV Badarpur – Khliehriat line. Hence, loading capacity of 132 kV Lumnsnong – Panchgram Line is to be enhanced.

The issue was discussed during 98th, 99th, 100th, 101st & 102nd OCC meetings.

The Sub-committee requested to AEGCL and MeECL to take up the necessary action accordingly.

AEGCL & Me. PTCL may kindly inform the latest status.

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