Agenda of 12th System Studies Meeting in NER

Date: 30.08.2016. **Venue: NERLDC,Shillong**

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.

During 8th SS Meeting, DGM, (SO-II), NERLDC informed that till date they have not received the new scheme planned by them.

After detailed deliberation, the Sub-committee directed OTPC to send the schematic details of the new scheme planned by them to NERLDC/NERPC by **16.08.2015**.

During 9th SS meeting, DGM (SO-II), NERLDC informed that new SPS II scheme is proposed by Palatana, OTPC. He stated that the following scheme proposed by Palatana, OTPC may be agreed:-

1. On receipt of trip signal of both 400 kV lines from Silchar end through PLCC or at OTPC end, if both or single 132 kV line available and generation above 120 MW, then trip command generated to ICT HC side breaker to avoid sudden overloading of 132 kV lines. The trip signal will be generated by executing algorithm in DCS.

2. When both 132 kV lines tripped along with 400 kV line, no tripping shall be initiated as all generators breaker tripped on over speed protection on protection class C.

However the following scheme proposed by Palatana, OTPC may not be agreed as 120 MW may not be absorbed by Tripura system under certain scenario.

1. When total generation of OTPC<=120 MW, no breaker tripping shall be initiated. As the load reduction done manually subjected to availability of 132 kV lines (if both 132 lines available load reduction not required)

OTPC had informed that total generation shall be varying from 15 MW to 726.6 MW. It is proposed that in case of tripping of 400 kV Palatana – Silchar I & II line, Palatana generation will be reduced to 15 MW through SPS II when both 132 kV lines from Palatana are available.

During 10th SS meeting, OTPC informed that D/T signal from Silchar end is required to implement the changes in SPS-2, POWERGRID agreed to do the needful. The Sub-Committee requested OTPC to implement the changes in SPS-1, as decided in 38th PCCM and SPS-2 before next PCC meeting.

In 11th SS Meeting OTPC informed that the changes in SPS – 1 were completed on 18.11.2015.

The 123rd OCC meeting, OTPC representative informed that on 09.07.2016(GD-IV) SPS-3 did not mal-operate rather it was due improper scheme design. He requested that the matter be discussed in System-Study sub-group. Sr. Engineer, NERLDC did not agree with view of OTPC and informed that as per design of SPS-3, generation at Palatana units to be reduced to 200 MW immediately (within seconds), and requested constituents to review the whole "System Protection & islanding" schemes designed for NER system due to subsequent addition of new Tr. Lines & generation in NER Grid. The matter of redesigning of SPS would be reviewed in next System Study meeting of NER.

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OTPC vide mail dtd. 04.08.16 has written:

"OTPC is repeatedly requesting forum at various platforms(since 117th OCC and 41st PCC meetings held on 7th January 2016) to review this scheme as it was framed considering only ONE Unit of OTPC in operation that time, now both Units of OTPC are in service. OTPC station faced serious on black out leading catastrophic failure of machines twice i.e. on 11th April 2016 and on 9th July 2016 due to SPS-III operation. SPS-III was implemented in January 2016.

In 41st PCC meeting, it was assured that the SPS-III will be reviewed in Systems Study Meeting. But, System Study Meeting is yet not called."

OTPC and NERTS, POWERGRID may kindly intimate the current status.

2. Updation of SPS Document of NER Grid:

NERLDC has finalized the SPS Document of NER Grid.

At present 9 no of SPS are in service in NER grid which can be categorized as:

a. Tripping of critical line(s) / corridor

i. Tripping of 400 kV Silchar- Palatana D/C lines

ii. Tripping of 400 kV Silchar – Azara S/C and 400 kV Silchar – Byrnihat S/C lines with no generation in Palatana

iii. Tripping of 132 kV Umiam Stg-I to Umiam St-III D/C lines

iv. Tripping of 400/132 kV, 2x200 MVA ICTs at Silchar (PG)

b. Safe evacuation of generation

i. Tripping of 400 kV Silchar – Azara S/C and 400 kV Silchar – Byrnihat S/C lines with two Module Palatana CCGT

ii. Generation evacuation of AGTPP

c. Overloading of Transformers / Critical line(s)

i. Overloading of 220 kV Salakati – BTPS D/C lines

ii. SPS associated with more than 60 MW loading from LV to HV side of Azara ICTs

d. For Reliable operation of Grid

i. Tripping of two Module of Palatana CCGT

NERLDC may please present SPS document for ratification.

3. Dynamic Simulation data for Generator in NER Grid:

As deliberated in 11th System Study Meeting of NERPC, all the generating Units were requested to furnish dynamic data as per the formats circulated in previous meetings.

Some of dynamic simulation data from IGSS are available with NERLDC as of now.

NLDC has prepared the Dynamic Model of All India Grid using legacy data. In order to tune the case for North-Eastern Region for performing Stability studies, it is necessary that all generating utilities to furnish the modelling information available with them. If these data are not readily available with them, generating utilities of NER are requested to collect these data from manufacture and send these data to NERLDC.

In 123rd OCC meeting, NERLDC informed the forum that NLDC had prepared Dynamic cases for study, based on legacy data, which may be insufficient for accurate representation of NER Grid generators. The forum advised the generating stations to submit the data whichever is available, and to contact manufacturer regarding data that is not available with them.

The dynamic simulation data from only IGSS are available with NERLDC as of now. The data available with NERLDC as of now are listed below:

i) Generator Model:

For the generator model, GENROU model has been considered for Thermal generators and GENSAL model considered for Hydro generators (Salient Pole) by NERLDC in absence of any concrete information from generating utilities.

- Palatana (GTG I, GTG II, STG I & STG II- except S(1.0) & S(1.2))
- BgTPP (Unit 1, 2 & 3- except S(1.2))
- AGBPP (Unit 1,2,3,4,5,6, 7, 8 & 9)
- AGTPP (Unit 1, 2,3 & 4 - only D-axis data)
- Monarchak (GT I- only D-axis data)
- AGTPP Extension (Unit 1 & 2- except S(1.0) & S(1.2))
- Doyang (Unit 1,2 & 3- only Xd, Xd' & Xd'')
- Kopili (Unit 1,2,3 & 4- except T''d0, T''q0, S(1.0) & S(1.2))
- Khandong (Unit 1 & 2 - except T"q0, D, Xl, S(1.0) & S(1.2))
- Kopili Stg II (except T"q0, D, Xl, S(1.0) & S(1.2))
- Ranganadi (Unit 1, 2, & 3, - except T''q0, H, D, S(1.0) & S(1.2))
- Loktak (Unit 1,2 & 3- except T''d0, T''q0, D, X'd, Xl, S(1.0) & S(1.2))

ii) Excitation system model:

- AGBPP (Unit 1,2, 3 & 4- partially given)
- Palatana (Only block diagram of Exciter given)
- BgTPP (Only block diagram of Digital AVR given)
- Monarchak (Only block diagram of Exciter given)
- Loktak (only Exciter data given; needs validation as values out of range as per setting of PSSE)

iii) Governor system model:

No data furnished by any generating utility.

iv) PSS model:

No data furnished by any generating utility.

v) Excitation limiters (OEL and UEL) model:

No data furnished by any generating utility.

Non-availability of dynamics simulation data makes it difficult to perform converged dynamic simulation for assessment of Contingencies or for study of efficacy of System Protection Schemes and Islanding Schemes.

All the ISGS are requested to furnish validated dynamic simulation data to enable NERLDC / NLDC to carry out simulation studies. The SLDCs of North-Eastern Region are required to collect the data from Intra-state generators for purpose of modeling.

4. Implementation of new SPS for OTPC ICTs:

Once ICT-2 is in service in parallel to ICT-1: This is required for overload protection of one ICT in case of tripping another ICT. The 124th OCC referred the matter to the System Studies Sub-Group.

OTPC may please deliberate.

5. Design and implementation of SPS Related to HVDC Operation:

+/- 800 kV Biswanath Chariali – Agra HVDC Pole I & II under operation and power, of the order of around 500 MW, is flowing in either direction depending on the system requirement. Any problem in AC interregional links, specially during power flow from Biswanath Chariali to Agra, may result in disturbance in NER grid.

To address the situation it is very much essential to design a SPS scheme and implement as early as possible.

All the members are requested to please contribute in designing the SPS.

Members may deliberate.

6. Review of Island No. II after integration of South Comilla system of Bangladesh through 132 kV Surjamaninagar – Comilla D/C lines:

A major disturbance of category GD-V occurred in NER Grid on 16.04.16 at 1203 Hrs. Island No. I, comprising of AGBPP system and Upper Assam system, survived. Island No II, comprising of Tripura system with AGTPP system, did not survived.

2nd major disturbance of category GD-IV occurred in NER Grid on 09.07.16 at 1319 Hrs. Island No II, comprising of Tripura system with AGTPP system, did not survived on this occasion also.

It is to be noted that in case of both the Disturbances, Island No II did not survived due to increase in load in Tripura system after integration of South Comilla system of Bangladesh.

During Peak Hours, in this system, there is around 300 MW load and 200 MW of Generation. This Island was designed with peak load of 180 MW and peak generation of 160 MW.

TSECL is requested to identify nearby nodes for further disconnection of load for successful operation of Island No. II.

Members may deliberate.

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