Eastern Regional Power Committee, Kolkata

Minutes of Special Meeting for discussion on installation of SPS at 400kV level at Rangpo S/s for reliable power evacuation through 400 kV Rangpo – Siliguri D/c line held on 30th November, 2016 at ERPC, Kolkata

1.0 List of participants is at **Annexure-A.** Member Secretary, ERPC welcomed all the participants to the special meeting. He informed that this special meeting was convened in continuation to the earlier meeting held on 14.10.2016 to deliberate issues in regard to the special protection scheme(SPS) for optimum power evacuation through 400 kV Rangpo –Silliguri D/C line. Thereafter, he requested Chief Engineer (PSP &A - II), CEA to start the deliberations of the meeting.

2.0 Chief Engineer, CEA enquired about the progress of the hydro projects. It was informed by TeestaUrja Ltd. that the six units of Teesta III HEP would be commissioned during December 2016 – January 2017 progressively. Sneha Kinetic Power Projects Ltd. and Shiga Energy Pvt. Ltd. informed that Dikchu HEP and Tashiding HEP would be commissioned in January 2017 and February 2017 respectively.

3.0 On enquiry about the transmission system, it was informed by Teesta valley Power Transmission Ltd. that Teesta III – Rangpo section of Teesta III – Kishanganj400 kV D/C quad-moose line has been commissioned on 25.11.2016 and the entire transmission line is targeted to be completed by March 2017.

4.0 Chief Engineer, CEA stated that in the earlier meeting on 14.10.2016, it was decided that the SPS would be required to in order to facilitate maximum evacuation from the generation projects in Sikkim till the commissioning of the main evacuation line viz. Rangpo – Kishanganj 400kV D/c (Quad) line. In this case, the total power from generation projects in Sikkim would have to be evacuated to the other parts of the grid through the only available 400kV line i.e.Rangpo – Siliguri 400kV D/c line which was originally planned for Teesta-V (510 MW) project. ERLDC had stated that the SPS may however remain in the circuit even after the commissioning of Rangpo-Kishanganjline for secure operation of the grid during other eventualities.

5.0 It was also informed that Teesta Urja Limited (TUL) vide their letter dated 01.11.2016 has conveyed their reservations with regard to the transmission capacity agreed for 400 kV D/C Rangpo - Siliguri Transmission Line. According to the said letter, the maximum power transfer capacity of both the circuits of 400 kV D/C Rangpo – Siliguri Transmission line should be about 2300 MW.

6.0 TUL stated that in the “Detailed Procedure for Relieving Congestion in Real Time Operation” issued vide CERC Order No. L-7/139(159)/2008 dated 22.04.2013 has reference to the CEA’s Manual on Transmission Planning Criteria, wherein it has

been mentioned that the transmission line may be loaded upto its maximum power transfer capacity i.e. thermal rating. The current carrying capacity of one ACSR moose conductor of diameter 31.77 mm for a maximum conductor temperature of 85^{o}C and ambient temperature of 40^{o}C is 874 ampere. Accordingly, the maximum power transfer capability of each circuit of 400 kV D/C Rangpo – Siliguri transmission line is about 1150 MW (at 0.95 power factor). It was also informed by TUL that the ambient temperature of the area where Rangpo – Siliguri line passes is less than 40^{o}C. It was also noted that the length of Rangpo – Siliguri line is only about 70km.

7.0 It was pointed out by POWERGRID that the thermal rating of 400kV D/c Rangpo-Siliguri line (twin moose conductor) is about 1105MVA per circuit with conductor design temperature of 85^{o}C and ambient temperature of 45^{o}C. Considering the power factor of 0.95, the maximum power transfer capacity of the line may be considered as 2100 MW (1050 x 2). After deliberation, it was agreed that though in general the ambient temperature is considered as 45^{o}c, the same may be taken as 40^{o}c for Rangpo-Siliguri line, considering that the temperature all through the year in the route of this line remains below 40^{o}c. Accordingly, the maximum current carrying capacity of the Rangpo – Siliguri 400kV D/c line may be considered as 2300 MW (1150MW x 2) as per 'Manual on Transmission Planning Criteria' issued by the Central Electricity Authority, without jeopardizing the secure and safe operation of the grid and its parameters.

8.0 After deliberation, it was agreed that for secure and safe operation of the Sikkim grid, to start with, the maximum power flow on Rangpo – Siliguri 400kV D/c line would be restricted to about 1500MW (750MW per circuit). The limit on power transfer capacity of the said line may be ramped up to its maximum power transfer capacity of 2300 MW in stages duly considering secure and safe operation of the grid based on the availability of generation from hydro projects in Sikkim, past data regarding maximum loading of the line & its duration etc. CTU stated that 2300 MW power transfer from Rangpo to Siliguri may result in voltage difference of upto 20 kV between Rangpo and Siliguri. The same may be taken into account while ramping up the power flow from 1500MW to 2300 MW in future. The SPS operation with a limit of 1500MW power on the Rangpo – Siliguri line may start in Dec., 2016. Thereafter, the power flow through this line would be reviewed periodically and depending upon the requirement of additional power flow, the limit of the maximum power flow on the Rangpo – Siliguri line would be enhanced progressively, till commissioning of 400 kV D/C quad moose Teesta III – Kishanganj Transmission Line in March 2017 and SPS would be modified accordingly

9.0 It was further reiterated that the SPS at the Generating Stations would be implemented by the respective developers and they need to follow the logic of SPS decided in the meeting held on 14.10.2016. On completion of the SPS installation process, POWERGRID-ERTS-II will do the simulation test and confirm regarding the commissioning ofSPS to ERPC/ERLDC. The SPS designed for maximum transfer limit of 1500 MW through the Rangpo – Siliguri line, would be modified

once the decision regarding enhancement of line loading limit based on power flow requirement is taken in the review meetings.

10.0 After detail deliberation, the following was concluded:

i. The SPS would be installed to limit the maximum power flow in the Rangpo-Siliguri 400kV D/c line to about 1500MW in order to facilitate evacuation of power from hydro projects in Sikkim (Teesta-V: 510 MW, Teesta-III: 600 MW, Chuzachen: 99 MW, Dikchu: 96 MW, Jorethang: 96 MW and Tashiding: 97 MW) in the month of December 2016. Under outage of any one circuit, the flow on the surviving ckt would be reduced to 750 MW through the SPS operation.

ii. The special protection System along with PLCC and SPS should be commissioned by respective generators and POWERGRID as per logic decided in the meeting on 14th Sep., 2016, fully to the satisfaction of ERLDC and ERPC.

iii. The limit on the capacity of Rangpo – Siliguri 400kV D/c line would be ramped up to its maximum power transfer capability of 2300 MW in stages duly considering secure and safe operation of the grid after review of the voltages and power flow condition and requirement of enhanced power flow through this line in order to facilitate maximum evacuation of power from the hydro projects in Sikkim.

iv. All generators & CTU should ensure proper protection co-ordination, healthiness of communication-voice, data, and plcc to the satisfaction of ERLDC/ERPC before start of the actual operation through the Grid.

The meeting ended with a vote of thanks to the chair.

Annexure-A

Participants in the Special meeting for review of implementation of SPS at 400kV Rangpo S/s

Venue: ERPC Conference Hall, Kolkata Time: 11:00 hrs Date: 30.11.2016 (Wednesday)

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