Eastern Regional Power Committee, Kolkata

Minutes of Review Meeting on evacuation of power from HEPs of Sikkim held on 21st June, 2017 at ERPC, Kolkata

List of participants is at **Annexure-A.**

Member secretary welcomed all the participants and referred decisions of special meeting of 13th June, 2017 and CERC directions on the issue. He requested ERLDC to share the result of SPS testing on 19.06.2017.

ERLDC informed that a SPS test was held at 11:48 Hrs of 19.06.2017 through simulation. (1) Signal received time and (2) total time to CB opening were recorded.

During the test, two signals were supposed to be generated at Rangpo viz. SPS-1: for tripping units at Teesta-III, Dikchu, Chujachen and Jorethang and SPS-2: for tripping Rangpo end CB of 400kV Rangpo-Teesta-III line. To avoid total loss of Teesta-III and Dikchu generation, SPS-2 was extended only to the SAS for the purpose of logging, but not to the CB trip coil at Rangpo.

The following result of SPS code 1 test based on event logger data at IPPs and SOE data from ERLDC SCADA were shared:

RANGPO SPS TIMEHH:MM:SS.ss	PROJECT NAME	Signal RECEIPT TIME at Power Stn	Signal transmission delay	CB OPEN TIME HH:MM:SS.ss		Total Delay	
				S/Stn Event Log	ERLDC SOE	As per S/Stn	As per ERLDC
11:48:22.677	Teesta III	11:48:22.813	136ms	11:48:23:040	11:48:26:460	363 ms	3s 783ms
	Jorethang	11:48:23.837	1s 160ms	11:48:23.837	N.A.	1s 160ms	N.A.
	Chuzachen	11:48:23.072	**395ms**	**11:48:23:498**	11:48:23:506	821ms	829ms
	Dikchu	11:48:22.758	81ms	11:48:22.828	11:48:29:509	151ms	6s 832ms
13:22:33.406	Teesta III	13:22:33.531	125ms		-		-
	Jorethang	13:22:35.870	2s 464ms		-		-
	Chuzachen	13:22:33.800	394ms		-		-
	Dikchu	13:22:32.821	- 585ms		-		-

DANS (Jorethang HPS) Energy representative informed that the time taken for the signal to reach from New Melli was 180 ms only. Rest of the time lag was from Rangpo to New Melli.

ERLDC pointed out discrepancy in data from Dikchu HPS as it was recording an lesser time than Teesta-III and one occasion had shown negative time also. It was also pointed out that there may be time synchronization issues. Dikchu representative informed that as per event logger at Dikchu HPS the breaker tripped at 160 ms.

Teesta-III representative suggested that current / power flow may help determineing the time of the event. ERLDC clarified that only 15 minutes data would be available and millisecond range data are not available for time checking.

Dikchu representative informed that they were continuously checking SPS and the SCADA systems at their end for continuous availability.

ERLDC proposed that the IPP's should get their time synchronized with Rangpo (Powergrid) and once again the exercise may be repeated.

Chuzachen HPS representative opined that time stamping in SCADA may be delayed and differ from actual event time. ERLDC agreed. It was informed that the SOE in ERLDC SCADA was not generated even when breaker status in SCADA was showing tripped.

ERLDC confirmed that SPS stage 2 signal had been successfully recorded at Rangpo, Powergrid.

Before initiating the dialogue on line loadability Member Secretary queried ERLDC whether they were satisfied with the outcome of the SPS test.

ERLDC mentioned that even though the result of SPS testing was not foolproof but enhancement of loading of 400 kV Rangpo-Siliguri D/C could be explored.

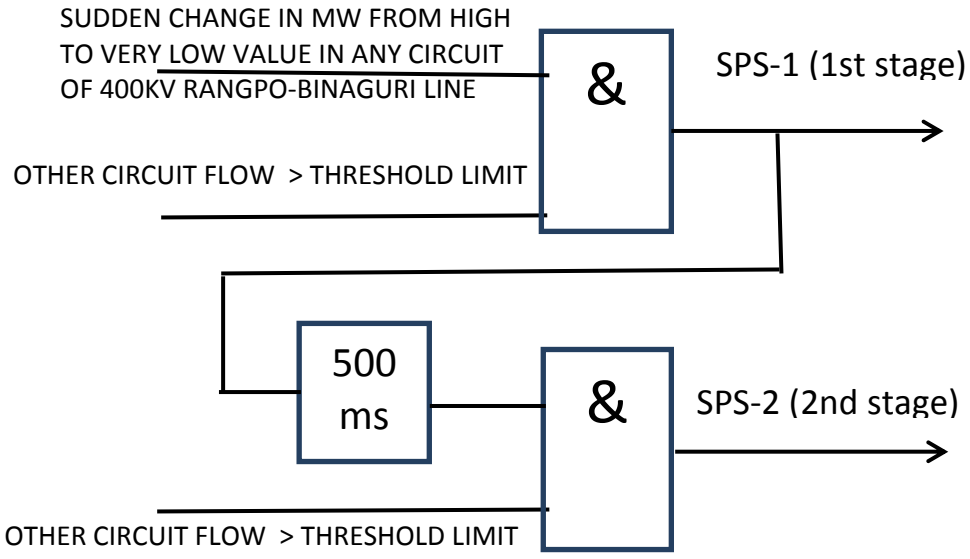
NLDC representative observed that if Rangpo-Siliguri trips at Siliguri end only then there will be problem with the existing SPS as agreed on 13.06.2017. For increasing the effectiveness of the SPS with tripping of the Rangpo-Siliguri line from Siliguri end only it was suggested that the existing SPS should be provided with more features.

ERLDC's proposed modification of SPS for smoothening of all eventualities and proposal is given below:

SPS-1 : In case of sudden change in MW from high to very low value in any circuit of 400kV Rangpo-Siliguri line the SPS would send a control signal to each of the Teesta-III, Chuzachen, Dikchu, Jorethang and Tashiding HEPs generating stations so as to keep only one unit of each project in service and disconnect the remaining units.

SPS-2 : Even after the above SPS operation, if the power flow in the surviving ckt of Rangpo-Siliguri still remains more than a threshold limit, at 500 ms the SPS would send a 2nd control signal to trip the breaker of Teesta-III- Rangpo at Rangpo end.

Therefore the logic proposed will be:



Detailed deliberation were held on the logic proposed by ERLDC.

It was informed that the proposed modifications could be implemented with the full fledged SPS being procured by Powergrid.

IPPs agreed with ERLDC proposal for redesign of SPS as and when it would be implemented. However it was decided that at present the existing scheme as agreed on 13.06.17 after incorporating necessary enhancement for MW loading should continue.

Representative of DANS Energy/ Jorethang HPS informed that Tashiding HPS may be declared under Commercial operation by end of month as Powergrid had committed that remaining portion of work would be completed by this month end.

Thereafter, it was agreed that the presently SPS will be as per the decision of 13.06.2017 which is reproduced below:

1. *In case of outage of one circuit of Rangpo-Siliguri 400kV D/c line if the power flow in the remaining circuit becomes more than threshold limit*, the SPS would send a control signal to each of the Teesta-III, Chuzachen, Dikchu, Jorethang and Tashiding HEPs generating stations so as to keep only one unit of each project in service and disconnect the remaining units.*

2. *Even after the above SPS operation, if the power flow in the surviving ckt of Rangpo- Siliguri still remains more than threshold limit*, at 400 ms the SPS would send a 2nd control signal to trip the breaker of Teesta-III- Rangpo at Rangpo end.*

   **Presently the threshold limit is kept at 750 MW as decided in previous meetings on Rangpo SPS held on 14.10.16 & 30.11.16 in ERPC and the same will be as per deliberations below on the maximum power flow allowable through 400 kV D/C Rangpo-Siliguri line.*

Member Secretary requested IPPs to share their views on the maximum loading that may be considered for evacuation through 400 kV Rangpo-Siliguri D/C Line.

Teesta-III representative informed that as per study and CEA planning criteria the MW loading could go upto 2300MW.

Dikchu representative opined that voltage stability limit and angular stability limit issues arise before thermal limit for *long* lines. However, the concerned lines are only 110 kM in length and these issues would not arise. Further, in a meshed network, the strength of network such as Short Circuit levels, Reactive power, etc are also important. However, these restrictions also are not applicable for 400 kV Rangpo-Siliguri line as Rangpo has a high Short Circuit level. It was opined that loading of 400 kV Rangpo-Siliguri D/C could be increased up 2100 MW.

Representative of Jorethang HPS/ DANS energy observed that a loading of 2100-2150 MW would ensure evacuation of power by all generators. Also, Jorethang Representative opined, that with the present status of commissioning of new generating stations, there would be no need to revise it for next 2 years.

Chuzachen HPS representative expresed that thermal loading should be considered. However, to keep margins and considering the line length less than 110 kM long upto 2100 MW loading of 400 kV Rangpo-Siliguri D/C may be explored.

CTU representative offered no comments on the loadability of 400 kV Rangpo-Siliguri D/C line.

NLDC representative observed that for reliability of power n-1 criteria must be followed. In grid standards also it is very clear that n-1 is to be followed. SPS could not be an alternative for n-1 criteria.

Member Secretary concluded that the power flow through the 400 kV Rangpo-Siliguri D/C line could be enhanced to its thermal limit as per CEA transmission planning criteria but in steps. So to start with a line loadability of 1700 MW was proposed subject to approval of the Commission.

Member Secretary opined that for a given quantum of line loading the methodology of sharing the transmission capacity needs also be discussed by the IPPs.

On this Teesta-III desired that the capacity agreed must be shared proportionally among all the IPPs. To this proposal Member Secretary did not agree. He opined that because of non availability of TeestaIII-Kishangaunj line the present evacuation problems have started. The construction of the same is the responsibility of TPTL, the subsidiary of TUL. Referring accounting principle, MS viewed that parent company also should take the adverse effects of failure on the part of its subsidiary.

Since all other generators have already completed their approved part of connectivity network Member Secretary therefore proposed out of 1700 MW Teesta-III should get the balance of capacity after Teesta-V and all other smaller IPPs (Dikchu, Chuzachen, Jorethang & Tashiding) are accommodated. So, if 1700 MW is agreed to be evacuated through 400 kV Rangpo-Siliguri D/C then evacuation allowed would be as under:

IPPs	**Evacuation Capacity before COD of Tashiding HPS (MW)**	**Evacuation Capacity after COD of Tashiding HPS (MW)**
Teesta-V HPS	530	530
Dikchu HPS	96	96
Jorethang HPS	96	96
Chuzachen HPS	99	99
Teesta-III HPS	879	782
Tashideng HPS	0	97

Teesta-III stated that they have no other option but to accept the proposal of Member Secretary.

DANS Energy (Jorethang HPS), Dikchu HPS, Chuzachen HPS also agreed.

ERLDC opined that they would abide by the decision of the hon'ble commission with respect to the allowed loading of 400 kV Rangpo-Siliguri D/C. But, ERLDC reiterated that regarding the allocation of capacity among the IPPs they had already shared their views to the Hon'ble Commission regarding congestion and consequent creation of a separate bid area (E3).

Member Secretary stated that a request will be placed before Hon'ble Commission tomorrow for enhancement of loading of 400 kV Rangpo-Siliguri D/C to 1700 MW. Further enhancement, if required could only be reviewed on commissioning of Teesta-III-Dikchu-Rangpo line

Teesta-III representative requested that if some margin is available then the same may be allowed to them for evacuation of more power.

ERLDC observed that during trial operation of Tashiding HPS also IPPs would need to back down to accommodate infirm generation from Tashiding HPS.

Powergrid confirmed that the end equipment ratings were sufficient to carry 1356 MW per circuit. He also confirmed that the change from 750 MW to 850 MW in the SPS settings would be implemented at Rangpo if agreed by the hon'ble Commission tomorrow.

Powergrid observed that given the terrain the design limit of loading of 400 kV Rangpo-Siliguri lines could be only 650 MW per circuit. So, if there is tripping of 400 kV Rangpo-Siliguri Powergrid should not be held responsible.

Member Secretary advised Powergrid to submit a written confirmation on the same so that the Hon' ble commission could be approached to restrict the loadability of 400 kV Rangpo-Siliguri D/C line to 1300 MW.

Member Secretary requested all IPPs to give the healthiness report of SPS at their end in each OCC meeting of ERPC. All IPPs agreed.

The meeting ended with the following conclusions:

1) *The power flow through the 400 kV Rangpo-Siliguri D/C line will be enhanced to 1700 MW till further reviewing on commissioning of 400 kV Teesta-III- Dikchu- Rangpo line..*

2) *The allowable evacuation of generation of Sikkim HEPs will be allocated as given below:*

IPPs	**Evacuation Capacity before COD of Tashiding HPS (MW)**	**Evacuation Capacity after COD of Tashiding HPS (MW)**
Teesta-V HPS	530	530
Dikchu HPS	96	96
Jorethang HPS	96	96
Chuzachen HPS	99	99
Teesta-III HPS	879 (1700-530-96-96-99)	782 (1700-530-96-96-99-97)
Tashideng HPS	0	97

3) *Teesta-III evacuation quantum could be enhanced if there is margin available in transmission corridor due to less generation/back down/ shutdown by any of the other generators.*

4) *Threshold limit for existing SPS at Rangpo will be revised to 850 MW.*

5) *Powergrid would implement the revised setting (threshold limit) of existing SPS at Rangpo after the decision of Hon'ble CERC.*

6) *While commissioning the full fledged SPS in coordination with ERLDC, Powergrid would implement the agreed modification in the existing SPS as suggested by ERLDC for increasing the effectiveness of the SPS in case the Rangpo-Siliguri line is tripped from Siliguri end only*

7) *All the respective Generators will submit the healthiness certificate for the SPS at their end on monthly basis in OCC meetings.*

Meeting ended with vote of thanks to the chair.

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Annexure-A

Participants in Review meeting on evacuation of power from HEPs of Sikkim

Venue: ERPC Conference Hall, Kolkata | Time: 11:30 hrs | Date: 21.06.2017 (Wednesday)

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Venue: ERPC Conference Hall, Kolkata Time: 11:30 hrs Date: 21.06.2017 (Wednesday)

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