Frequency Response Characteristic Calculation for All India based on NLDC SCAD

EVENT:	On 05-Jan-24, at 05:10 Hrs, multiple trippings occured at kota TPS and RAPP nuclear units. The total generation loss as per SCADA data occured in the event is around 1726 MW and demand loss occured was 410 MW. The net generation loss considered for FRC computation is 1316 MW. In the event frequency recovered back to pre disturbance frequency within one minute, then continued to fall further to lower levels. Since disturbance o For the computation of FRC, the quasi state frequency is considered after the 90 seconds of the incident.

S No	Particulars	Dimension	NR	ER	WR	NER	SR
1	Actual Net Interchange before the Event (05:16:04)	MW	10748	-8660	-12945	159	10278
2	Actual Net Interchange after the Event (05:17:28)	MW	11192	-8786	-13668	156	10020
3	Change in Net Interchange (2-1)	MW	444	-126	-723	-3	-258
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	1316	0	0	0	0
5	Control Area Response (3 - 4)	MW	-872	-126	-723	-3	-258
6	Frequency before the Event	HZ	50.01	50.01	50.01	50.01	50.01
7	Frequency after the Event	HZ	49.97	49.97	49.97	49.97	49.97
8	Change in Frequency (7 - 6)	HZ	-0.046	-0.046	-0.046	-0.046	-0.046
9	Frequency Response Characteristic (5 / 8)	MW/Hz	18946	2743	15714	56	5604
10	Net System Demand met before the Event	MW	42612	16503	52713	1558	40589
11	Internal Generation before the Event (10 - 1)	MW	31864	25162	65658	1399	30312
12	Ideal load response assuming 4% per Hz (0.04*Row 10)	MW/Hz	1704	660	2109	62	1624
13	Ideal generator response assuming 5% droop…….40% per Hz (40% of Row 11)	MW/Hz	12746	10065	26263	560	12125
14	Composite ideal response (12 + 13)	MW/Hz	14450	10725	28372	622	13748
15	Percentage ideal response	%	131.1%	25.6%	55.4%	9.0%	40.8%

(*) - Data may be constant/suspected during the event Note: +ve exchange=> import ; (-)ve exchange => export	# only interchange of 132kv Surjamani-comilla D/c.

Total Change in (MW)	1316
FRC for NEWS GRID (dp/df) MW/Hz	**28609**
Power Number (net change in MW/maximum change in frequency	**17978**

Source Wise Generation (MW)	GAS	HYDRO	NUCLEAR	Thermal	WIND	SOLAR
	2174	**4233**	**5425**	**136723**	**6147**	**14**

Percentage of Non responsive generation to Primary frequency response (nuclear+ wind+ solar) as a percentage of total generation	7.49%
Percentage of non rotating generation (wind+ solar) as a percentage of total generation	3.98%