

Frequency Response Characteristic and Performance Computation in NorthEastern Region

On 23 April 2024, at 20:15 hrs, 400 kV Tiroda-Warora-2 tripped on R-E fault from both ends. 400 kV Tiroda-Warora-1 also tripped on R-E fault Zone 2 from Warora end but did not tripped from Tiroda end. It resulted in busbar protection to operate on both buses at 400 kV Tiroda substation leading to tripping of APML Tiroda Unit-1,2 & 3 (660 MW) ;765/400 kV ICT-1 and Bus reactor-1 & 2. As per SCADA data, generation loss of around 1800 MW was observed due to loss of evacuation path.

S No	Particulars	Dimension	Assam GBPS	Agartala GBPS	Bongaigaon TPP	Palatana	Doyang HEP	Kameng HEP	Khandong HEP	Khandong Stg-2	Kopili HEP	Loktak HEP	Panyor HEP	Pare HEP	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura*	NER Region*	
1	Actual Net Interchange before the Event (20:14:57)	MW	-197	-60	-636	-448	-54	-554	0	0	-148	-105	-396	-110	124	1580	154	232	110	134	337	42	
2	Actual Net Interchange after the Event (20:16:18)	MW	-197	-60	-643	-449	-54	-564	0	0	-151	-105	-399	-110	122	1570	155	232	111	134	335	4	
3	Change in Net Interchange (2 - 1)	MW	-0.5	-0.4	-6.9	-0.9	-0.1	-10.6	0.0	0.0	-2.5	-0.3	-2.7	0.2	-1.9	-10.4	1.0	-0.5	1.7	0.7	-1.7	-37.7	
4	Generation Loss (+) / Load Throw off (-) during the Event	MW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	Control Area Response (3 - 4)	MW	-0.5	-0.4	-6.9	-0.9	-0.1	-10.6	0.0	0.0	-2.5	-0.3	-2.7	0.2	-1.9	-10.4	1.0	-0.5	1.7	0.7	-1.7	-37.7	
6	Frequency before the Event	HZ	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058	50.058
7	Frequency after the Event	HZ	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974	49.974
8	Change in Frequency (7 - 6)	HZ	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08
9	Frequency Response Characteristic (5 / 8)	MW/Hz	5	5	82	11	2	126	0	0	29	3	33	-2	23	124	-12	7	-20	-9	20	449	
10	Frequency Response Obligation (FRO) of control area	MW/Hz	0	0	22	22	2	13	0	1	4	2	11	4	5	70	0	14	4	5	19	196	
11	Frequency Response Performance (FRP) (9/10)	NA	NA	NA	3.68	6.49	0.91	9.69	No Gen	No Gen	7.81	1.92	3.10	-0.57	4.92	1.78	NA	0.46	-5.39	-1.82	1.03	2.30	

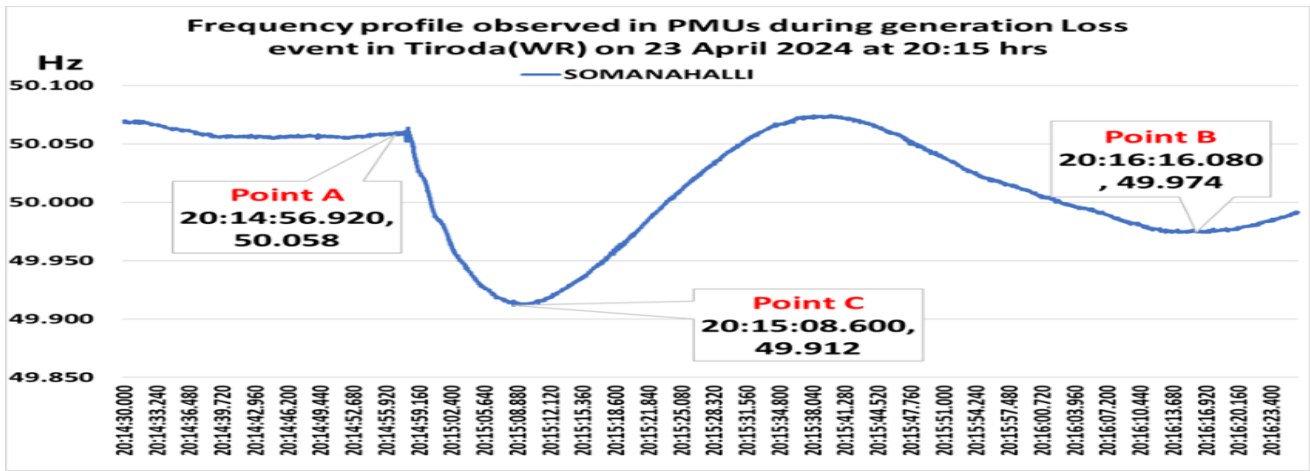


Figure 1 Generation loss event in Tiroda (WR) at 20:15 hrs of 23rd April 2024