

BHUTAN POWER CORPORATION LIMITED

BHUTAN POWER SYSTEM OPERATOR

THIMPHU: BHUTAN



ANNUAL TRANSMISSION SYSTEM PERFORMANCE REPORT FOR THE YEAR 2020

JANUARY-2021

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1.0 INTRODUCTION

In compliance to Grid Code Regulation 2008, Clause No. 6.14.2.1, this office prepared an annual report covering the performance of the Transmission System and details as required by the Ministry and the Authority annually for development of power system master plan and formulation of other policy decisions, thus this report contains the performance of Transmission System for the year 2019.

All the index and other calculations in this report have been executed based on the data received from substations and generating plants.

2.0 PERFORMANCE OF GENERATING STATIONS

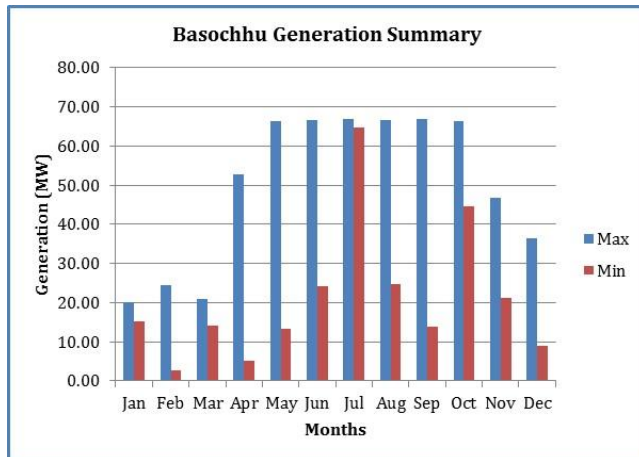
2.1 POWER GENERATION

The maximum individual plant generation was recorded as 1,358.00 MW by the Mangdichhu Hydropower Plant, followed by 1,122.00 MW by Tala Hydropower Plant.

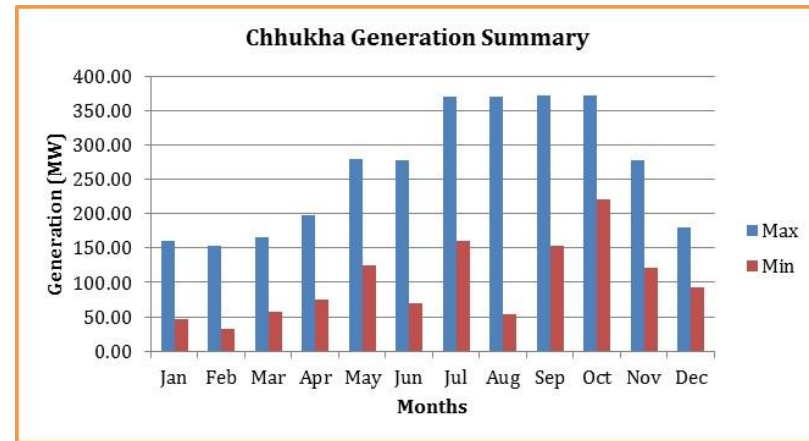
Table: 2.1.1 Monthly maximum and minimum generation summary

Sl. No	Hydropower Plant	Monthly Maximum and Minimum Generation (MW)												Max/Min of year (MW)		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
1	BHP	Max	20.01	24.30	20.90	52.70	66.40	66.50	66.81	66.48	66.82	66.35	46.78	36.50	66.82	
		Min	15.18	2.78	14.00	5.00	13.40	24.10	64.65	24.68	13.72	44.48	21.23	8.95		2.78
2	CHP	Max	159.87	152.50	165.96	197.90	278.79	278.02	370.52	370.62	371.56	370.88	277.43	180.23	371.56	
		Min	47.50	31.90	57.35	74.51	124.81	69.10	160.77	53.00	154.00	221.19	121.24	93.14		31.90
3	THP	Max	240.00	260.00	300.00	480.00	1,122.00	1,122.00	1,122.00	1,122.00	1,122.00	1,122.00	560.00	320.00	1,122.00	
		Min	120.00	120.00	60.00	60.00	270.00	460.00	935.00	935.00	748.00	400.00	270.00	190.00		60.00
4	KHP	Max	32.42	32.48	45.27	66.00	66.18	66.00	66.00	66.00	66.00	66.00	48.75	33.00	66.18	
		Min	16.00	13.00	10.29	12.01	31.58	16.50	49.50	16.50	33.00	16.07	16.00	16.50		10.29
5	DHP	Max	23.50	36.16	50.06	47.00	126.92	126.98	95.10	100.70	100.79	100.70	52.27	40.03	126.98	
		Min	13.16	10.99	15.21	14.01	17.16	36.20	5.50	1.13	40.30	48.74	31.31	23.06		1.13
6	MHP	Max	150.60	182.10	554.04	379.28	792.05	791.61	793.07	1,358.21	790.24	594.26	359.41	194.86	1,358.00	
		Min	102.68	84.78	111.57	175.87	426.96	589.94	727.05	789.40	630.46	388.40	194.45	133.47		84.78

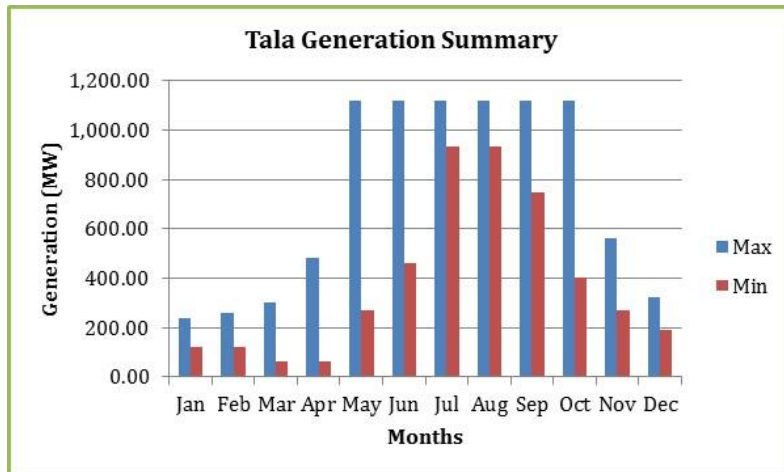
Graph: 2.1.1 Basochhu generation summary



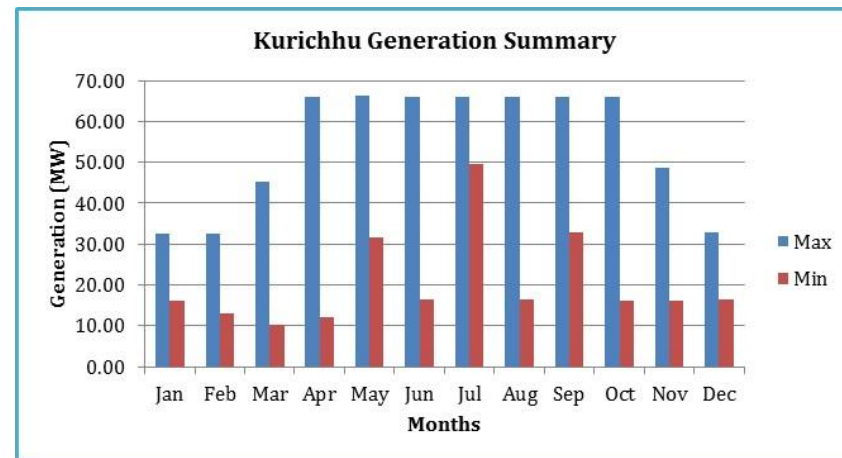
Graph: 2.1 Chhukha generation summary



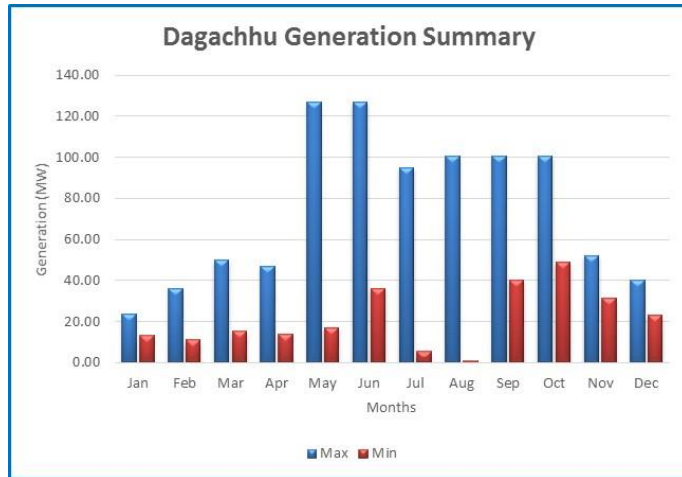
Graph: 2.1.3 Tala generation summary



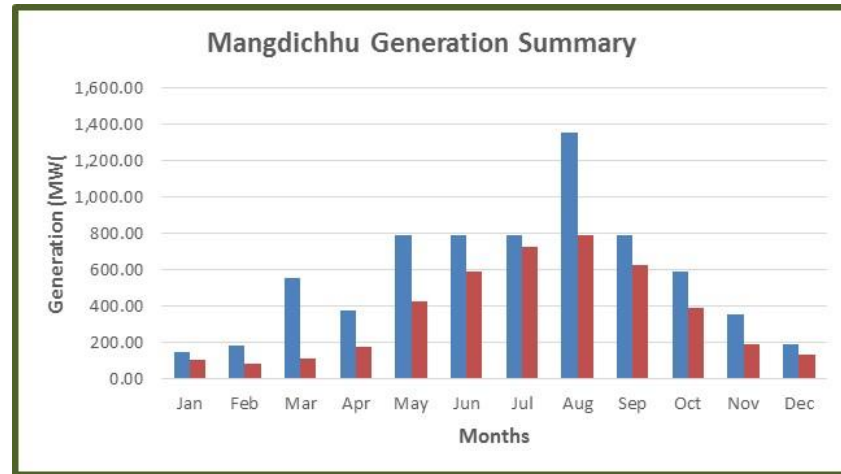
Graph: 2.1.4 Kurichhu generation summary



Graph: 2.1.5 Dagachhu generation summary



Graph: 2.1.6 Mangdichhu generation summary



2.2 PLANT FACTOR

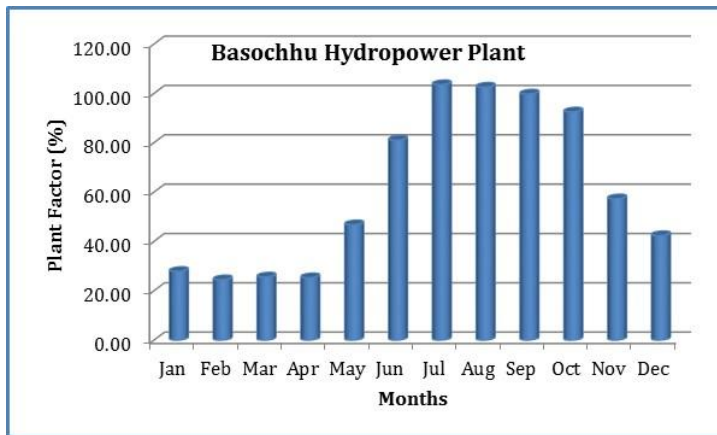
The plant factor of each generating plant was calculated as below:

$$\begin{aligned}
 \text{Plant factor} &= (\text{Actual output of a plant over a period of time}) / (\text{Output when operated at name plate rated capacity for entire time}) \\
 &= (\text{Total energy plant has produced over a period}) / (\text{Total energy plant would produce when operated at full rated capacity})
 \end{aligned}$$

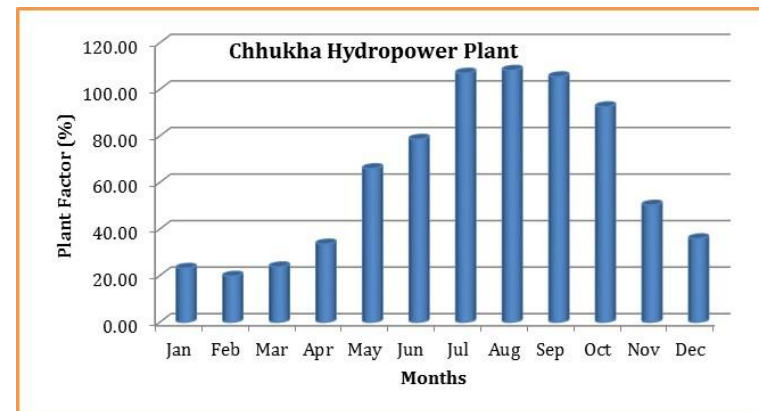
Table: 2.2.1 Monthly plant factor of the hydropower plants

Sl. No	Hydropower Plant	Monthly Plant Factor (%)												Max/Min of year	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max	Min
1	BHP	27.85	24.45	25.57	25.26	46.74	81.04	103.54	102.54	99.75	92.49	57.26	42.35	103.54	24.45
2	CHP	23.11	19.71	23.74	33.54	65.93	78.56	106.93	108.17	105.39	92.50	50.24	35.82	108.17	19.71
3	THP	15.21	13.67	16.23	22.08	56.25	89.02	109.41	109.23	103.96	68.78	33.15	23.52	109.41	13.67
4	KHP	30.85	28.76	38.03	60.37	97.93	100.15	108.59	105.79	109.65	99.47	57.30	41.60	109.65	28.76
5	DHP	13.73	13.20	13.82	13.77	32.59	61.23	96.31	96.25	87.08	64.99	33.41	23.83	96.31	13.20
6	MHP	0.00	0.00	0.00	26.48	39.18	56.70	72.54	73.75	81.21	57.20	4.60	0.00	81.21	0.00

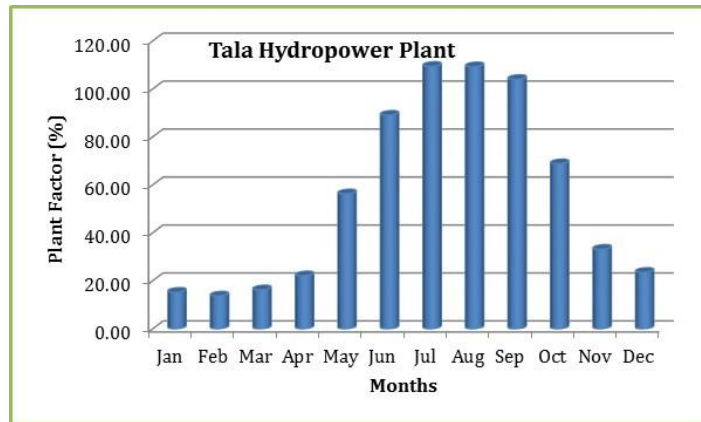
Graph: 2.2.1 Plant factor of Basochhu Hydropower Plant



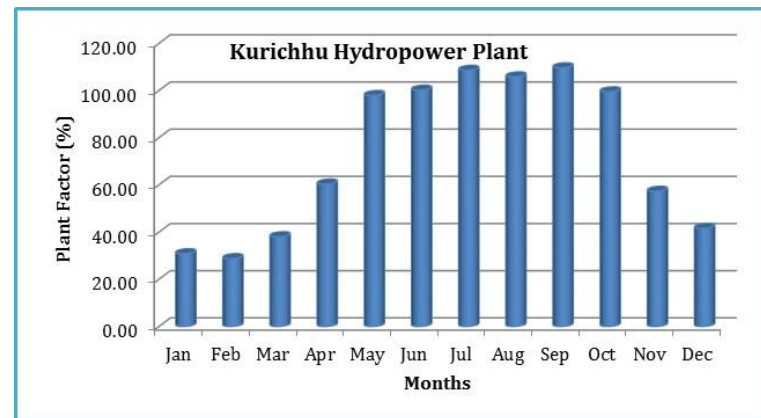
Graph: 2.2.2 Plant factor of Chhukha Hydropower Plant



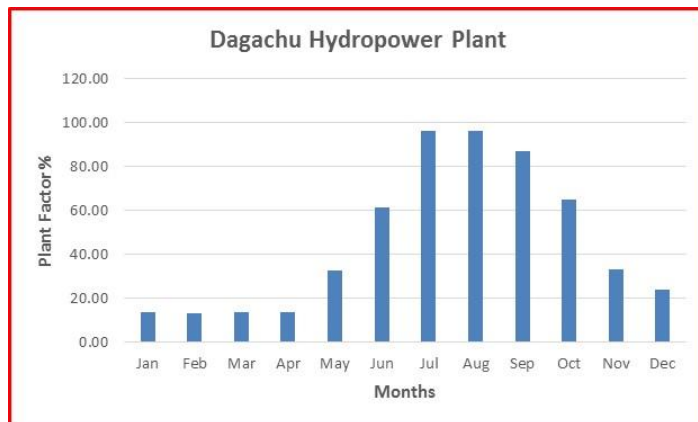
Graph: 2.2.3 Plant factor of Tala Hydropower Plant



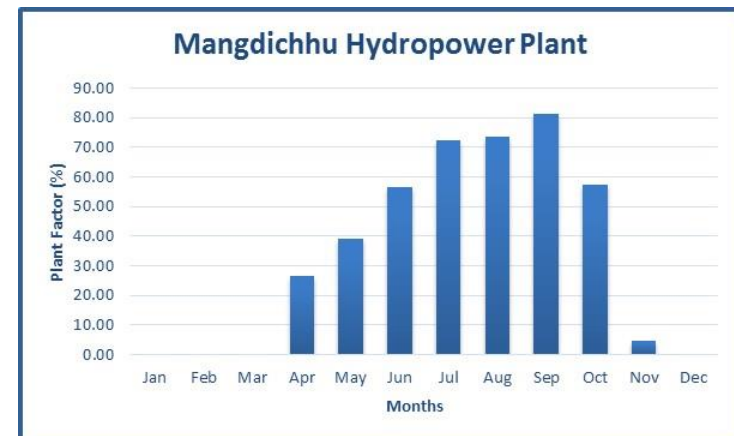
Graph: 2.2.4 Plant factor of Kurichhu Hydropower Plant



Graph: 2.2.5 Plant factor of Dagachhu Hydropower Plant



Graph: 2.2.6 Plant factor of Mangdichhu Hydropower Plant



3.0 PEAK DEMAND, ENERGY AVAILABILITY AND REQUIREMENT FOR THE COUNTRY

Calculation of coincidental peak load for the eastern grid, western grid and national load, we use the following methods:

1. *National Demand = (Sum of all total generation of each plant) – (Sum of all Export/Import)*
2. *National Demand = (Sum of all feeders loading at hydropower plant) – (Sum of all Export/Import)*
3. *National Demand = (Sum of all substation loading)*

The national load calculated using method-3 is considered in the report.

3.1 NATIONAL LOAD

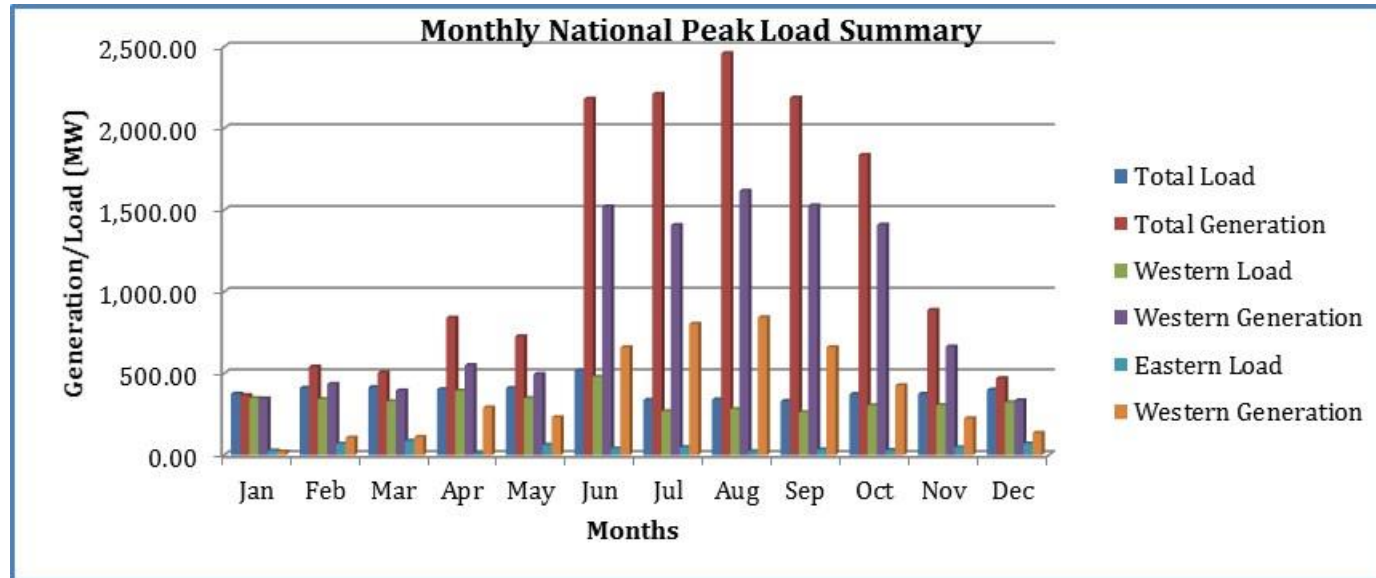
The national coincidental peak load for the year was recorded 374.53 MW (almost reduced by -3.39% compare to 2019 (387.66 MW)) on December 24, 2020 at 15:00Hrs. using method-2 (sum of all feeder loading at hydropower plant minus sum of export/import). The peak load persisted for 6 second as per the record in the Scada system. The main factor contributing towards the fall in Bhutan peak load from 2018 could be because of less production by the industries in 2020((Due to Covid-19). It had been also observed that the total sale of energy to BPC is less by about 50 MU this year compare to 2019. The table below shows the coincidental peak load summary from 2007:

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Peak Load (MW)	157.36	187.05	237.17	256.95	276.24	282.44	313.94	333.41	336.52	335.87	362.09	399.35	387.66	374.53
% Growth over previous Year	-	18.87	26.79	8.34	7.51	2.24	11.15	6.20	0.93	-0.19	7.81	10.29	-2.93	-3.39

Table: 3.1.2 Monthly national peak load and corresponding generation using method- 3

Sl. No	Months	Date	Time	Total Grid (MW)		Western Grid (MW)		Eastern Grid (MW)	
				Load	Generatio n	Load	Generatio n	Load	Generatio n
1	Jan	9-Jan-19	18:00	375.25	366.15	348.25	345.74	27.00	20.41
2	Feb	26-Feb-20	19:00	411.17	541.22	341.81	435.10	69.36	106.12
3	Mar	4-Mar-20	19:00	415.98	505.02	328.92	394.74	87.06	110.28
4	Apr	28-Apr-20	13:00	402.83	840.32	393.31	550.10	9.52	290.22
5	May	12-May-20	19:00	410.15	726.02	347.76	494.93	62.39	231.09
6	Jun	24-Jun-20	2:00	518.60	2,180.72	478.78	1,521.32	39.83	659.40
7	Jul	23-Jul-20	10:00	336.8	2,210.66	269.01	1,408.08	47.91	802.58
8	Aug	26-Aug-20	4:00	340.03	2,459.52	281.43	1,617.39	23.51	842.13
9	Sep	24-Sep-20	15:00	330.66	2,186.84	261.28	1,527.39	33.82	659.45
10	Oct	27-Oct-20	3:00	372.91	1,836.69	303.81	1,409.80	30.34	426.89
11	Nov	13-Nov-20	19:00	373.94	888.07	305.34	663.22	47.21	224.85
12	Dec	31-Dec-20	18:00	399.35	469.91	322.49	334.56	70.01	135.35
National Peak Load of the year (MW)				518.60					

Graph: 3.1.2 Monthly national peak load and corresponding generation using method- 3



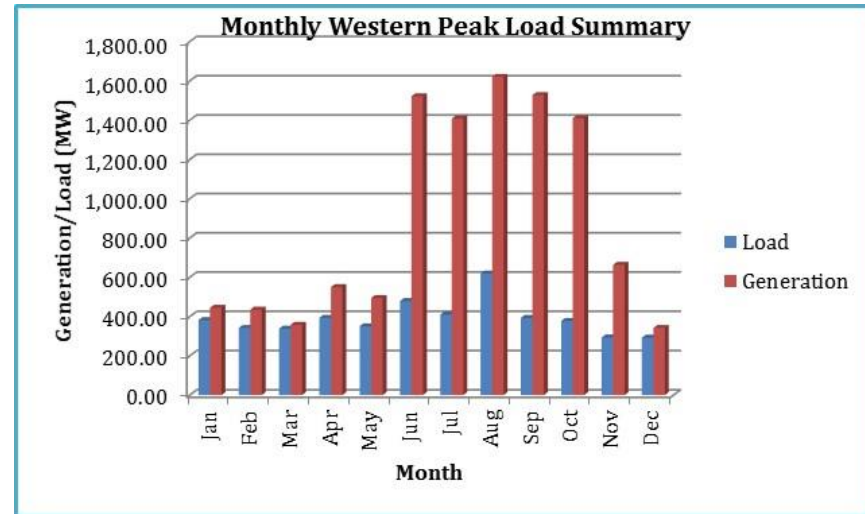
3.2 WESTERN GRID PEAK LOAD

Using method-3, the peak load for the western grid was 618.55 MW which occurred on August 13, 2020.

Table: 3.2.1 Monthly western peak load and corresponding generation

Sl. No	Months	Date	Time	Western Grid (MW)	
				Load	Generation
1	Jan	12-Jan-20	19:00	381.96	444.41
2	Feb	26-Feb-20	19:00	341.81	435.10
3	Mar	10-Mar-20	22:00	338.56	358.02
4	Apr	28-Apr-20	13:00	393.31	550.10
5	May	12-May-20	20:00	350.01	494.25
6	Jun	24-Jun-20	2:00	478.78	1,521.32
7	Jul	23-Jul-20	10:00	410.32	1,408.08
8	Aug	13-Aug-20	20:00	618.55	1,620.60
9	Sep	24-Sep-20	15:00	392.86	1,527.39
10	Oct	27-Oct-20	3:00	377.45	1,409.80
11	Nov	13-Nov-20	19:00	293.22	663.22
12	Dec	28-Dec-20	19:00	292.48	341.81
Western Peak Load of the year (MW)				618.55	

Graph: 3.2.1 Monthly western peak load and corresponding generation



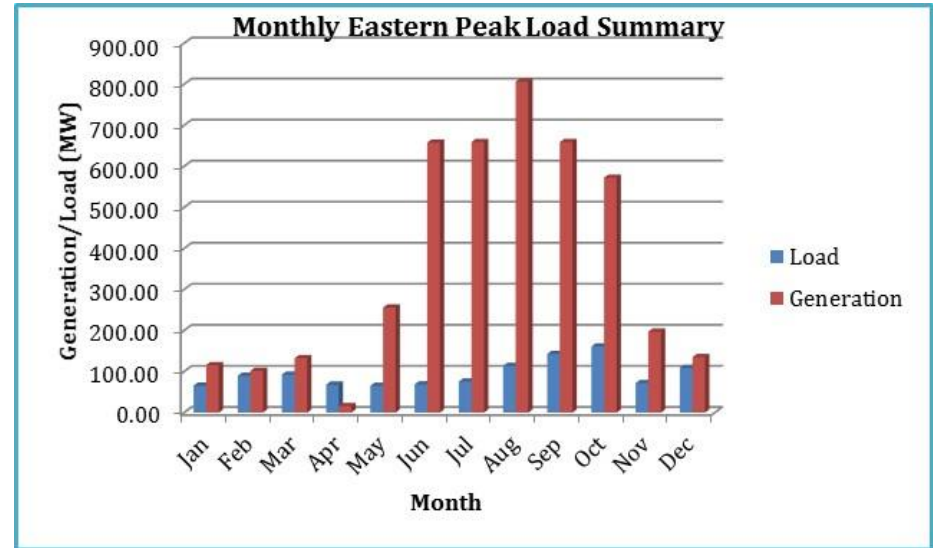
3.3 EASTERN GRID PEAK LOAD

Using method-2, the peak load for the eastern grid was 70.48 which occurred on December 6, 2019.

Table: 3.3.1 Monthly eastern peak load and corresponding generation

Sl. No	Months	Date	Time	Eastern Grid (MW)	
				Load	Generation
1	Jan	29-Jan-20	8:00	65.55	115.70
2	Feb	7-Feb-20	19:00	89.92	101.74
3	Mar	15-Mar-20	19:00	92.60	132.65
4	Apr	13-Apr-20	19:00	68.12	16.03
5	May	9-May-20	19:00	65.28	255.98
6	Jun	19-Jun-20	12:00	68.73	657.73
7	Jul	29-Jul-20	21:00	75.72	659.38
8	Aug	24-Aug-20	23:00	113.99	806.33
9	Sep	3-Sep-20	7:00	142.85	659.21
10	Oct	2-Oct-20	23:00	161.24	572.30
11	Nov	25-Nov-20	18:00	71.94	197.26
12	Dec	31-Dec-20	18:00	108.85	135.35
Eastern Peak Load of the year (MW)				161.24	

Graph: 3.3.1 Monthly eastern peak load and corresponding generation



4.0 EXPORT AND IMPORT OF ELECTRICITY TO/FROM NEIGHBORING COUNTRIES

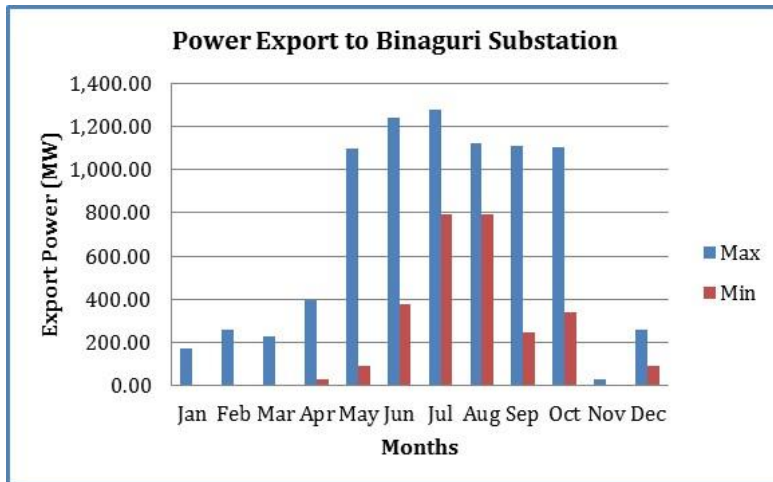
4.1 EXPORT OF ELECTRICITY TO NEIGHBORING COUNTRY

Maximum export of electricity for the year was 1,280.00MW to Binaguri substation in July, 2020, followed by 445.50MW and 192.20 to Birpara and Salakoto & Rangia substation. The minimum export was 0.01 MW to Salakati & Rangia substation.

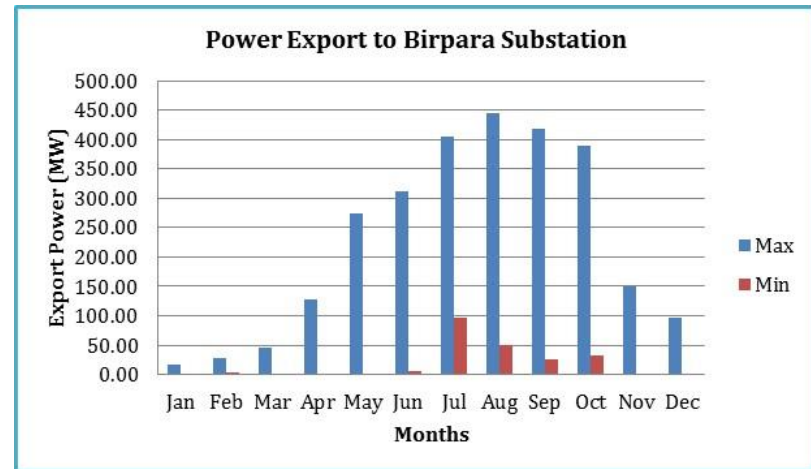
Table: 4.1.1 Monthly power export summary

Sl. No	Substation in India		Monthly Maximum and Minimum Export (MW)												Max/Min of year (MW)	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Binaguri	Max	174.00	256.00	228.00	398.00	1,097.00	1,238.00	1,280.00	1,122.00	1,110.00	1,104.00	28.00	261.00	1,280.00	
		Min	0.00	1.00	1.00	29.00	92.00	374.00	794.50	791.00	244.00	338.00	1.00	91.00	0.00	
2	Birpara	Max	17.00	28.70	46.00	128.00	273.55	311.08	405.10	445.50	418.80	390.50	150.50	96.20	445.50	
		Min	0.40	3.20	0.50	0.04	0.33	6.00	95.88	49.00	24.82	33.00	0.30	0.14	0.04	
3	Salakoti & Rangia	Max	46.56	55.51	18.57	101.04	150.44	123.20	139.97	192.20	125.31	127.13	61.99	18.64	192.20	
		Min	0.01	0.29	0.24	0.03	1.24	19.55	50.87	0.89	3.83	38.97	0.34	0.03	0.01	

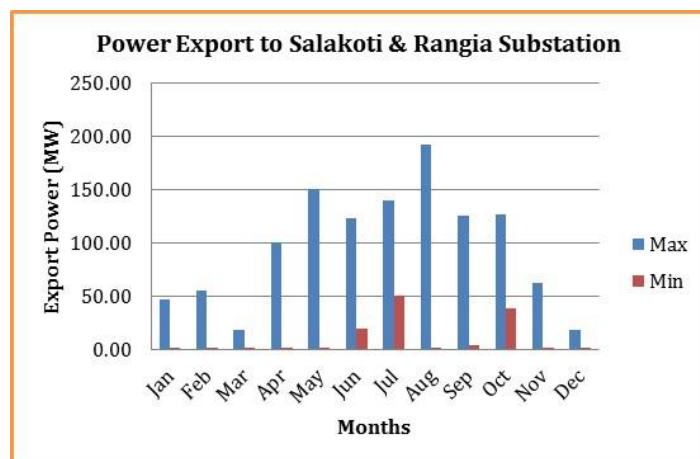
Graph: 4.1.1 Monthly power export to Binaguri substation



Graph: 4.1.2 Monthly power export to Birpara substation



Graph: 4.1.3 Monthly net power export to Salakoti and Rangia substation



4.2 IMPORT OF ELECTRICITY FROM NEIGHBORING COUNTRY

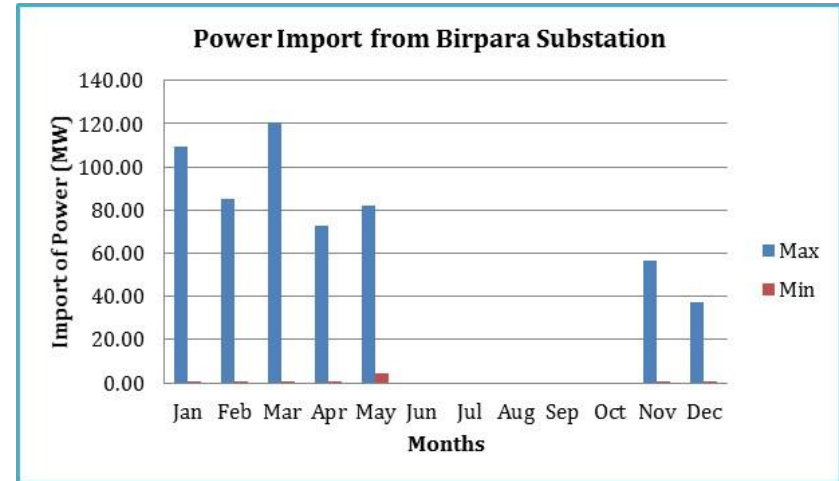
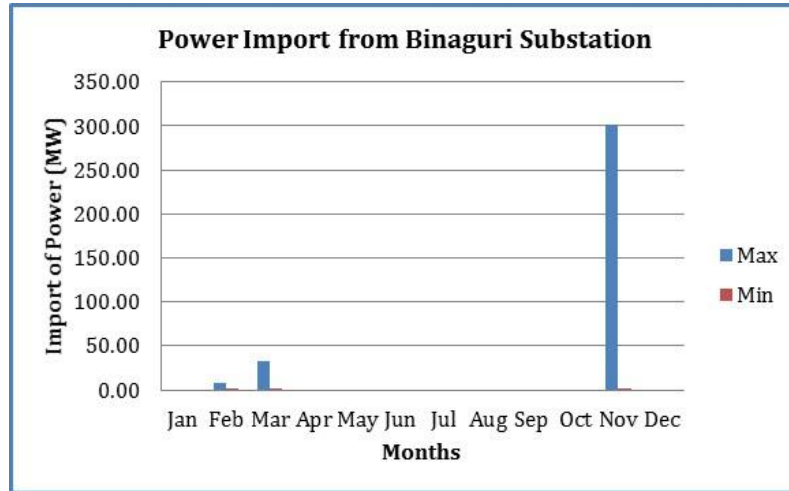
Maximum import of power was 301.00 MW from Binaguri substation which occurred in November, 2020 followed by 120.80 MW and 67.98 from Birpara, Salakoti and Rangia and respectively.

Table: 4.2.1 Monthly power import summary

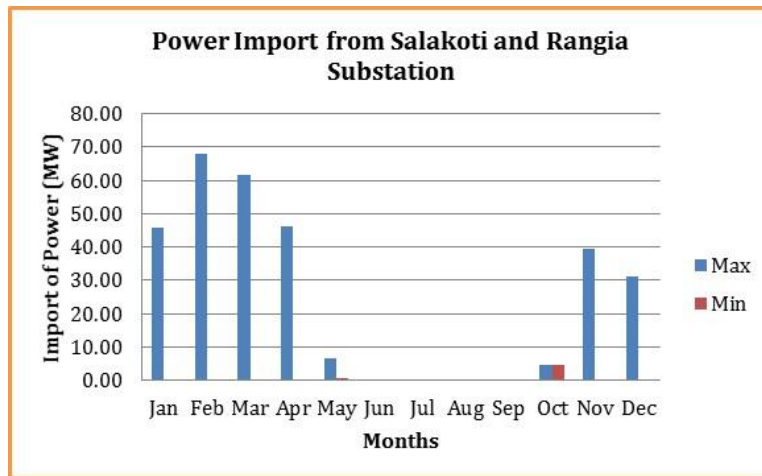
Sl. No	Substation in India	Monthly Maximum and Minimum Import (MW)												Max/Min of year (MW)		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
1	Binaguri	Max	0.00	8.00	33.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	301.00	0.00	301.00	
		Min	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
2	Birpara	Max	109.30	85.31	120.80	73.00	82.18	0.00	0.00	0.00	0.00	0.00	56.43	37.36	120.80	
		Min	0.20	0.40	0.10	0.10	4.30	0.00	0.00	0.00	0.00	0.00	0.50	0.30	0.00	0.00
3	Salakoti & Rangia	Max	45.80	67.98	61.84	46.37	6.74	0.00	0.00	0.00	0.00	4.67	39.27	31.25	67.98	
		Min	0.01	0.05	0.05	0.01	0.50	0.00	0.00	0.00	0.00	4.67	0.01	0.08	0.00	0.00

Graph: 4.2.1 Power import from Binaguri substation summary

Graph: 4.2.2 Power import from Birpara substation summary



Graph: 4.2.3 Power import from Salakoti and Rangia substation summary



5.0 FREQUENCY PROFILE: MAXIMUM AND MINIMUM FREQUENCY RECORDED AND THE FREQUENCY DURATION IN DIFFERENT FREQUENCY BANDS

As per the Grid Code Regulation 2008, Clause 6.4.1 the transmission system frequency was classified into three different bands as follows:

1. *Normal state*
The transmission system frequency is within the limit of 49.5Hz to 50.5Hz
2. *Alert state*
The transmission system frequency is beyond the normal operating limit but within 49.0Hz to 51.0Hz
3. *Emergency state*
There is generation deficiency and frequency is below 49.0Hz.

We base our frequency at 220kV Bus frequency at 220/66/11kV Semtokha substation in the western grid and 132kV Bus frequency at 60MW Kurichhu Hydropower Plant in the eastern grid.

Table: 5.0.1 Frequency profile at Semtokha substation

220/66/11kV Semtokha Substation					
Sl. No	Months	220kV Bus Frequency Operation State (%)			
		Normal	Alert	Emergency	Blackout/Other
1	Jan	100.00	0.00	0.00	0.00
2	Feb	100.00	0.00	0.00	0.00
3	Mar	100.00	0.00	0.00	0.00
4	Apr	100.00	0.00	0.00	0.00
5	May	100.00	0.00	0.00	0.00
6	Jun	96.51	0.00	0.00	3.49
7	Jul	100.00	0.00	0.00	0.00
8	Aug	100.00	0.00	0.00	0.00
9	Sep	100.00	0.00	0.00	0.00
10	Oct	100.00	0.00	0.00	0.00
11	Nov	100.00	0.00	0.00	0.00
12	Dec	0.00	0.00	0.00	0.00
Operation State for the year		91.38%	0.00%	0.00%	0.29%

Graph: 5.0.1 Frequency profile at Semtokha substation

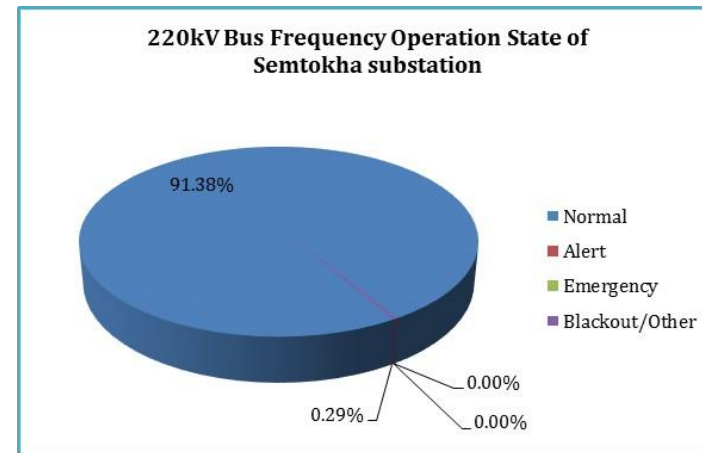
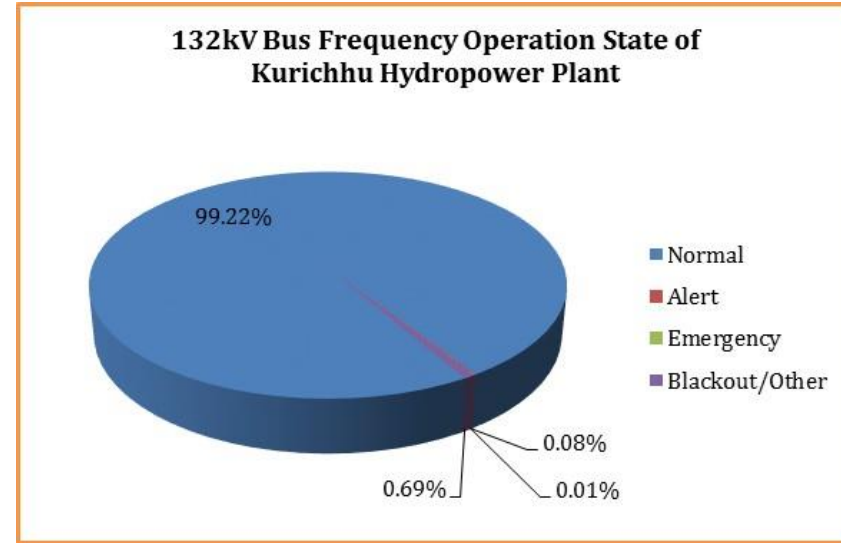


Table: 5.0.2 Frequency profile at Kurichhu Hydropower plant

60MW Kurichhu Hydropower Plant					
Sl. No	Months	132kV Bus Frequency Operation State (%)			
		Normal	Alert	Emergency	Blackout/Other
1	Jan	100.00	0.00	0.00	0.00
2	Feb	98.71	0.14	0.00	1.15
3	Mar	100.00	0.00	0.00	0.00
4	Apr	99.31	0.00	0.00	0.69
5	May	99.73	0.27	0.00	0.00
6	Jun	96.77	0.00	0.00	3.23
7	Jul	100.00	0.00	0.00	0.00
8	Aug	99.60	0.40	0.00	0.00
9	Sep	100.00	0.00	0.00	0.00
10	Oct	100.00	0.00	0.00	0.00
11	Nov	96.51	0.13	0.13	3.23
12	Dec	100.00	0.00	0.00	0.00
Operation State for the year		99.22%	0.08%	0.01%	0.69%

Graph: 5.0.2 Frequency profile at Kurichhu Hydropower Plant



6.0 VOLTAGE PROFILE OF SELECTED SUBSTATIONS

As the Grid Code Regulation 2008, Clause 6.4.1, the voltage at all connection points was classified into three different bands as follows:

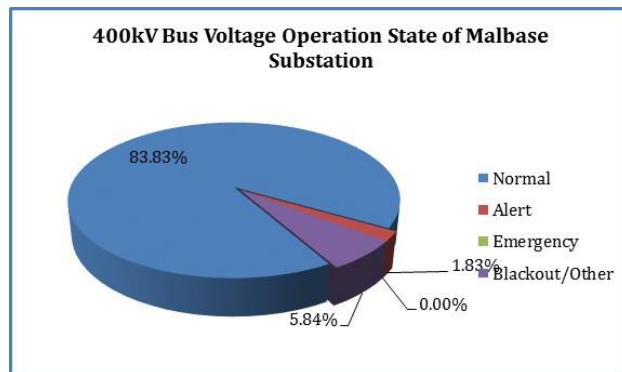
1. *Normal state*
The voltages at all connection point are within the limits of 0.95 times and 1.05 times of the normal values
2. *Alert state*
The voltage at all connection points are outside the normal limit but within the limits of 0.9 times and 1.1 times of the normal values
3. *Emergency state*
Transmission system voltages are outside the limits of 0.9 times and 1.1 times of nominal values.

The voltage profile of 400/220/66/11kV Malbase substation in western grid and 132/33/11kV Nangkhor substation in the eastern grid are considered in the report.

Table: 6.0.1 Voltage profile at Malbase substation

400/220/66/11kV Malbase Substation										
Sl. No	Months	400kV Bus Voltage Operation State (%)				220kV Bus Voltage Operation State (%)				
		Normal	Alert	Emergency	Blackout/Other	Normal	Alert	Emergency	Blackout/Other	
1	Jan	100.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	
2	Feb	100.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	
3	Mar	100.00	0.00	0.00	0.00	99.73	0.27	0.00	0.00	
4	Apr	96.10	0.27	0.00	3.63	92.07	4.44	0.00	3.49	
5	May	100.00	0.00	0.00	0.00	99.87	0.13	0.00	0.00	
6	Jun	100.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	
7	Jul	100.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	
8	Aug	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	
9	Sep	96.77	0.00	0.00	3.23	96.77	0.00	0.00	3.23	
10	Oct	99.60	0.40	0.00	0.00	99.46	0.00	0.54	0.00	
11	Nov	15.59	21.24	0.00	63.17	96.64	0.00	0.13	3.23	
12	Dec	97.85	0.02	0.00	0.00	100.00	0.00	0.00	0.00	
Operation State for year		83.83%	1.83%	0.00%	5.84%	98.71%	0.40%	0.06%	0.83%	

Graph: 6.0.1 Voltage profile at Malbase substation at 400kV bus



Graph: 6.0.2 Voltage profile at Malbase substation at 220kV bus

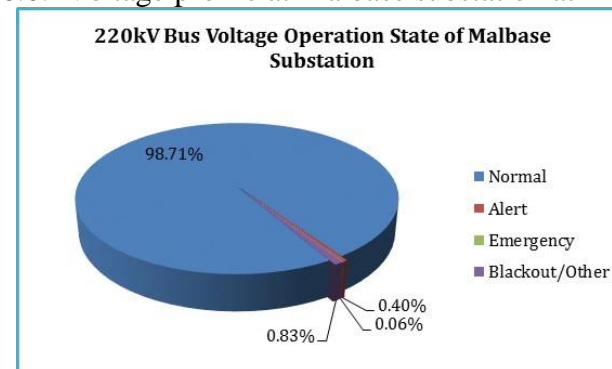
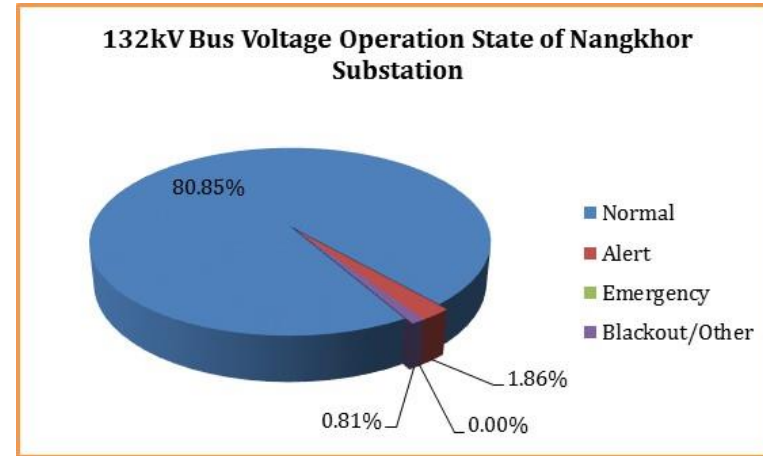


Table: 6.0.2 Voltage profile at Nangkhor substation

132/33/11kV Nangkhor Substation					
Sl. No	Months	132kV Bus Voltage Operation State (%)			
		Normal	Alert	Emergency	Blackout/Other
1	Jan	90.59	9.27	0.00	0.13
2	Feb	98.13	1.44	0.00	0.43
3	Mar	96.37	2.96	0.00	0.67
4	Apr	94.89	4.97	0.00	0.13
5	May	97.18	2.82	0.00	0.00
6	Jun	99.44	0.56	0.00	0.00
7	Jul	100.00	0.00	0.00	0.00
8	Aug	0.00	0.27	0.00	1.34
9	Sep	96.77	0.00	0.00	3.23
10	Oct	100.00	0.00	0.00	0.00
11	Nov	96.77	0.00	0.00	3.23
12	Dec	0.00	0.00	0.00	0.54
Operation State for year		80.85%	1.86%	0.00%	0.81%

Graph: 6.0.3 Voltage profile at Nangkhor substation



7.0 MAJOR GENERATING AND TRANSMISSION OUTAGE

The summary of the major transmission outages for the eastern grid and western grid are attached as Annexure- I and Annexure- II respectively.

The outages of transmission line or transformer or any power system equipment below 66kV, tripping/outage of less than 30minutes and planned shutdown which do not cause supply interruption to the customers are not reflected.

8.0 TRANSMISSION CONSTRAINTS

There are no instant of transmission constraints during normal condition in Bhutan Power System.

9.0 INSTANCES OF PERSISTENT OR SIGNIFICANT NON-COMPLIANCE WITHIN THE GRID CODE REGULATION

The instance of non-compliance with the Grid Code Regulation 2008 for the year 2019 was not recorded.

Eastern Grid Outages

SMD Deothang												
January, 2020												
132/33/11kV, Kilikhar substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	01.01.2020	13:05	01.01.2020	13:23	0:18	5.07	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
2	03.01.2020	2:47	03.01.2020	2:49	0:02	7.16	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
3	03.01.2020	19:45	03.01.2020	19:59	0:14	7.12	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
4	04.01.2020	2:51	04.01.2020	2:53	0:02	7.29	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
5	04.01.2020	3:57	04.01.2020	3:59	0:02	7.52	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
6	05.01.2020	17:35	05.01.2020	17:42	0:07	5.22	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
7	05.01.2020	19:19	05.01.2020	19:24	0:05	6.66	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	
8	05.01.2020	19:25	06.01.2020	19:54	0:29	6.66	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	Relay 86	Corlung end	Tripped on fault
9	13.01.2020	8:20	13.01.2020	8:39	0:19	12.38	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	86 relay operated	Corlung end	Tripped on fault
10	13.01.2020	8:45	13.01.2020	8:53	0:08	12.38	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	86 relay operated	Corlung end	Tripped on fault
11	13.01.2020	13:46	13.01.2020	15:48	0:02	14.68	132kV O/G Corlung Feeder	132kV O/G Corlung Feeder only	Tripped on fault	86 relay operated	Corlung end	

132/33/11kV, Deothang substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	03.01.2020	7:42	03.01.2020	8:03	0:21	1.33 & 1.3	132/33 5MVA Transformer I and II	Deothang substation	Tripped by 33kV s/jongkhor fdr	Tripped on fault	Deothang	
2	05.01.2020	17:13	05.01.2020	17:30	0:17	7.23	132kV Motanga	Motanga fdr	Tripped on fault	Zone I,II & III trip, Fault Loop: L1-L2, Fault Dist: 42.840km	Unknown	
3	05.01.2020	17:45	05.01.2020	17:59	0:14	7.23	132kV Motanga	Motanga fdr	Tripped on fault	Zone I & III trip, Fault Loop: L2-L3, Fault Dist: 4.9192km	Unknown	
4	27.01.2020	15:19	30.01.2020	13:45	71:05	-21.28	132kV Nangkhor	Nangkhor -Deothang line	Tree fallen on B phase conductor	Tripping relay 86	Unknown	
5	29.1.2020	7:08	29.1.2020	7:26	0:18	-2.74	132kV Motanga	Motanga - Deothang line	Tripped from Rangia substation	-	Rangia substation	Tripped on fault
132/33/11kV, Nangkhor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	17:05 hrs	05.01.2020	17:10 hrs	0:05	-5.79	132kV Nangkhor-Nganglam	Nangkhor-Nganglam line	Transient fault	Distance relay operated	Nangkhor-Nganglam line	
2	05.01.2020	17:45 hrs	05.01.2020	17:48 hrs	0:03	15.01	132kV Nangkhor-Deothang	Nangkhor-Deothang line	Transient fault	Distance relay operated	Nangkhor-Deothang line	
3	27.01.2020	15:20 hrs	30.01.2020	13:44 hrs	71:04	21.48	132kV Nangkhor-Deothang	Nangkhor-Deothang line	Tripped on fault/B Ø Conductor snapped	Distance relay operated	Between ND#35 & ND#36	
4	27.01.2020	15:30 hrs	27.01.2020	15:51 hrs	21	-6.76	132kV Nangkhor-Nganglam	Nangkhor-Nganglam line	Tripped on fault	Distance relay operated	Between ND#35 & ND#36	

132/33/11kV, Kanglung substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	17:31	05.01.2020	17:37	0:06	4.87	132kV Corlung Feeder	Corlung Feeder	Tripped on fault	O/C	Corlung end	
2	13.01.2020	8:24	13.01.2020	8:37	0:13	8.48	132kV Corlung Feeder	Corlung Feeder	Tripped on fault	O/C	Corlung end	
3	13.01.2020	8:46	13.01.2020	8:53	0:07	8.48	132kV Corlung Feeder	Corlung Feeder	Tripped on fault	O/C	Corlung end	
4	29.01.2020	8:15	29.01.2020	8:21	0:06	15.94	132kV Corlung Feeder	Corlung Feeder	Tripped on fault	-	KHPC end	

132/33/11kV, Nganglam substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	17:07	05.01.2020	17:09	0:02	7.27	132kV Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	NA	Tingtibi Substation	
2	27.01.2020	15:26	27.01.2020	15:39	0:13	7.27	132kV Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	86opted & O/C, DPR relay opted.	Nganglam-Tingtibi	
3	27.01.2020	15:28	27.01.2020	15:47	0:19	5.72	132kV Nangkhor-Nganglam	Nangkhor-Nganglam	Tripped on Fault	86opted & O/C, DPR relay opted.	Nganglam-Tingtibi	

SMD Jigmeling

January, 2020												
220/132/33kV, Jigmeling substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	16:06	05.01.2020	16:54	0:48	106.900	400kV Interim Jigmeling to Alipurduar	400kV Interim Jigmeling to Alipurduar line segment	earth fault	distance relay main 1 and main 2 optd.	main 1=18.5km main 2=18.47km	
2	05.01.2020	15:29	05.01.2020	15:39	0:10	17.68	132kV Jigmeling to Tingtibi line	132kV Jigmeling to Tingtibi line segment	Bad weather	distance relay 1 and distance relay 2 optd.	main 1=3.4km main 2=3.5km	
132/33/11kV, Tingtibi substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	1/5/2020	15:29 Hrs	2/5/2020	15:40Hrs	0:11	17.000	132kV Tingtibi-Jigmeling fdr.	132kV Tingtibi-Jigmeling fdr.	Over current	Distance relay operated :Zone-1,Fault loaction:39.49kM.	132kV Tingtibi-Jigmeling fdr.	
2	1/5/2020	17:06 Hrs	2/5/2020	17:11Hrs	0:05	14.610	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Distance relay operated :Zone-3,Fault loaction:110.4kM.	132kV Tingtibi-Nanglam fdr.	

SMD Deothang

April, 2020

132/33/11kV, Kilikhar substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	9.04.2020	22:15	9.04.2020	22:28	13	10.73	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nil	Jigmeling	
2	9.04.2020	22:33	10.04.2020	0:05	32	10.73	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nil	Jigmeling	
3	10.04.2020	2:55	10.04.2020	3:04	9	2.88	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nil	Deothang	
4	15.04.2020	14:24	15.04.2020	15:30	6	11.70	132kv I/C, Kurichu FDR	All the O/G Fedrs	NA	Nil	Kurichu	

132/33/11kV, Kanglung substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	5:30	09.04.2020	5:41	0:11	-5.537	132kV Puntshothang Feeder	Phuntshothang Line	VT fuse fail		Kanglung SS	
2	09.04.2020	22:15	09.04.2020	22:28	0:13	7.344	132kV Korlung Feeder		Grid fail	6 (GR A/B trip optd.	Jigmeling SS	
3	09.04.2020	22:33	10.04.2020	0:05	0:32	7.344	132kV Korlung Feeder		Grid fail	6 (GR A/B trip optd.	Jigmeling SS	
4	10.04.2020	2:54	10.04.2020	3:01	0:07	1.498	132kV Korlung Feeder		Grid fail		Jigmeling SS	
5	15.04.2020	14:21	15.04.2020	15:29	0:08	10.8	132kV Korlung Feeder		Grid fail	6 (GR A/B trip optd.	Jigmeling SS	

132/33/11kV, Nangkor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	01:50 hrs	09.04.2020	09:30 hrs	51	0.3	5MVA,132/33kV Transformer-I	All 33kV & 11kV feeders	NA	Ref.Protn.64R & trip relay opearted	Nangkor Substation	Tripped due to fault on Wamrong feeder. Charged in the morning hrs, no supply interrupted.
2	09.04.2020	01:50 hrs	09.04.2020	02:10 hrs	20	0.29	5MVA,132/33kV Transformer-II	All 33kV & 11kV feeders	NA	Bucholz relay 30E/F & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on Wamrong feeder
3	09.04.2020	22:16 hrs	09.04.2020	22:27 hrs	11	9.68	Grid fail	All feeders	NA	-	Jigmeling Substation	Supply failed from Jigmiling Substation.
4	09.04.2020	22:33 hrs	09.04.2020	00:05 hrs	32	-	Grid fail	All feeders	NA	-	Jigmeling Substation & Motonga Substation	Supply failed from Jigmiling Substation & Motonga Substation. Supply restored from Motonga Substation(Rangia Grid)
5	10.04.2020	02:51 hrs	10.04.2020	03:02 hrs	11	-53.28	Grid fail	All feeders	NA	-	Deothang Substation	Supply failed from Deothang Substation
6	15.04.2020	14:11 hrs	15.04.2020	15:08 hrs	57	13.96	Grid fail	All feeders	NA	Distance Relay Operated: Star Ø ABCN, Tripped phase ABC	Nangkor-Deothang line	
7	21.04.2020	14:38 hrs	21.04.2020	14:56 hrs	18	29.2	Grid fail	All feeder	NA	Distance Relay Operated: Star Ø CN, Tripped phase ABC	Nangkor-Deothang line	

132/33/11kV, Deothang substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	21:47	9.04.2020	21:55	8	-11.413	132kV Incomer fdr	Deothang to Nangkhor line	Gride fail	NA	Grid fail	
2	09.04.2020	21:47	9.04.2020	21:56	9	10.62	132kV Motanga fdr	Deothang to Motonga line	Gride fail	RYB Phase & Z1, Z2,Z3 operated. Fault Dist: 9.794km Fault Loop: L1-L2	Grid fail	
3	09.04.2020	22:15	9.04.2020	0:06	51	-11.413	132kV Incomer fdr	Deothang to Nangkhor line	Gride fail	NA	Grid fail	
4	10.04.2020	2:55	10.04.2020	3:05	10	-49.32	132kV Incomer fdr	Deothang to Nangkhor line	O/C on B&C phase	tripping relay (86) and zone 1, Zone 3 Fault Dist: 48.08km	NA	
5	15.04.2020	14:10	15.04.2020	14:11	1	-14.364	132kV Motanga fdr	Deothang to Motanga line	Overcurrent on all phase	RYB Phase & Z1, Z2,Z3 operated. Fault Dist: 9.0416km, Fault Loop: L1-L2	unknown	
6	15.04.2020	14:20	15.04.2020	14:23	3	-14.364	132kV Motanga fdr	Deothang to Motanga line	Overcurrent on all phase	RYB Phase & Z1, Z2,Z3 operated. Fault Dist: 1km, Fault Loop: L1-L2	unknown	
7	15.04.2020	14:34	15.04.2020	14:55	16	-14.364	132kV Motanga fdr	Deothang to Motanga line	Gride fail	NA	Grid fail	
8	15.04.2021	14:20	15.04.2021	14:30	10	-14.364	132kV Incomer fdr	Deothang to Nangkhor line	Tripped on Earthfault	86 relay & 50N opt.	Unknown	
132/33/11kV, Nganglam substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	21:20	10.04.2020	21:30	10	0.183	5MVA Tr-I & II	5MVA Tr-I & II	Transient fault	86opted	5MVA Tr-I & Tr-II	
2	09.04.2020	22:15	10.04.2020	00:09	54	0.183	5MVA Tr-I & II	5MVA Tr-I & II	Transient fault	86opted	5MVA Tr-I & Tr-II	
3	09.04.2020	22:15	10.04.2020	00:33	37	-9.64	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Nangkhor & Tingtini end	
4	09.04.2020	22:15	10.04.2020	00:57	42	6.42	DCP	DCP	Hand Tripped	NA	Grid fail	
5	10.04.2020	02:55	10.04.2020	03:02	7	-18.54	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Nangkhor & Tingtini end	
6	15.04.2020	14:21	15.04.2020	15:01	40	-12.16	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Nangkhor & Tingtini end	
7	19.04.2020	20:41	19.04.2020	20:50	9	-9.35	Nganglam -Tingtibi	Nganglam -Tingtibi	Earth fault	Earth Fault & 86opted.	Nganglam-Tingtibi	
8	21.04.2020	14:38	21.04.2020	14:56	18	-13.35	Nangkhor & Tingtibi	Nganglam SS	Grid Fail	NA	Jigmeling & Deothang end.	
9	22.04.2020	16:33	22.04.2020	17:05	32	0.186	5MVA Tr-I & II	Nganglam SS	Tripped on Fault/tansient fault	Earth Fault & 86opted.	33kV Druk GYP fdr	

SMD Deothang												
May, 2020												
132/33/11kV, Kanglung substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	12.05.2020	13:21	12.05.2020	13:30	0:09	1.188	132kV Corlong	Kanglung Substation	Tripped on fault	OC	Kanglung Substation	
132/33/11kV, Nangkor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.05.2020	16:09 hrs	02.05.2020	16:33 hrs	24	0.57	Nangkor-Nganglam	Nangkor-Nganglam line	Tripped on fault	Distance Relay Operated: Star Ø CN, Tripped phase ABC : TOC start, SOTF TOR trip, Trip Z2	Nangkor-Nganglam line	
2	02.05.2020	16:18 hrs	02.05.2020	16:38 hrs	20	-1.33	Nangkor-Deothang	Nangkor-Deothang line	Tripped on fault	Distance Relay Operated: Star Ø ABCN, Tripped phase ABC : TOC start, Trip Z1, AR lockout shot>	Nangkor-Deothang line	
3	02.05.2020	16:45 hrs	02.05.2020	16:58 hrs	13	0.57	Nangkor-Nganglam	Nangkor-Nganglam line	Tripped on fault	Tripping relay 86 operated at our end.	Nangkor-Nganglam line	
4	02.05.2020	17:57 hrs	02.05.2020	18:10 hrs	13	0.72	Nangkor-Nganglam	Nangkor-Nganglam line	Tripped on fault	Tripping relay 86 operated at our end.	Nangkor-Nganglam line	
5	02.05.2020	18:13 hrs	02.05.2020	18:28 hrs	15	0.72	Main Grid fail	All feeders	NA	-	Rangia & Tintibi Substation	
6	13.05.2020	12:15 hrs	13.05.2020	12:18 hrs	3	25.7	Main Grid fail	All feeders	NA	-	Rangia & Tintibi Substation	
7	13.05.2020	12:15 hrs	13.05.2020	12:27 hrs	12	25.7	Nangkor-Deothang	All feeders	Tripped on fault	Distance Relay Operated: Star Ø AN, Tripped phase ABC : TOC start, Zone 2, AR lockout shot>	Nangkor-Deothang line	
132kV, Motanga substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/10/2020	22:14 hrs	4/10/2020	00:01hrs	47	16.17	Rangia fdr	Motanga-Rangia line	Tripped on fault	OV/UV	Motanga ss	
2	5/2/2020	18:19 hrs	5/3/2020	13:28hrs	47	27.1	Deothang fdr	Motanga-Deothang line	Tripped on fault	OV/UV	Motanga ss	
3	5/7/2020	22:38 hrs	5/7/2020	23:06hrs	28	-32.5	Deothang fdr	Motanga-Deothang line	Tripped on fault	R, Y, B phase trip & 86A & 86 B operated	Motanga ss	
4	5/7/2020	22:40 hrs	5/7/2020	22:54hrs	14	-14.34	Phunthothang fdr	Motanga-phunthothang line	Tripped on fault	OV/UV	Motanga ss	
5	5/13/2020	13:57hrs	5/13/2020	14:02 hrs	5	-22.7	Deothang fdr	Motanga -Deothang Line	Tripped on fault	B phase tripped, 86A & 86B operated	Motanga ss	
6	5/30/2020	17:40hrs	5/30/2020	18:35hrs	5	0.06	15mva Xmer	Motanga ss	Tripped on fault	86 A operated	Motanga ss	

SMD Jigmeling												
May, 2020												
220/132/33kV, Jigmeling substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	07.05.2020	19:16 hrs	08.05.2020	09:11 hrs	27	141.680	440kV Alipur Line 1	Jigmeling ss and Alipurduar	Line to Earth fault	Main 1 R&Y picked up, Z1 optd & Main 2 R&Y picked up, Z1 optd	Main 1 (dist:135.4 km). Main II(dist:135.4 km)	
2	07.05.2020	19:16 hrs	07.05.2021	20:25hrs	9	141.680	440kV Alipur Line 2	Jigmeling ss and Alipurduar	Line to Earth fault	Main 1 R&Y picked up, Z1 optd & Main 2 R&Y picked up, Z1 optd	Main 1 (dist:132.4 km). Main II(dist:132.4 km)	
3	10.05.2020	10:04 hrs	10.05.2020	10:28 hrs	23	125.080	440kV MHEP Line 4	Jigmeling ss and MHEP	line to line fault	Main 1 R&Y picked up & Main 2 R&Y picked up	Main 1 (dist:58 km). Main II(dist:58 km)	
4	13.05.2020	22:00 hrs	13.05.2020	22:14 hrs	14	103.990	440kV MHEP Line 4	Jigmeling ss and MHEP	Line to Earth fault	Main 1 Y picked up & Main 2 RYB picked up	Main 1 (dist:58 km). Main II(dist:58 km)	
5	02.05.2020	16:31 hrs	02.05.2020	16:42 hrs	11	0.87	220kV dagapela feeder	Jigmeling ss and dagapela	Line to earth fault	Main 1 R&B picked up, Z1 optd. Main II R picked up Z1 optd	main I (Dist: 25km) & Man 2(Dist: 22.76km)	
6	14.05.2020	6:39 hrs	14.05.2020	6:46 hrs	7	1.08	220kV dagapela feeder	Jigmeling ss and dagapela	Line to Line fault	Main 1 Y&B picked up, Z1 and Z1B opted, Main 2 Y&B Pickup, Z1 opt.	Main I(dist:7.7 km), Main II(dist:7.9km)	
7	02.05.2020	16:13 hrs	02.05.2020	16:31 hrs	18	3.73	132kV Tintibi feeder	Jigmelingss and Tintibi	Line fault	Main 1 RYB picked up, Z1 optd. Mian 2 RYB picked up Z1 optd	Main I(dist:17.3 km) Main II(dist:21.94 km)	
8	06.05.2020	13:35 hrs	06.05.2020	13:45 hrs	15	13.56	132kV Tintibi feeder	Jigmelingss and Tintibi	line to Earth fault	Main I R phase tripped, Mian II R Phase picked up Z1 optd.	Main I(dist:30 km) Main II(dist:26.91 km)	
9	07.05.2020	20:24hrs	07.05.2022	20:31 hrs	7	7.340	13kV Tingtibi feeder	Jigmelingss and Tintibi	Line to Line fault	Main I B phase tripped, Mian II B Phase picked up Z1 optd.		

132/33kV, Yurmoo substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/2/2020	16:13hrs	5/2/2020	16:31hrs	18	-3.7	132kV Tingtibi I/C	Yurmoo Substation	Grid fail	Null	Null	
2	5/13/2020	14:17hrs	5/13/2020	14:24rs	7	-3.3	132kV Tingtibi I/C	Yurmoo Substation	Grid fail	Null	-	

132/33/11kV, Tingtibi substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/2/2020	16:11 Hrs	5/2/2020	16:36Hrs	25	12.380	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Directional O/C & EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Nanglam fdr.	
2	5/2/2020	16:45 Hrs	5/2/2020	17:23Hrs	38	12.380	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Directional O/C & EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Nanglam fdr.	
3	5/2/2020	17:57 Hrs	5/2/2020	18:30Hrs	33	12.380	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Tripping relay 86 & Auto reclosed lock out annunciation dispalyed.	132kV Tingtibi-Nanglam fdr.	
4	5/13/2020	02:17 Hrs	2/13/2020	02:32Hrs	15	9.930	132kV Tingtibi-Jigmeling fdr.	132kV Tingtibi-Jigmeling fdr.	Over current	Directional O/C & EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Jigmeling fdr.	
5	5/13/2020	02:17 Hrs	2/13/2020	02:26Hrs	9	14.610	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Distance relay operated :Zone-none,Fault duration:1.665ms	132kV Tingtibi-Nanglam fdr.	
6	5/13/2020	12:17 Hrs	2/13/2020	12:19Hrs	2	12.700	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current	Tripping relay 86 & Auto reclosed lock out annunciation dispalyed.	132kV Tingtibi-Nanglam fdr.	
7	5/26/2020	16:32 Hrs	2/26/2020	16:38Hrs	6	5.000	132kV Tingtibi-Nanglam fdr.	132kV Tingtibi-Nanglam fdr.	Over current/Earth fault	Directional O/C & EF Realy Optd:Trip phase:N,E/F Trip IN1>2.	132kV Tingtibi-Nanglam fdr.	

SMD Deothang

June, 2020												
132/33/11kV, Nganglam substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	03.06.2020	02:49	03.06.2020	02:59	0:10	-9.68	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	E/F & 86opted.	Nganglam-Tingtibi Line	
2	03.06.2020	8:43	03.06.2020	8:56	0:13	-2.91	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	E/F & 86opted.	Nganglam-Tingtibi Line	
3	23.06.2020	12:38	23.06.2020	13:03	0:25	-3.78	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Over Voltage	86opted	Nganglam-Tingtibi Line	
132kV, Motanga substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	13:01	11.06.2020	15:01	2:00	0.09	15MVA Transformer	15MVA Transformer	Tripped on fault	86A & 86B optd	Motanga ss	
2	11.06.2020	19:46	11.06.2020	20:50	1:04	-39.6	Deothang Feeder	Motanga-Deothang line	Hand tripped		Motanga ss	
3	19.06.2020	12:02	19.06.2020	12:25	0:23	-53.02	Rangia Feeder	Motanga -Rangia Line	Tripped on fault	86A &86B operated	Motanga ss	

SMD Jigmeling												
June, 2020												
220/132/33kV, Jigmeling substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.06.2020	1:59	04.06.2020	3:03	2:04	234.160	Interim Alipur Line-2	Interim Alipur Line-2		Main I:R trip optd.; Mian 2:R trip optd.		
2	25.06.2020	3:17	25.06.2020	4:31	1:14	379.280	Interim Alipur Line-1	Interim Alipur Line-1	Main I:R trip optd.; Mian 2:R trip optd.	Main I:R phase trip distance at 174.7 km. Mian 2:R phase trip at distance 174.6 km.		
3	25.06.2020	3:17	25.06.2020	10:04	6:39	378.870	Interim Alipur Line-2	Interim Alipur Line-2	Main I:R trip optd.; Mian 2:R trip optd.	Main I:R trip optd.; Mian 2:R trip optd.		
4	25.06.2020	4:32	25.06.2020	6:20	1:48	247.990	MHPA Fdr 1	MHPA fdr 1	Main I-RYB phase trip Main II RYB phase trip	Main I-RYB phase trip Main II RYB phase trip		
5	25.06.2020	4:32	25.06.2020	6:00	1:28	255.970	MHPA fdr-2	MHPA fdr-2	Main I-RYB phase trip Main II RYB phase trip	Main I-RYB phase trip Main II RYB phase trip		
6	25.06.2020	4:32	25.06.2020	7:55	3:23	255.970	MHPA fdr-3	MHPA fdr-3	Main I-RYB phase trip Main II RYB phase trip	Main I-RYB phase trip Main II RYB phase trip		
7	26.06.2020	16:10	26.06.2020	17:35	1:25	366.890	interim alipurduar ckt I	Alipurduar s/s	Rph pick up for both main 1 and 2	Rph pick up for both main 1 and 2		
8	26.06.2020	16:23	26.06.2020	18:17	1:54	386.870	interim alipurduar ckt II	Alipurduar s/s	Yphase trip on O/V (OV values 425.40)	Yphase trip for main 1 and main 2		
9	26.06.2020	16:10	26.06.2020	17:45	1:35	253.070	MHPA line 3	Mhpa and alipurduar	Generator got trip due to O/C at their end	DTT trip received at our end		
10	26.06.2020	16:10	26.06.2020	18:14	4:04	258.880	MHPA line 1	Mhpa and alipurduar	Generator got trip due to O/C at their end	DTT trip received at our end		
11	26.06.2020	16:10	26.06.2020	18:33	2:23	260.340	MHPA line 2	Mhpa and alipurduar	Generator got trip due to O/C at their end	DTT trip received at our end	DTT trip received at our end	
12	03.06.2020	8:43	03.06.2020	8:56	1:13	6.84	132kV Tingtibi	Tingtibi ss	Line Faulty	Main I RYB picked up, Z3 optd. Mian 2 RYB picked up Z3 optd.	Main-1 109.5km, Main-2 51.10km	
13	06.06.2020	15:52	06.06.2020	15:57	1:05	-56.92	220kV Dagapela	Jigmeling SS	Line - Earth fault	Main-1 Rphase pick up, SOTF optd.	Main-1: -253.7km	
14	06.06.2020	15:57	06.06.2021	16:20	0:23	-56.92	220kV Dagapela	Jigmeling SS	Line - Earth fault	Main-1 Rphase pick up, SOTF optd.	Main-1 8.6km	
15	19.06.2020	4:45	19.06.2020	5:01	0:16	0.79	220kV Jigmeling-Dagapela	Dagapela Substation	Phase to Phase fault	Main I Ryph Z1 Trip. Mian 2 RYph Z1 Trip	Main-1: 7.6km, Main-2 6.93km	
16	21.06.2020	4:14	21.06.2020	4:23	0:09	0.71	220kV jigmeling-Dagapela	Dagapela Substation	Phase to Phase fault(L2L3)	Mian 1 YB phase trip Main 2 YB phase trip	Main-1 7.5km, Main-2 7.11km	
17	23.06.2020	11:55	23.06.2020	14:02	2:07	-59.72	220 kV Jigmeling - Tsirang fdr	Jigmelins SS	Phase to Earth fault	Main 1; Rph to Ground (distance 107.7km) Main 2: Directional EF	Main 1; Rph to Ground (distance 107.7km) Main 2: Directional EF	

July, 2020												
132/33/11kV, Nangkhor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.07.2020	02:47 hrs	02.07.2020	02:51 hrs	0	0.42	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Tripping relay 86 operated.	Nangkhor Substation	Tripped due to fault on 33kV Yurung feeder & 33kV Tsebar feeder.
2	02.07.2020	02:47 hrs	02.07.2020	02:52 hrs	0	0.24	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Tripped on fault	Non directional IDMT O/C Relay-50C & tripping relay 86 operated.	Nangkhor Substation	Tripped due to fault on 33kV Yurung feeder & Tsebar feeder.
3	05.07.2020	23:12 hrs	05.07.2020	23:16 hrs	0	0.48	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C-50A & tripping relay 86 operated	Nangkhor Substation	Tripped due to fault on 33kV Tsebar feeder.
4	05.07.2020	23:12 hrs	05.07.2020	23:17 hrs	0	0.2	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkhor Substation	Tripped due to fault on 33kV Tsebar feeder.
7	21.07.2020	00:59 hrs	21.07.2020	01:08 hrs	0	-15.84	Nangkhor-Nganglam	Nangkhor-Nganglam line	Transient fault	Directional O/C & E/F:	Nangkhor-Nganglam line	Start phase AN, trip phase N, O/C start I>1, E/F start E/F IN1>12, trip IN1>2. IA-652.8A, IB-45.40A, IC-95.56A, VAB-115.0kV, VBC-138.4kV, VCA-126.2kV, VAN-62.23kV, VBN-77.79kV, VCN-79.03kV, VN-0.00, IN measured-511.6A, IN derieved-512.0A & tripping rerlay 86 operated at our end.'Informed to BPSO, and as instructed charged the feeder.
8	21.07.2020	12:28 hrs	21.07.2020	12:31 hrs	0:00	-13.35	Nangkhor-Nganglam	Nangkhor-Nganglam line	Tripped on fault	Directional O/C & E/F:	Nangkhor-Nganglam line	Start phase AN, trip phase N, O/C start I>1, E/F start E/F IN1>12, trip IN1>2. IA-628.5A, IB-44.39A, IC-93.53A, VAB-113.2kV, VBC-135.7kV, VCA-124.8kV, VAN-61.83kV, VBN-76.17kV, VCN-77.72kV, VN-0.00, IN measured-490.4A, IN derieved-490.8A & tripping rerlay 86 operated at our end.'Informed to BPSO, and as instructed charged the feeder.
9	29.07.2020	08:03 hrs	29.07.2020	08:08 hrs	0:00	0.67	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C-50A & tripping relay 86 operated	Nangkhor Substation	Tripped due to fault on 33kV Tsebar feeder.
10	29.07.2020	08:03 hrs	29.07.2020	08:08 hrs	0:00	0.46	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Tripped on fault	Non directional O/C Relay-50A & tripping relay 86 operated.	Nangkhor Substation	Tripped due to fault on 33kV Tsebar feeder.
132/33/11kV, Nanglam substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.07.2020	12:02	05.07.2020	12:07	0	-21.13	132k Nganglam-Tingtibi Feeder	Nganglam-Tingtibi	Tripped on Fault	Directional EF 67N	Nganglam-Tingtibi line	After coordinating with tingtibi substation and NLDC Madam pema lhamo test charged line successfully.no distance indicated in distance relay, same in both subsattion.
2	10.07.2020	9:58	10.07.2020	10:20	0	7.96	DCCL Feeder	DCCL	Tripped on fault	50A,51A& 86	DCCL	Heavy rainfall with lightning and thundering.
3	10.07.2020	9:58	10.07.2020	10:00	0	0.927	132/33kV 5MVA Tr-I	Nganglam SS	Tripped on fault	E/F(51C) & 86opted	33kV Dechenling fdr	Tripped due to Dechenling fdr and transfer load to 5MVA TRF -2
4	15.07.2020	04:38	15.07.2020	04:42	0	0.606	132/33kV 5MVA Tr-II	Nganglam SS	Tripped on fault	E/F(51C) & 86opted	33kV Druk GYP fdr	Feeder breaker has fail to trripped and Transformer CB has operated.
5	20.07.2020	01:41	20.07.2020	01:48	0	-14.04	Nganglam-Tingtibi Feeder	Nganglam-Tingtibi	Tripped on fault	EF	Nganglam-Tingtibi line	No Fault is recorded. Line restored after coordinating with BPSO and Tingtibi substation.
6	20.07.2020	11:03	20.07.2020	11:07	0	0.855	132/33kV 5MVA Tr-II	Nganglam SS	Tripped on fault	E/F(51C) & 86opted	33kV Dechenling Fdr	Feeder breaker has fail to trripped and Transformer CB has operated
7	20.07.2020	12:49	20.07.2020	12:53	0	0.618	132/33kV 5MVA Tr-II	Nganglam SS	Tripped on fault	O/C & E/F(51C) & 86opted	33kV Dechenling Fdr	Feeder breaker has fail to trripped and Transformer CB has operated
8	21.07.2020	00:59	21.07.2020	01:05	0	-18.82	Nganglam-Tingtibi & Nangkhor-Nganglam	Nganglam-Tingtibi & Nangkhor-Nganglam	Tripped on fault	NA	Nganglam-Tingtibi & Nangkhor-Nganglam	Both Nangkhor & Tingtibi end was tripped but no CB opened at our end,but black out at our end.
9	21.07.2021	12:28	21.07.2021	12:35	0	-15.48	Nganglam-Tingtibi & Nangkhor-Nganglam	Nganglam-Tingtibi & Nangkhor-Nganglam	Tripped on fault	NA	Nganglam-Tingtibi & Nangkhor-Nganglam	Nangkhor CB opted on Earth fault and Directional O/C rely is opted at Tingtibi end but No CB & Relay was opted at our end. At 12:31hrs supply extended from Nangkhor substation and at 12:35hrs Tingtibi CB is Closed.
10	24.07.2020	12:44	24.07.2020	12:52	0	-19.42	Nganglam-Tingtibi	Nganglam-Tingtibi	Tripped on Fault	Directional earth fault 67N	Nganglam-Tingtibi	Line restored after coodinating to Tingtibi and BPSO

132kV, Motanga substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	7/6/2020	22:32 hrs	7/6/2020	22:43hrs	0	56	32kV Motanga-Deothang	Motanga-Deothang Line	Tripped on fault	86A & 86B OPT	Motanga ss	Informed to BPSO, instructed to closed the CB from our end.
2	7/6/2020	22:32 hrs	7/6/2020	22:47hrs	0	63.04	132kV Motanga-Rangia	Motanga-Rangia line	Tripped on fault	86A & 86B OPT	Motanga ss	Informed to BPSO, as instructed to closed the CB with code NLDC bht-1588, NLDC India-261 and NERLDC-1652 CB closed from our end.
3	7/6/2020	22:56hrs	7/6/2020	23:10hrs	0	63.04	132kV Motanga-Rangia	Motanga-Rangia line	Tripped on fault	86A & 86B OPT	Motanga ss	Informed to BPSO, as instructed to closed the CB with code NLDC bht-1589, NLDC India-263 and NERLDC-1653 CB closed from our end.
4	7/7/2020	12:26 hrs	7/7/2020	12:41hrs	0	0.14	33kV 15MVA Transfo	All 33kV Feeders	Tripped on fault	86A operated	Motanga ss	Informed to BPSO, instructed to closed the CB from our end.
5	7/8/2020	11:053 hrs	7/8/2020	12:04hrs	0	0.01	33kV 15MVA Transfo	All 33kV Feeders	Tripped on fault	86A optd	Motanga ss	Informed to BPSO, instructed to closed the CB from our end.
6	7/8/2020	15:25 hrs	7/8/2020	15:32hrs	0	0.08	33kV 15MVA Transfo	All 33kV Feeders	Tripped on fault	85A operated	Motanga ss	Informed to BPSO, instructed to closed the CB from our end.
7	7/23/2020	11:12 hrs	7/23/2020	11:15 hrs	0:00	1.1	132/33kV 15MVA Transformer	All 33kV Feeders	Tripped on fault	86A & 86B opt	Motanga ss	Informed to BPSO, instructed to closed the CB from our end.
8	7/23/2020	11:15 hrs	7/23/2020	11:45 hrs	0:00	1.1	132/33kV 15MVA Transformer	All 33kV Feeders	Tripped on fault	86A & 86B opt	Motanga ss	Informed to BPSO, instructed to closed the CB from our end.
9	7/23/2020	12:13 hrs	7/23/2020	12:46 hrs	0:00	59.88	132kV Motanga-Rangia	Motanga-Rangia line	Tripped on fault	86A & 86B opt	Motanga ss	Tripped due to EF at B-phase and 86A&86B opt at our end. Informed BPSO, instructed to closed CB with code NLDC bht-1806, NLDC India-916 and NERLDC-1938.
10	7/23/2020	13:17 hrs	7/23/2020	14:00hrs	0:00	54.75	132kV Motanga-Rangia	Motanga-Rangia line	Tripped on fault	BRC opt, 86A&86B opt	Motanga ss	Tripped due to BRC opt and 86A&86B opt at our end. Informed BPSO, as instructed to closed CB with code NLDC bht-1937, NLDC India-918 and NERLDC-18257.
400/220/132/33kV, Jigmeling substation												
400kV												
1	01.07.2020	23:45 hrs	02.07.2020	00:21 hrs	0	370.870	400kV Interim Alipur Line-2	Alipurduar SS / Interim Alipur Line-2	Line to Earth fault	Main I: R, Y, B phase pick up. Mian 2: Y, B phase pick up	Main-1 127.0km, Main-2 127.7km	Charging code: NLDC Bhutan: 1580 ERLDC: 55. (BPSO duty person: Pema Lhamo) NLDC India: 43
2	19.07.2020	11:48 hrs	20.07.2020	00:28 hrs	0	386.870	400kV Interim Alipur Line-1	Interim Alipur Line-1	Line to Earth fault	Main I: B phase pick up. DTT Mian 2: B phase pick up, DTT	NA	Generation tripped and at the same time Alipurduar Circuit-1 tripped.
3	19.07.2021	11:48 hrs	20.07.2021	01:39 hrs	1	386.890	400kV Interim Alipur Line-2	Interim Alipur Line-2	Line to Earth fault	Main I: B phase pick up. DTT Mian 2: B phase pick up, DTT	NA	Lightning & Raining
4	22.07.2019	2.02hrs	22.07.2019	10:22hrs	8	381.930	400kV Interim Jigmeling-Alipur Line-1	Jigmeling_Alipur Line-1 & MHPA	Line to Earth fault	Main I: R, Y, B phase pick up. Mian 2: R, Y, B phase pick up	Main-1 13.7km, Main-2 13.7km	
5	22.07.2019	2.02hrs	22.07.2019	04:22hrs	2	381.93	400kV Interim Jigmeling-Alipur Line-2	Jigmeling_Alipur Line-1 & MHPA	Line to Earth fault	Main I: Zone-1, Rph-Ground Trip & R, Y, B phase pick up. Mian 2: Zone-1, Rph-Ground Trip & R, Y, B phase pick up.	Main1=7.3 km, Main2=7.3km	
132/66/33/11kV, Gelephu substation												
1	30.07.2020	02.00hrs	30.07.2020	02.08hrs		72	132 kv Salakati	133 kv Salakati	weather condition	General trip, R, Y and B phase trip, zone 1, dist. 15.85km	Salakati line	Heavy Rainfall

August, 2020												
132/33/11kV, Kilikhar substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	16.08.2020	0.5243056	16.08.2020	0.52708333		21.96	132KV Kurichu	132KV Kurichu Only	NA	Nil	Rangia	Grid Failed from Rangia due to Earth Fault.
132/33/11kV, Nangkor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.08.2020	09:15 hrs	05.08.2020	09:19 hrs	0	0.54	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Transient fault	Non directional O/C Realy-50A & tripping relay 86 operated	Nangkor Substation	Tripped due to fault on 33kV Yurung feeder
2	05.08.2020	09:15 hrs	05.08.2020	09:18 hrs	0	0.33	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Transient fault	Non directional O/C Relay-50A & tripping relay 86 operated	Nangkor Substation	Tripped due to fault on 33kV Yurung feeder
3	05.08.2020	13:07 hrs	05.08.2020	13:10 hrs	0	0.52	132/33kV 5MVA, Transformer-I	All 33kV & 11kV feeders	Transient fault	Non directional O/C Relay-50A,50C & tripping relay 86 operated	Nangkor Substation	Tripped due to fault on 33kV Nanung feeder
4	05.08.2020	13:07 hrs	05.08.2020	13:10 hrs	0	0.33	132/33kV 5MVA, Transformer-II	All 33kV & 11kV feeders	Transient fault	Non directional O/C Relay-50A,50C & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Nanung feeder
9	16.08.2020	12:34 hrs	16.08.2020	12:41 hrs	0	41.1	Main Grid	All 33kV & 11kV feeders	Tripped on fault	-	Motonga Substation	Supply failed from Motonga Substation. Supply interrupted for 7 minutes. Supply restored via Nnganglam Substation.
10	23.08.2020	10:59 hrs	23.08.2020	11:07 hrs	0	-10.72	Nangkor-Nganglam	Nangkor-Nganglam line	Transient fault	Directional O/C & E/F: Start phase AN, trip phase N, O/C start I>1, E/F start E/F IN1>12, trip IN1>2, IA-630.4A, IB-45.76A, IC-69.05A, VAB-114.9kV, VBC-134.2kV, VCA-124.0kV, VAN-61.84kV, VBN-76.80kV, VCN-76.7kV, VN-0.00, IN measured-554.3A, IN derieved-554.6A & tripping rrelay 86 operated at our end.	Nangkor-Nganglam line	Informed to BPSO an closed the CB as per their instruction.
132/33/11kV, Deothang substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.08.2020	17:18	02.08.2020	17:24	0	0.78	5MVA 132/33kV Transformer & II	Deothang s/s	Tripped by Bangar fdr	86	Unknown	Both 5MVA 132/33kV Transformer I & II was got tripped due to the tripping of 33kV Bangter feeder.
2	16.08.2020	12:32	16.08.2020	12:36	0	-40.932	132kV Deothang-Motonga	132kV Deothang-Motonga	Tripped from Motonga ss with E/F	Nil	132kV Deothang-Motonga	Deothang Substation got black out, since Nangkor- Nanglam line as open and line was charge through Motonga ss. Motonga - Deothang breaker opened at Motonga end only.
3	24.8.2020	23:50	24.8.2020	23:59	0	0.69	5MVA XMER=2(HV&LV)	Deothang s/s	Tripped by s/jongkhar&deothan g fdr	86	Unknown	Transfer got tripped by s/jongkhar & Deothang fdr, test charge and found normal.
7. 132/33 kV Corlung substation												
132kV Feeder												
1	8/16/2020	12:33 Hrs	8/16/2020	12:40 Hrs	0		132 Khilihar-Corlung line and 132 kV Corlung-Kanglung Line	132 Khilihar-Corlung line and 132 kV Corlung-Kanglung Line and 33 kV T/Yantse Fedeer	Incoming supply fail	NA		At 12:33 hrs Incoming supply from khilihar substation fail and Corlung substation was blkout but no breaker tripping has occurred at Corlung substation.
220/66/33kV, Dhajay substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	20:01hrs	26.08.2020	21:19hrs	1	211.7	Jigmeling	Dhajay substation	Grid fail	Main-2(21.2)IR=13.3A,IY=14.25A,IB=13.25A,IN=0.59A, VR=131.09KV, VY=130.29KV, VB=131.50KV.		Charged when supply extended from Rurichu end.
2	26.08.2020	20:02hrs	26.08.2020	21:19hrs	1	-120.2	Dagachu	Dhajay substation	Grid fail	main-2(21.2)-IR=23.21A,IY=25.65A,IB=26.18A,VR=132.02KV, VY=133.84KV, VB=133.40KV.		Charged when supply extended from Rurichu end.

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132/66/33/11kV, Gelephu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.08.2020	06:51hrs	05.08.2020	07:37hrs		49	132kv Sal-Gel	132kv Sal-Gel	weather condition	General trip,R,Y and B phase trip,zone 1,dist.2.26km towards Sal.end. Fault Current; R-ph=2276.36A, Y-ph=2433.06A & B-ph=2366.79A	Salakati line	Charging Code: NLDC BTN=1601, NLDC IND=174 & NERLDC=2145
2	11.08.2020	02.10hrs	11.08.2020	02.37hrs		51.6	132kv Sal-Gel	132kv Sal-Gel	weather condition	General trip, R and B phase trip, Zone 1, Dist.17.45km towards Sal.end. Fault Current; R-ph=1660.76A,36A & B-ph=1867.26A	132kv Sal-Gel	Charging Code: NLDC BTN=1611, NLDC IND=442 & NERLDC=2311
3	30.08.2020	19.54hrs	30.08.2020	20.20hrs		60	132kv Sal-Gel	132kv Sal-Gel	weather condition	General trip, R and B phase trip, Zone 1, Dist.29.44km towards Salakati end. Fault Current; R-ph=1509.42A, B-ph=1711.14A & N=1484.09A	132kv Sal-Gel	Charging Code: NLDC BTN=1795, NLDC IND=1317 & NERLDC=2666
4	30.08.2020	23.29hrs	30.08.2020	23.55hrs		70.4	132kv Sal-Gel	132kv Sal-Gel	weather condition	General trip, R and B phase trip, Zone 1, Dist.26.38km towards Salakati end.	132kv Sal-Gel	Charging Code: NLDC BTN=1796, NLDC IND=1320 & NERLDC=2669
5	31.08.2020	00.00hrs	01.09.2020	02.30hrs	2	70.4	132kv Sal-Gel	132kv Sal-Gel	weather condition	General trip, Y phase trip, Zone 1, Dist.30.53km towards Sal.end.	132kv Sal-Gel	Charging Code: NLDC BTN=1797, NLDC IND=1234 & NERLDC=2673
132/33/11kV, Tingtibi substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	8/2/2020	11:13	8/2/2020	11:25	0	27.600	132kV Ting-Nanglam Fdr	132kV Ting-Nanglam Fdr	Tempoary fault(Bad weather)	Distance relay:Zone-1,Triped pahse :ABC,Fault Location:55.55KM	132kV Ting-Nanglam Fdr	
2	8/4/2020	16:38	8/4/2020	17:02	0	-40.000	132kV Ting-Jigmeling Fdr	132kV Ting-Jigmeling Fdr	Tempoary fault(Bad weather)	Direction OC&E/F reay:Start Phase AN,Trip phase:N,Earth Fault trip IN1>2 trip.	132kV Ting-Jigmeling Fdr	
3	8/5/2020	6:49	8/5/2020	7:42	0	-36.000	132kV Ting-Jigmeling Fdr	132kV Ting-Jigmeling Fdr	Tempoary fault(Bad weather)	AR Lock out & 86	132kV Ting-Jigmeling Fdr	
4	8/5/2020	8:01	8/5/2020	8:11	0	23.240	132kV Ting-Nanglam Fdr	132kV Ting-Nanglam Fdr	Tempoary fault(Bad weather)	Distance relay:Zone-2,Triped pahse :ABC,Fault Location:73.21KM	132kV Ting-Nanglam Fdr	
5	8/11/2020	2:08	8/11/2020	2:12	0	-40.000	132kV Ting-Jigmeling Fdr	132kV Ting-Jigmeling Fdr	Tempoary fault(Bad weather)	Distance relay:Zone-none,Triped pahse :ABN.	132kV Ting-Jigmeling Fdr	
6	8/23/2020	10:58	8/23/2020	11:05	0	19.360	132kV Ting-Nanglam Fdr	132kV Ting-Nanglam Fdr	Tempoary fault(Bad weather)	Direction OC&E/F reay:Start Phase AN,Trip phase:N,Earth Fault trip IN1>2 trip.	132kV Ting-Nanglam Fdr	
7	8/24/2020	23:00	8/24/2020	23:13	0	33.700	132kV Ting-Nanglam Fdr	132kV Ting-Nanglam Fdr	Tempoary fault(Bad weather)	Distance relay:Zone-2,Triped pahse :ABC,Fault Location:77.80KM	132kV Ting-Nanglam Fdr	
8	8/28/2020	18:17	8/30/2020	16:59	46	0.006	132kV Ting-Nanglam Fdr	132kV Ting-Nanglam Fdr	Emergency Hand trip	86	132kV Ting-Nanglam Fdr	
132/33kV, Yurmoo substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	28.08.2020	0.8166667	28.08.2020	0.8625	1	-6.8	132kV Tingtibi I/C	Yurmoo Substation	Grid fail	Null	Null	supply was fail from Tingtibi due to grid fail at Ng
132/33kV, Dagapela substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	8/26/2020	20:36	8/26/2020	21:03	0	-1.49	220kV Dagapela Jigmeling Incoming fdr.	Dagapela Substation	over voltage	Main I and Main II optd	-	Time taken to restore since CB Spring was Discharged and had to Charge Manually as DG was found Not working

September, 2020												
132/33/11kV, Nangkor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.09.2020	21:22 hrs	11.09.2020	21:24 hrs	0	0.062	132/33kV 5MVA, Transformer-I	-	Transient fault	Non directional O/C Realy-51A & tripping relay 86 operated	Nangkor Substation	Tripped due to fault on 33kV Wamrong feeder
2	30.09.2020	09:06 hrs	30.09.2020	09:16 hrs	0	-7.16	Nangkor-Nganglam	Nangkor-Nganglam line	Transient fault	Directional O/C & E/F & trip relay 86 operated at our end: Start phase AN, trip phase N, O/C start I>1, E/F start E/F IN1>12, trip IN1>2. IA-633A, IB-67.82A, IC-101.6A, VAB-113.3kV, VBC-134.2kV, VCA-122.7kV, VAN-60.9kV, VBN-76.10kV, VCN-76.63kV, VN-0.00,49.95hz, IN measured-509.9A, IN derieved-510.4A	Nangkor-Nganglam line	Informed to BPSO an closed the CB as per their instruction.No supply interrupted.
220/66/33kV, Dhajay substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	01.10.2020	8:45hrs	01.10.2020	8:58hrs	0	83.9	Jigmeling	Dhajay substation	Over current at Y&B phase	distance protection relay,main-1-Ia=0.23kA, Ib=2.42kA, Ic=2.21kA , main-2-Ia=226.89A, Ib=2427.89A, Ic=2220.11A.	main-1=20.8km, main-2=20.73km	Breaker at Dhajay is closed first then only breaker at Jigmeling end is closed.

November, 2020												
132/33/11kV, Nangkor substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.11.2020	10:30 hrs	05.11.2020	10:34 hrs	0	0.59	5MVA, 132/33kV Trf-I(HV side)	All 33kV & 11kV feeders	Transient fault	Non directional IDMT O/C Relay-50A,51A,50C,51C & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Nanung feeder.
2	05.11.2020	10:30 hrs	05.11.2020	10:35 hrs	0	0.37	5MVA, 132/33kV Trf-II(HV side)	All 33kV & 11kV feeders	Transient fault	Non directional IDMT O/C Relay-50A,51A,50C,51C & tripping relay 86 operated.	Nangkor Substation	Tripped due to fault on 33kV Nanung feeder.
132/33/11kV, Nanglam substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.11.2020	09:21	24.11.2020	09:25	0	0.68	3MVA Tr-II	3MVA Tr-II	Over current	O/C 51A 86opted	33kV Dechenling feeder	Crow has touched with Line at Chokhorling Distribution Substation
132kV, Motanga substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11/1/2020	14:27 hrs	11/1/2020	14:40 hrs		0	33kV O/G POP factory	-	Fuse Fail	-	POP factory end	Informed to DCSD site person,as instructed to closed the CB from our end at 14:40 hrs.
2	11/20/2020	08:33 hrs	11/1/2020	17:16 hrs		-5	Motanga -Silicon line	-	Hand tripped	-	Motanga ss	Shutdown taken by Silicon factory for Bay extension at their end.informed BPSO and done necessary operation from our end.

220/132/33/11kV, Jigmeling substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1.400kV												
1	01.11.2020	15:20 hrs	01.11.2020	16:01 hrs	0:00	-125.81	Jigmeling-MHPA Line 4	Jigmeling-MHPA Line 4	R&Y phase pick up, DTT trip.	Main-1= RYBph pickup, ; Main-2= ground pickup,		Line Charged as per BPSO instruction (Karma Yangden)
2	03.11.2020	10 :43 hrs	03.11.2020	15:23 hrs	6	-127.260	Jigmeling-MHPA Line 3	Jigmeling-MHPA Line 3	DTT Trip	Main-1= RYBph pickup		
3	07.11.2020	11:34 hrs	07.11.2020	21:49 hrs			Jigmeling-MHPA Line 3	Jigmeling-MHPA Line 3	OV	Main-1= RYBph pickup, z1 optd		Line Charged via bpsoclosing code 1519-Tshering Choden
4	07.11.2020	12:20 hrs	07.11.2020	17:23 hrs	5		Interim Line-1	Alipurauar	OV	Main-1= RYBph pickup, Main-2= RYBph pickup		
5	22.11.2020	1:25 hrs				-90.900	Jigmeling-MHPA Line 3	Jigmeling-MHPA Line 3	R&Y phase pick up, DTT trip.			
6	22.11.2020	1:51 hrs	22.11.2020		0	-90.17	Jigmeling-MHPA Line 4	Jigmeling-MHPA Line 4	R&Y phase with ground pick up	Main-1= RYBph pickup, ; Main-2= ground pickup,		Setting Revised as per TCCD's recommendation for MHPA line's 2 & 4
7	26.11.2020	08:54hrs	26.11.2020		2	-82.9	Jigmeling-MHPA Line 2	Jigmeling-MHPA Line 2	R&Y phase trip, Zone-1 opted	Main -1 opted with distance=42.6km, Main-2 opted with distance=46.5km		Line Charged via bpsoclosing code 1631-Tshering Choden

220/132/33/11kV, Jigmeling substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1.400kV												
1	01.09.2020	22:45hrs					MHPA line 2	jigmelingss and Alipurduar ss	RYB phase pick up, DTT trip.	RYB phase pick up, DTT trip.		Test charge in order to check the line Healthiness as per BPSSO instruction. Charging code not issued. And the line was declared as faulty.
2	01.09.2020	22:45hrs	01.09.2021	11:16hrs	0		Interim Alipurduar ckt 1	jigmelingss and Alipurduar ss	RYB phase pick up, DTT trip.	RYB phase pick up, DTT trip.		Line was tripped while test charging the MHPA line 2
3	01.09.2020	22:45hrs	01.09.2022	12.:02hrs	1		Interim Alipurduar ckt 2	jigmelingss and Alipurduar ss	RYB phase pick up, DTT trip.	RYB phase pick up, DTT trip.		Line was tripped while test charging the MHPA line 3
4	01.09.2020	11:42hrs	01.09.2023	11:49hrs	0		MHPA line 1	jigmelingss and Alipurduar ss	RYB phase pick up, DTT trip.	RYB phase pick up, DTT trip.		The line was tripped while charging Alipurduar ckt 2
5	01.09.2020	11:42hrs	01.09.2024	11:49hrs	0		MHPA line 3	jigmelingss and Alipurduar ss	RYB phase pick up, DTT trip.	RYB phase pick up, DTT trip.		The line was tripped while charging Alipurduar ckt 2
6	02.09.2020	02:00hrs	02.09.2020	02:18hrs	0		MHPA line 4	jigmeling ss and Generation end	RYB phase pick up, DTT trip.	RYB phase pick up, DTT trip.		
7	10.09.2020	07:27hrs	10.09.2020	8:14hrs		-254.52	Jigmeling-MHPA Line 4	Jigmeling-MHPA Line 4	Earth fault	R, Y&Bph Pickup, Ground Pick up, Fault Current= Ia=1.16kA, Ib=0.07kA, Ic=0.07kA	-	
8	10.09.2020	21:18hrs	10.09.2020	22:10hrs		363.6	Jigmeling-Alipur Ckt 2	Jigmeling-Alipur Ckt 2	DT Received	R, Y&Bph Pickup,	-	
2. 220kV and 132kV												
1	01.09.2020	16:49hrs	01.09.2020	17:15hrs	0	46.43	ICT 2(HV/LV)	Jigmeling ss	LV SEF	LV SEF		
2	19.09.2020	10:42hrs	19.09.2020	10:52hrs	0	36.53	ICT 1(HV/LV)	Jigmeling ss	Over current, earth fault	50N/51N trip		
3	19.09.2020	10:42hrs	19.09.2020	10:52hrs	0	36.57	ICT 2(HV/LV)	Jigmeling ss	Over current, earth fault	50N/51N trip		
4	24.09.2020	13:31hrs	24.09.2020	14:14hrs	0	11.92	Jigmeling - Tintibi Feeder	Jigmelingss	Power swing	main 1, R,Y &B PHASE TRIP	23.4km	
5	24.09.2020	13:31hrs	24.09.2020	13:47hrs	0	65.780	Jigmeling - Gelephu Feeder	Jigmelingss	Power swing	main 1, R,Y &B PHASE TRIP main 2 zone 1 trip	2.6km	AUTO RECLOSED when 86.2 is reset

Annexure- II

Western Grid Outages

SMD Phuentsholing												
January, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	14:38	05.01.2020	14:55	17	-36	220kV Chukha- Malbase Feeder	220kV Chukha- Malbase Feeder	tripped	Distance start,Distance Trip A,B,C.Zone 1 Trip, Trip values IL1=5.846kA IL2= 5.962kA IL3=4.884 kA	9.405km	
2	05.01.2020	14:38	05.01.2020	15:40	2	93	200MVA ICT	200MVA ICT	tripped	67(H.V), O/C Optd Trip Values: IL1=1505A IL2=1483A IL3=1290A IE= 237.2		
66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	14:46	05.01.2020	14:55	9	2.26	66kV Chukha feeder	66kV Chukha-Pling feeder	Overcurrent	IA- 1.097kA, IB- 1.114kA, IC- 1.096kA, VAB- 16.33kV, VCA- 14.79kV, VBC- 15.30kV. INM- 32.07A, IND- 32.09A	Substation	
2	16.01.2020	9:21	16.01.2020	14:42	21	idle	66kV Malbase feeder	66kV Malbase feeder		Nil	Substation	
3	18.01.2020	9:11	18.01.2020	13:27	16	idle	66kV Malbase feeder	66kV Malbase feeder	nil	Nil	Substation	
4	31.01.2020	9:37	31.01.2020	11:12	35	idle	66kV Malbase feeder	66kV Malbase feeder	nil	Nil	Substation	
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.01.2020	14:45	05.01.2020	15:00	15	1.25	66kV Chukha-Phuntsholing	Black out	Heavy lightning with hailstone		Line segment	
66kV Chumdo switching station												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.01.2020	1319hrs	04.01.2020	1325hrs	6min	2.71MW	66KV O/G Pangbasa Feeder	Pangbasa Substation	Transient Fault	C.B open, E/F	Chumdo substation	
2	23.01.2020	1515hrs	23.01.2020	1528hrs	13min	2.05MW						
3	24.01.2020	1039hrs	24.01.2020	1039hrs	14min	2.62MW						
4	29.01.2020	1215hrs	29.01.2020	1225hrs	10min	2.77MW						
5		1338hrs		1348hrs	10min	2.53MW						
6	30.01.2020	1415hrs	30.01.2020	1423hrs	8min	2.53MW						

220/66/11kV Semtokha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	1/24/2020	1742hrs	1/24/2020	1752hrs	10.00	25.090	220/66kV, 50/63MVA-I transformer	220/66kV, 50/63MVA-I transformer	Trip along with 11kV incommer-I, Y-phase cable blust	Back-up O/C & E/F operated	Semtokha substation	
2	1/25/2020	0927hrs	1/25/2020	0936hrs	9.00	26.730	220/66kV, 50/63MVA-I transformer	220/66kV, 50/63MVA-I transformer	Trip along with 11kV incommer-I, R-phase cable blust	Back-up O/C & E/F operated	Semtokha substation	
3	1/24/2020	1742hrs	1/24/2020	1750hrs	8.00	25.130	220/66kV, 50/63MVA-II transformer	220/66kV, 50/63MVA-II transformer	Trip along with 11kV incommer-I, Y-phase cable blust	Back-up O/C & E/F operated	Semtokha substation	
4	1/25/2020	0927hrs	1/25/2020	0937hrs	10.00	26.790	220/66kV, 50/63MVA-II transformer	220/66kV, 50/63MVA-II transformer	Trip along with 11kV incommer-I, R-phase cable blust	Back-up O/C & E/F operated	Semtokha substation	
66kV Chumdo switching station												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.01.2020	1319hrs	04.01.2020	1325hrs	6min	2.71MW	66KV O/G Pangbasa Feeder	Pangbasa Substation	Transient Fault	C.B open, E/F	Chumdo substation	
2	23.01.2020	1515hrs	23.01.2020	1528hrs	13min	2.05MW						
3	24.01.2020	1039hrs	24.01.2020	1039hrs	14min	2.62MW						
4	29.01.2020	1215hrs	29.01.2020	1225hrs	10min	2.77MW						
5	30.01.2020	1338hrs	30.01.2020	1348hrs	10min	2.53MW						
6	30.01.2020	1415hrs	30.01.2020	1423hrs	8min	2.53MW						
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.01.2020	1:18	04.01.2020	1:57	39minutes	-1.24	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
2	23.01.2020	15:15	23.01.2020	15:29	14minutes	-1.95	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
3	24.01.2020	10:39	24.01.2020	10:53	14minutes	-2.01	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
4	26.01.2020	11:10	26.01.2020	11:33	23minutes	-1.68	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
5	29.01.2020	12:07	29.01.2020	12:20	13minutes	-2	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
6	29.01.2020	13:38	29.01.2020	13:48	10minutes	-1.91	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
7	29.01.2020	13:55	29.01.2020	13:59	4minutes	-1.91	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
8	29.01.2020	15:17	29.01.2020	15:21	4minutes	-1.82	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	
9	30.01.2020	14:13	30.01.2020	14:20	7minutes	-1.93	66kV Incomer	All feeders	Fault at 33kV feeder at Pangbesa SS	No relay operation	Pangbesa SS	

SMD Phuentsholing

February, 2020

66/33/11kV Phuentsholing substation

Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.02.2020	6:09	24.02.2020	6:16	0:07	-2.47	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	186 & 86	Line	
2	29.02.2020	17:47	29.02.2020	17:52	0:05	-0.91	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	186 & 86	Line	

66/33/11kV Gomtu substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.02.2020	06:05	24.02.2020	06:08	0:03	0.64	66kV Gomtu-Phuntsholing	Nil	Over Current	IDMTL O/C 51CX	P/ling Sub Station	
2	29.02.2020	17:50	29.02.2020	17:54	0:04	4.4	66kV Gomtu-Phuntsholing	Nil	Over Current	IDMTL O/C 51CX	Gomtu Sub Station	

SMD Semtokha

February, 2020

66/33/11kV Lobeysa substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	2/26/2020	11:25hrs	2/26/2020	11:35hrs	0:10	2.230	66kV LSA- Semtokha feeder	NA	Snow fall at Dochula	OC/EF relay(IA-8.223A IB-938.2A IC-928.7A IN-11.67A)	NA	

220/66/11kV Semtokha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	2/26/2020	1125hrs	2/26/2020	1135hrs	0:10	-2.230	66kV Semtokha-Lobesa feeder	Nil feed from 220kv feeders	Transient fault	Main distance relay operated, trip on zone-1	Distance shown in relay 10.4km	
2	2/4/2020	1806hrs	2/4/2020	1814hrs	0:08	49.730	66kV Semtokha-Olakha feeder	66kV Olakha Substation	Overloading	Backup overcurrent relay operated	Chukha end, The CT terminal damage for 20MVA transformer. So 66kV Chumdo-Chukha kept idle charge	

66/33kV Olakha substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	2/4/2020	17:40	2/4/2020	17:44	0:04	45.4	66KV Tie line	66KV Olakha substation	Over load at Semtokha Substation	Nil	Semtokha substation	Tripped at Semtokha end
2	2/4/2020	18:04	2/4/2020	18:13	0:09	38.3	66KV Tie line	66KV Olakha substation	Over load at Semtokha Substation	Nil	Semtokha substation	Tripped at Semtokha
3	2/4/2020	18:18	2/4/2020	18:20	0:02	38.3	66KV Tie line	66KV Olakha substation	Over load at Semtokha Substation	Nil	Semtokha substation	Tripped at Semtokha
4	2/4/2020	18:36	2/4/2020	18:40	0:04	38.3	66KV Tie line	66KV Olakha substation	Over load at Semtokha Substation	Nil	Semtokha substation	Tripped at Semtokha

66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	07.02.2020	14:36	07.02.2020	14:58	24minutes	-2.05	66kV Incomer	all the feeders	Unknown	Nil	Pangbesa station	
2	27.02.2020	14:54	27.02.2020	15:06	12minutes	-1.86	66kV Incomer	all the feeders	Unknown	Nil	Pangbesa station	
66/33kV Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	2/16/2020	12:12hrs	2/16/2020	12:18hrs	6min	.390MW	SF6 breaker	Fdr. I and II	Earth fault & Over current	E/F and O/C relay operated	Fdr. II shemagangkha	
66/33kV Pangbesa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	27/2/2020	14:54	27/2/2020	14:59	0:05	1.84	HA line	HAA line and Pangbesa SS	Transient Fault	Overcurrent		
SMD Phuentsholing												
March, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.03.2020	20:37	02.03.2020	20:47	0:10	-14	220kV Chukha feeder	-	Tripped	General trip, Trip B phase, zone 1 trip & CARR-sensd. Tripped values: I1=7.956A<264.5deg, I2=120.3A<64.84deg, I3=5314A<43.31deg, 5414A<44.67deg.	L3-N=6.8KM	
2	02.03.2020	20:37	02.03.2020	20:50	0:13	130	200MVA ICT	-	Tripped	400kV Main & Tie CB open I1=219.8A I2=287.8A, I3=1334A, I4=1083A.	-	
3	28.03.2020	15:36	28.03.2020	16:24	0:48	80	400kV Siliguri feeder	-	Tripped	Main & Tie CB open, Main 1 trip, General trip. IL1=173.6 A< 65.22deg, IL2=1232A<208.1deg, IL3=367.3A<186.2 deg, IL4=2895A< 198.3 deg.	-	
4	28.03.2020	15:36	28.03.2020	15:47	0:11	-	220kV Bus Coupler	-	Tripped	There was no display of data in the relay penal.	-	
5	28.03.2020	16:47	28.03.2020	17:01	0:14	-	66kV Bus Coupler (GIS, Singyegoan)	-	Tripped	General trip,time overcurrent trip, IEP trip, I1=0.24KA, I2=0.06KA, I3=0.18KA	-	
6	28.03.2020	16:47	28.03.2020	16:57	0:10	-	66kV Bhutan Concast Feeder. (GIS, singyegoan)	-	Tripped	General trip, Directional time overcurrent trip, IEP Directional trip, I1=0.24KA, I2=0.06KA, I3=0.18KA	-	

66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	03.03.2020	10:53	03.03.2020	10:56	0:03	2.48	10MVA Transformer (66/33kV Voltamp)	All 33kV feeders		86	Substation	
2	03.03.2020	22:24	03.03.2020	22:27	0:03	2.57	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	Dist Protection Opt,186 & 86	Line	
3	23.03.2020	12:35	23.03.2020	12:53	0:18	-1.6	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	Dist Protection Opt,186 & 86, Fault imp: 6.35, fault angle:57, fault current: 2.9	Line	
4	23.03.2020	14:03	23.03.2020	14:17	0:14	-1.98	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	Dist Protection Opt,186 & 86	Line	
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.03.2020	12:35	23.03.2020	12:51	0:16	2.110	66kV Incomer	Black out	Tripped due lightening and thundering		Line segment	
2	23.03.2020	14:04	23.03.2020	14:14	0:10	1.880	66kV Incomer	Black out	Tripped due lightening and thundering		Line segment	
SMD Semtokha												
March, 2020												
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.03.2020	16:09	26.03.2020	14:21	12minutes	-1.87	66kV Incomer	all the feeders	Unknown	Nil		
2	28.03.2020	10:53	28.03.2020	11:49	56minutes	-1.72	66kV Incomer	all the feeders	due to heavy windfall, 1.5mm wire got in contact with 66KV line causing 66KV line to touch the ground.	Nil	near substation colony.	
66/33kV Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	20/3/2020	15:13hrs	20/3/2020	16:34hrs	21min	.350MW	66KV breaker	Fdr. I and II	O/C and EFH	O/C, EFH RYB phase	8MVA transformer	
2	31/3/2020	16:37hrs	31/3/2020	16:58hrs	21min	.335MW	66KV breaker	Fdr. I and II	Over Current on Phase A, B	Over Current relay operated	Fdr. I & II	
66/33kV Pangesa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26/3/2020	16:11hrs	26/3/2020	16:21hrs	10	1.66	66kV HA O/G feeder	66kV HA Substation and it's outgoing feeder	Tripped	86A & 86B optd		
2	28/3/2020	10:53hrs	28/3/2020	11:49hrs	56	1.71	66kV HA O/G feeder	66kV HA Substation and it's outgoing feeder	Tripped	Earth fault relay optd		

SMD Phuentsholing												
April, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	18:45	09.04.2020	19:34	49	-68	220kV Birpara feeder	-	Tripped	B/B trip, Trip R,Y,B Phase		
2	09.04.2020	18:48	09.04.2020	19:35	47	8	220kV Samtse feeder	-	Tripped	B/B trip, Trip R,Y,B Phase, M-I Trip, Zone I trip	-	
3	09.04.2020	22:52	09.04.2020	23:15	23	23	50/63 MVA Transformer -I (210)	-	Tripped	General Trip, LBB Trip	-	
4	09.04.2020	22:52	09.04.2020	23:40	48	25	50/63 MVA Transformer -III	-	Tripped	86 operated ,	-	
5	09.04.2020	22:52	09.04.2020	22:58	6	94	200 MVA ICT Transformer	-	Tripped	86 operated ,	-	
6	15.04.2020	10:38	15.04.2020	11:07	29	23	Passakha Feeder I		Tripped	OC trip , General Trip		
7	15.04.2020	10:39	15.04.2020	10:45	6	-	220kV Bus Coupler	-	Tripped	General trip,time overcurrent trip	-	
8	15.04.2020	10:39	15.04.2020	11:09	30	9	Passakha Feeder I		Tripped	OC trip , General Trip		
9	15.04.2020	10:38	15.04.2020	11:09	31	12	Passakha Feeder I		Tripped	OC trip , General Trip		
10	16.04.2020	18:10	16.04.2020	18:18	8	-	220kV Bus Coupler	-	Tripped	General trip		
11	16.04.2020	18:10	16.04.2020	18:27	17	-146	400kV Tala	400kV Siliguri & Tie	Tripped	General trip, Directional time overcurrent trip, IEP Directional trip,		
12	16.04.2020	18:10	16.04.2020	19:05	55	71	400kV Siliguri	400kV Tala & Tie	Tripped	OC trip , General Trip	-	
13	18.04.20	23:11	18.04.20	23:23	12	63	200MVA ICT		Tripped	86 optd.	-	
14	18.04.20	23:11	18.04.20	23:45	34	-63	220kV Birpara feeder		Tripped	86 optd. R and B phase open.		
15	21.04.20	3:14	21.04.20	3:31	17	37	400KV ICT	Malbase s/s	Tripped	Main CB optd.67 O/C optd.		
16	21.04.20	3:14	21.04.2020	10:09	55	-92	220kV Birpara feeder	Malbase s/s	Tripped	Zone1 trip,M2 protection optd.		
17	21.04.20	3:14	21.04.2020	3:39	25	-	66kV bus coupler	Malbase s/s	Tripped	IEF trip, General trip		
18	21.04.20	3:14	21.04.2020	3:40	26	23	66kV Pasakha feeder I	Malbase s/s	Tripped	IEF- 50- trip, General trip,86 Optd.		
19	21.04.20	3:14	21.04.2020	3:41	27	23	66kV Pasakha feeder I	Malbase s/s	Tripped	51 START,86 Optd.		
20	21.04.20	3:14	21.04.2020	3:42	28	25	66kV Pasakha feeder I V	Malbase s/s	Tripped	50-trip,50N- trip, IEF 50N trip, General trip,86 optd.		
21	23.04.202	22:25	23.04.202	22:32	7	5	220kV Samtse feeder	Malbase s/s	Tripped	M-1 trip,zone 2 trip,M1/BC trip, AR optd.		
22	23.04.202	23:15	23.04.202	23:54	39	61	400kV Siliguri feeder	Malbase s/s	Tripped	M-1 trip, ZM 1 trip, Fuse fail,		
23	15.04.2020	10:39	15.04.2020	11:07	28	-	66kV Bhutan Concast	Singyegoan(GIS)	Tripped	General trip,Overcurrent trip,		
24	18.04.2020	23:11	19.04.2020	2:54	43	1.4MW	220kV Singyegoan-Samtse feeder	Singyegoan(GIS)	Tripped	General trip,zone 1 trip, Overcurrent relay optd.	31.8km	
25	21.04.2020	3:14	21.04.2020	3:55	41	4.1MW	66kV Bhutan Concast		Tripped			

66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	23:10	09.04.2020	23:19	9	-4.32	66kV Chukha-Pling	66kV Chukha-Pling feeder	Tripped	Dist Protection Opt,186 & 86	Line	
2	09.04.2020	23:26	10.04.2020	1:13	50	2.18	66kV Pling-Gomtu	66kV Pling-Gomtu feeder	Earthfault		Line	
3			12.04.2020	9:47		idle	66kV Pling-Malbase	66kV Pling-Malbase				
4	14.04.2020	10:58	14.04.2020	11:09	11	-5.76	66kV Chukha-Pling	66kV Chukha-Pling	Tripped	Dist Protection Opt,186 & 86	Line	
5	16.04.2020	18:10	16.04.2020	18:22	12	-3.54	66kV Pling-Gomtu	Black out at Pling	Tripped at our end	Dist Protection Opt,186 & 86	Line	
6	16.04.2020	18:10	16.04.2020	18:39	29	-6.87	66kV Chukha-Pling	Black out at Pling	Tripped at our end	Dist Protection Opt,186 & 86, (Fault imp-18.8	Line	
7	21.04.2020	3:15	21.04.2020	6:32	17	12.32	66kV Pling-Malbase	Black out at Pling	Tripped at Malbase end	Nil	Line	
8	21.04.2020	3:15	21.04.2020	3:29	14	-11.72	66kV Chukha-Pling	Black out at Pling	Tripped at Chukha end	Nil	Line	
9	22.04.2020	17:09	22.04.2020			5.81	66kV Pling-Malbase	66kV Pling-Malbase fdr				
10	23.04.2020	22:25	23.04.2020	22:32	7	1.32	66kV Pling-Gomtu	66kV Pling-Gomtu	Earthfault		Line	
11	25.04.2020	15:50	25.04.2020	15:58	8	idle	66kV Pling-Malbase	66kV Pling-Malbase fdr		Nil	Line	
12	27.04.2020	17:10	27.04.2020	17:26	16	-5.22	66kV Chukha-Pling	66kV Chukha-Pling	Tripped a both end	Dist Protection Opt,186 & 86. At Chukha end: Distance 15KM, General Zone 1 trip.	Line	
13	29.04.2020	14:30	29.04.2020	15:15	45	2.72	66kV Pling-Gomtu	66kV Pling-Gomtu	Earthfault		Line	
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	18:26	09.04.2020	18:41	15	-5.51	66kV Dhamdum feeder	Nil	Grid Failed	NA	Line segment	
2	09.04.2020	23:27	09.04.2020	23:56	29	-1.09	66kV Dhamdum feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
3	09.04.2020	23:27	10.04.2020	4:19	52	2.58	66kV P/ling feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
4	21.04.2020	3:15	21.04.2020	3:29	14	-6.051	66kV Dhamdum feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
5	23.04.2020	10:36	23.04.2020	10:46	10	-2.98	66kV Dhamdum feeder	Gomtu / Samtse	Grid Failed	NA	Line segment	
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	12.04.2020	10:03	12.04.2020	10:19	16	0.300	66kV line	Black out	SMVA Transformer HV side isolator alignment problem.		Substation	
2	21.04.2020	3:15	21.04.2020	3:30	15	0.710	66kV line	Black out	Heavy lightning and thunder strom.		Line segment	
3	27.04.2020	17:10	27.04.2020	17:24	14	1.950	66kV line	Black out	Heavy lightning and thunder strom.		Line segment	

SMD Semtokha												
April, 2020												
66/33/11kV Dechenchholing substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	30.04.2020	9:49	30.04.2020	10:12	23	0.31	66KV Gasa fdr.	Gasa line	Tripped on O/C			
66/33kV Olakha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/7/2020	7:44	4/7/2020	7:47	3	4.50	66/33kV, 20MVA Transformer I	All 33kv Outgoing feeders	Tripping of 33KV outgoing VI (DPH II)	DIR. O/C & E/F PROT.N. RELAY 67		
2	4/7/2020	8:03	4/7/2020	8:05	2	5.2	66/33kV, 20MVA Transformer I	All 33kv Outgoing feeders	Tripping of 33KV outgoing VI (DPH II)	DIR. O/C & E/F PROT.N. RELAY 67		
3	4/18/2020	17:42	4/18/2020	17:44	2	5.6	66/33kV, 20MVA Transformer I	33kv OG VI (DPH II)	Tripping of 33KV outgoing VI (DPH II)	TRAFO DIFFL.PROTN Relay 8		
66/33/11kV Jemina substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.04.2020	16:20	09.04.2020	16:25	5	-5.52	66 kV both Changhidaphu & Chundo	Black out	Non directional earth fault, IN>> Trip.	-	Line	
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/5/2020	13:49	4/5/2020	14:05	16minutes	-2.084	66kV Incomer	all the feeders		Nil		
2	4/9/2020	16:21	4/9/2020	16:44	5minutes	-2.16	66kV Incomer	all the feeders		O/C & E/F		
3	4/18/2020	13:45	4/18/2020	13:54	9minutes	-1.94	66kV Incomer	all the feeders		O/C & E/F		
4	4/18/2020	14:47	4/18/2020	14:52	5minutes	-1.35	66kV Incomer	all the feeders		O/C & E/F		
5	4/24/2020	12:44	4/24/2020	12:48	4minutes	-2.32	66kV Incomer	all the feeders		O/C & E/F	near substation colony.	
66/33kV Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/5/2020	7:37hrs	4/5/2020	8:45hrs	8min	.820MW	66KV breaker	Fdr. I and II	Over Current stage 2	Over Current relay operated	8MVA transformer	
2	4/16/2020	10:20hrs	4/16/2020	10:24hrs	4min	.310MW	66KV SF6 breaker	Fdr. I and II	O/C and E/F stage 2 on RYB phase	O/C and E/F stage 2 relay operated	Fdr. I Wanakha	
66/33kV Pangesa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	6/4/2020	13:48hrs	6/4/2020	14:05	16	2.31	Haa Line Out	Haa S/S	Dir. OC	Dir.OC/EF relay		
2	9/4/2020	16:21hrs	9/4/2020	16:40hrs	19	2.19	Haa Line Out	Haa S/S	Dir. OC/EF	Dir.OC relay		
3	18/4/2020	13:41hrs	18/4/2020	13:54hrs	7	1.92	Haa Line Out	Haa S/S	Dir. OC/EF	Dir.OC/EF relay		
4	18/4/2020	14:47hrs	18/4/2020	14:52hrs	5	1.93	Haa Line Out	Haa S/S	Dir. OC/EF	Dir.OC/EF relay		
5	24/4/2020	12:40hrs	24/3/2020	12:42hrs	2	1.97	Haa Line Out	Haa S/S	Dir. OC	Dir.OC/EF relay		
6	24/4/2020	12:44hrs	24/3/2020	12:48Hrs	4	1.97	Haa Line Out	Haa S/S	Dir. OC	Dir.OC/EF relay		

SMD Phuentsholing												
May, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	03.05.2020	20:28	03.05.2020	20:35	7		200MVA ICT Transformer	400kV Malbase Substation	Tripped	EARTHFAULT		
2	03.05.2020	20:28	03.05.2020	20:45	17		50/63MVA Transformer III	400kV Malbase Substation	Tripped	From RET 670,OLTC BUCH TRIP,DIFF TRIP		
3	03.05.2020	20:28	03.05.2020	20:40	12		220 Singyegoan to Samtse Feeder	220 GIS Singyegoan	Tripped	REL 511.General trip,trip R,Y&B phase,distance protection optd.	Fault loop L3-N Distance=11km	
4	04.05.2020	17:10	04.05.2020	17:20	10	20	50/63MVA Transformer III	400kV Malbase Substation	Tripped	OLTC Buch Trip, Differential Trip, EXT Trip		
5	04.05.2020	17:10	04.05.2020	17:25	15	141	400kV Siliguri Feeder	400kV Malbase Substation	Tripped	Distance- Z1 trip, A/R Lockout, Zone -I Trip.	4.25km	
6	07.05.2020	17:55	07.05.2020	18:01	6		220kV Bus Coupler	400kV Malbase Substation	Tripped		-	The feeder was tripped on over current on R- phase.
7	07.05.2020	17:55	07.05.2020	18:03	8	4	220kV Samtse Feeder	400kV Malbase Substation	Tripped			
8	07.05.2020	17:55	07.05.2020	18:30	35	-41	220kV Birpara Feeder	400kV Malbase Substation	Tripped	Zone 3start, B/B trip	-	
9	07.05.2020	18:18	07.05.2020	18:21	3	51	200MVA ICT Transformer	400kV Malbase Substation	Tripped	67(HV) O/C OPTD,400kV side B/U O/C & EF Protn. Trip		
10	07.05.2020	18:18	07.05.2020	18:27	9	16	50/63MVA Transformer III	400kV Malbase Substation	Tripped	Relay RET 670 008 OLTC BUCH Trip,027 Trip		
11	13.05.2020	22:13	13.05.2020	22:20	7	-76	220kV Chukha Feeder III	400kV Malbase Substation	Tripped	Zone 1 trip,AR-lockout,location =5.315km		
12	13.05.2020	22:13	13.05.2020	22:28	15	45	200MVA ICT Transformer	400kV Malbase Substation	Tripped	Main & TIE CB open, 86 optd.		

13	13.05.2020	22:13	13.05.2020	22:22	9	22	50/63MVA Transformer I(HV)	400kV Malbase Substation	Tripped	Diff trip, 86 optd.	-	
14	13.05.2020	22:13	13.05.2020	22:34	21	24	50/63MVA Transformer III(HV)	400kV Malbase Substation	Tripped	Diff trip, 86 optd. EXT. trip,OLTC Buch trip.	-	
15	13.05.2020	22:13	13.05.2020	22:34	21	24	50/63MVA Transformer III(LV)	400kV Malbase Substation	Tripped	No Data Display in the relay.		
16	13.05.2020	22:13	13.05.2020	22:22	9	22	50/63MVA Transformer I(LV)	400kV Malbase Substation	Tripped	86 opt.		
17	15.05.2020	20:32	15.05.2020	20:45	13	86	200MVA ICT Transformer	400kV Malbase Substation	Tripped	EARTHFAULT (FWD)IDMTL I4=857.7A.		
18	15.05.2020	20:32	15.05.2020	20:54	22	-	220kV Chukha Feeder	400kV Malbase Substation.	Tripped	General trip,zone 1 trip,A/R lockout, Dist=22.51km		
19	26.05.2020	13:57	26.05.2020	14:34	37	8	220kV Samtse Feeder	400kV Malbase Substation/ Dhamdum S/S	Tripped	Main 1 trip,trip R,Y,B.,zone 1 trip, Carrier fail,m1 carrier send. L1-N,DIST=32.2km.		
20	26.05.2020	13:57	26.05.2020	14:05	8	52	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	EARTHFAULT (REV)<HSI>IDMTL I4=1995A.		
21	26.05.2020	14:02	26.05.2020	14:47	45	249	400kV Siliguri Feeder	400kV Malbase Substation.	Tripped	Zm1 & Zm 3 trip, Time Sync error, Fuse fail,main1 & 2 trip.		
22	26.05.2020	14:14	26.05.2020	14:25	11	58	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	G1 PHASE A(REV) IDMTL IA= 210.2A,		
23	29.05.2020	14:53	29.05.2020	14:59	6	58	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	G1 PHASE A(REV) IA= 230.7A		

220/66/11kV Singhigoan substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	07.05.2020	18:18	07.05.2020	18:29	11	-10	66kV Concast	GIS Singhigoan	Tripped	I1=0.07kA, I2=0.10kA. I3=0.06kV.		
2	07.05.2020	18:18	07.05.2020	18:53	35		66kV Bus Coupler	GIS Singhigoan	Tripped	I1=0.09kA, I2=0.06kA. I3=0.10kV.		
3	09.05.2020	20:28	09.05.2020	20:40	12	64	220kV Samtse Feeder	GIS Singhigoan	Tripped	I1=58.44A, I3=4439A. I2=50.40A. I4=4334A		
4	26.05.2020	13:57	26.05.2020	14:45	48	0.02	220kV Samtse feeder	GIS Singhigoan	Tripped	I1=2345A, I2=80.69kA I3=88.69 I4=2173 A		

66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	08.05.2020	17:32	08.05.2020	10:48	16	0.40	5MVA Transformer (66/11kV)	Not affected	Tripped	OLTC Buch Trip, 30D OLTC Buch relay optd, 86	Substation	
2	07.05.2020	18:18	07.05.2020	18:24	6	-10.18	66kV Chukha-Pling	Black out at Pling	Tripped at our end	Dist Protection Opt,186 & 86, (Fault imp-20.4, fault current 1.42A, fault angle-162 deg, fault voltage-0.688 & fault location- 42%	Line	
3	23.05.2020	19:33	23.05.2020	20:21	48	-4.03	66kV Chukha-Pling	Black out at Pling	Tripped	Dist Protection Opt,186 & 86		
4	27.05.2020	11:07	27.05.2020	11:18	11	-3.69	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at both end	Dist Protection Opt,186 & 86.	Line	
5	29.05.2020	13:37	29.05.2020	13:50	13	-4.03	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at both end	Dist Protection Opt,186 & 86, (Fault imp-2.19, fault current 3.56A, fault angle-47 deg, fault voltage- .165 & fault location- 11.61%	Line	
6	29.05.2020	15:46	29.05.2020	15:54	8	-3.24	66kV Chukha-Pling	66kV Chukha-Pling	Tripped at both end	Dist Protection Opt,186 & 86,	Line	
220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	06.05.2020	17:14	06.05.2020	17:22	8	-0.074	66kV Dhamdum feeder	Nil	Supply failed from Dhamdum	NA	Dhamdum Sub Station	
2	07.05.2020	18:18	07.05.2020	18:23	5	-1.642	66kV Incomer	Whole Gomtu	Grid failed	NA	Malbase Sub Station	
3	23.05.2020	19:32	23.05.2020	19:37	5	1.23	66kV Pling feeder	Nil	Over current	IDMTL over current relay 51CX optd	Line segment	Rest charged the line as per instruction given by BPSO
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	27.05.2020	11:06	27.05.2020	11:16		1.070	66kV Chukha-P/ling feeder	Black out			Line segment	Restored from Chukha.
2	29.05.2020	13:36	29.05.2020	13:48	12	0.940	66kV Chukha-P/ling feeder	Black out			Line segment	Supply resumed from Phuntsholing Ss.
3	29.05.2020	15:45	29.05.2020	15:53	8	0.840	66kV Chukha-P/ling feeder	Black out			Line segment	Supply resumed from Phuntsholing Ss.

SMD Semtokha												
May, 2020												
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/5/2020	13:33	5/5/2020	14:22	48minutes	-1.71	66kV Incomer	all the feeders	Unknown	O/C	Pangbesa	
2	5/18/2020	9:15	5/18/2020	15:06	51minutes	0.75MW	5MVA Tr-I	Transformer & Incomer - I	Ten-delta test	Nil	Haa substation	
66/33kV Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	4/5/2020	7:37hrs	4/5/2020	8:45hrs	8min	.820MW	66KV breaker	Fdr. I and II	Over Current stage 2	Over Current relay operated	8MVA transformer	
2	4/16/2020	10:20hrs	4/16/2020	10:24hrs	4min	.310MW	66KV SF6 breaker	Fdr. I and II	O/C and E/F stage 2 on RYB phase	O/C and E/F stage 2 relay operated	Fdr. I Wanakha	
66/33kV Pangesa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/5/2020	13:33hrs	5/5/2020	14:12	39	2.14	Chumdo Line In	Haa S/S & Pangbesa S/S	Dir. OC stage 2	Dir.OC relay	Pangbesa -Chumdo	
SMD Phuentsholing												
June, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	20:00	11.06.2020	20:10	0:10	7	220kV Samtse Feeder	400kV Malbase Substation	Tripped	Main 1 Trip, Trip RYB, 86 OPT, Fault loop=L3-N	29.5 KM	
2	11.06.2020	20:00	11.06.2020	20:18	0:18	23	50/63MVA Transformer III	400kV Malbase Substation	Tripped	From RET,DIFF TRIP ,27 Trip, 86 optd.		
3	11.06.2020	20:32	11.06.2020	20:54	0:22	7	220kV Samtse Feeder	400kV Malbase Substation	Tripped	Main 1 Trip, Zone 2 trip, M1/BC Block, AR, 86OPT		
4	11.06.2020	20:32	11.06.2020	20:51	0:19		220kV Bus Coupler	400kV Malbase Substation	Tripped	I0>Trip		
5	11.06.2020	20:55	11.06.2020	21:16	0:21	115	220kV Chukha Feeder	400kV Malbase Substation.	Tripped	Main 1 trip,zone 1 , Fault loop=4.9KM	4.9KM	
6	11.06.2020	20:52	11.06.2020	21:36	0:44	149	400kV Siliguri Feeder	400kV Malbase Substation.	Tripped	Zone 1 trip, Trip RYB, AR lockout shot, Flt loop=L, NI,	8.243KM	
7	11.06.2020	20:52	11.06.2020	21:36	0:44	46	200MVA ICT Transformer	400kV Malbase Substation.	Tripped	G1 phase A, Phase B (rev) , IB= 423.2A, Phase C (rev) Ic= 549.6 A, Earth Fault (FWD) =IDMTL, <HSL> IE= 3034A		
8	14.06.2020	7:33	14.06.2020	7:46	0:13	21	Passakha I	Passakha II,IV	Tripped	50N Trip, 86 optd.		
9	14.06.2021	7:33	14.06.2021	7:46	0:13	21	Passakha II	Passakha I,IV	Tripped	IEF 50N Trip, 86 optd.		
10	14.06.2021	7:33	14.06.2021	7:46	0:13	21	Passakha IV	Passakha I,II	Tripped	IEF 50N Trip, 86 optd.		

220/66/11kV Singhigaon substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
	24.06.2020	3:23	24.06.2020	3:29	0:06	108	200MVA ICT Transformer	400/220/ 66 kV Malbase Substation	Tripped due to over current on R Phase and Earth fault	67/67N Operated , 86 operated. G2 Phase A (FWD) LS IDMTL IA =1505A, Phase IB =180.8A, Phase IC = 200A , Earth Fault (FWD) IDMTL IE =1441A		
	24.06.2020	3:23	24.06.2020	3:35	0:12	7	220kV Malbase -Samtse Feeder	400/220/ 66 kV Malbase Substation	Tripped due to over current on R Phase and Earth fault	REL511: Distance trip, OC IL1=6035A<283.6deg, IL2=31.70A<121.3deg, IL3=71.23A<107deg IL4=5923<283.6deg.	4.9 KM	
	24.06.2020	3:23	24.06.2021	3:45	0:22	23	50 MVA Transformer I	400/220/ 66 kV Malbase Substation	Tripped	RET 670:Driffential Trip IL1=64.04A<121.15deg, IL2=72.68A<179.53, IL3= 128.66A<122.45deg, IL4=238.89<137.04deg.		
	24.06.2020	3:23	24.06.2021	3:45	0:22	25	50 MVA Transformer III	400/220/ 66 kV Malbase Substation	Tripped	RET 670:Driffential Trip IL1=87.49A<127.72deg, IL2=98.98A<173.68, IL3= 157.88A<125.92deg, IL4=321<139.62deg.		
1	30.06.2020	6:30	30.06.20	13:55	0:25	0.6	20MVA transformer I	400/220/ 66 kV Malbase Substation	Tripped	IL1=0.28kA, IL2=0.11kA, IL3=7.81kA	-	
2	11.06.2020	20:00	11.06.2020	20:13	0:12	-0.2	220kV Singi- Samtse	Dhamdum Substation	Tripped	General trip, Zone 1 trip, Fault loop= L3-L I1=71.52 A<212.3deg, I2=86.14A<234.4deg I3=2364A<43.15 deg I4=2212A<42.97deg	33.7KM	
3	11.06.2020	20:35	11.06.2020	22:05	0:30	-0.2	220kV Singi- Samtse	Dhamdum Substation	Tripped	General trip, Zone 2 trip, AR blocked I1=2079A<284.1deg, I2=93.33A<96.89deg I3=94.24A<111.9 deg I4=1890A<284.2deg		
4	14.06.2020	7:33	14.06.2021	7:46	0:13	-5	66kV Bhutan Concast	Buscoupler	Tripped	Over current & earth fault, IE>> directional trip, I>>Directional trip, IEP Dreectional Trip86 optd. IL1=5.6kA IL2=0.45kA IL3=0.4kA.		
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	18:33	11.06.2020	18:36	0:03	0.63	66kV P/ling	Nil	Over current	IDMTL O/C 51AX, 51BX & 51CX	Gomtu Sub Station	
2	11.06.2020	19:44	11.06.2020	19:56	0:12	2.04	66kV P/ling	Whole Gomtu	Earth fault	IDMTL Earth fault 57NX	Gomtu Sub Station	Grid failed
3	11.06.2020	19:45	11.06.2020	19:56	0:11	-3.646	66kV Dhamdhum	Whole Gomtu	General trip	Nil	Chukha	Grid failed
4	11.06.2020	20:28	11.06.2020	20:33	0:05	-3.711	66kV Dhamdhum & 66kV P/ling	Whole Gomtu	General trip	Nil	Malbase	Grid failed
5	11.06.2020	20:27	11.06.2020	20:32	0:05	4.03	66kV P/ling	Whole Gomtu	General trip	Nil	Malbase	Grid failed
6	11.06.2020	20:50	12.06.2020	09:15	0:25	4.03	66kV P/ling	Phuntsholing	Earth fault	IDMTL Earth fault 57NX	P/ling Sub Station	
7	18.06.2020	12:00	19.06.2020	12:12	0:12	1.39	66kV P/ling	Phuntsholing	Over current	IDMTL O/C 51CX	Gomtu Sub Station	
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.06.2020	19:45	11.06.2020	19:53	0:08	1.880	66kV Chukha-Phuntsholing Line	Gedu black out	Thundering /lightning		Line segment	
2	11.06.2020	20:28	11.06.2020	20:33	0:05	1.700	66kV Chukha-Phuntsholing Line	Gedu black out	Thundering /lightning		Line segment	
3	11.06.2020	20:51	11.06.2020	21:19	0:28	1.700	66kV Chukha-Phuntsholing Line	Gedu black out	Thundering /lightning		Line segment	

SMD Semtokha												
June, 2020												
66/33/11kV Lobeysa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.06.2020	11:55	23.06.2020	12:52	0:57	12.200	66kV Basochu Incomer	All outgoing feeders	Grid fail	NA	Grid fail from Chukha end	
2	23.06.2020	11:55	23.06.2020	12:52	0:57	12.200	66kV Semtokha Incomer	All outgoing feeders	Grid fail	NA	Grid fail from Chukha end	
220/66/11kV Semtokha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.06.2020	11:56	23.06.2020	12:49	0:53	52.610	220kV Semtokha-Chukha	Semtokha Substation	Trip at Chukha end, Rurichu on isolation mode	Nil, no tripping at Semtokha end	Chukha end	
2	23.06.2020	11:56	23.06.2020	12:51	0:55	-72.880	220kV Semtokha-Rurichu	Semtokha Substation	Trip at Chukha end, Rurichu on isolation mode	Nil, no tripping at Semtokha end	Chukha end	
66/33/11kV Dechencholing substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	23.06.2020	11:54	23.06.2020	12:49	0:43	-7.69	66KV Semtokha Incomer	whole substation	Supply fail from source.			
66/33kV Olakha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	21.06.2020	16:20	21.06.2020	16:22	0:02	3.40	66/33kV, 20MVA T.R.I	All 33KVoutgoing feeders	O/C and E/F	TRAFO DIFFL.PROTN Relay 8	Line Segments	
2	22.06.2020	11:57	22.06.2020	11:59	0:03	3.5	66/33kV, 20MVA T.R.I	All 33KVoutgoing feeders	O/C and E/F	TRAFO DIFFL.PROTN Relay 8	Line Segments	
3	22.06.2020	15:00	22.06.2020	15:02	0:02	2.8	66/33kV, 20MVA T.R.I	All 33KVoutgoing feeders	O/C and E/F	TRAFO DIFFL.PROTN Relay 87	Line Segments	
4	23.06.2020	11:57	23.06.2020	12:55	0:58	-13.4	66KV Tie Line	Olakha	Blackout	Blackout	Chukha Line	Whole Supply fail from Chukha

0												
56/11kV Malbase substation												
Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
02.07.2020	1:20	02.07.2020	1:50	0	8	220kV Samtse Feeder	400kV Malbase Substation	Tripped	IL2=79.34A<198.8deg.	38.7km	The feeder tripped due to ceaseless thunder, lightning, wind along with heavy rainfall. The feeder charged with code "1555"	
02.07.2020	1:20	02.07.2020	1:55	0	20	50/63MVA Transformer III	400kV Malbase Substation	Tripped	OLTC BUCH trip,27 Trip, 86 optd. IL1=40.51A<1159deg. IL2=36.05A<140deg. IL3=58.32A<172.65deg. IL4=148.36A<153.46deg		The feeder tripped due to ceaseless thunder, lightning, wind along with heavy rainfall. The feeder charged with code "1557"	
02.07.2020	1:20	02.07.2020	2:47	1	42	200MVA ICT Transformer	400kV Malbase Substation	Tripped	1.IV RELAY INDICATION from 67/67N RELAY: 86 operated, G1 Phase A (REV) IDMTL , IA =1818A, Phase B(REV) IB=211.6A, Phase C(REV) IC = 1979A , Earth Fault (REV) IDMTL<HS1> IE =1693A. 2.HV RELAY INDICATION from 67/67N RELAY: 86 operated, G2 Phase A (FWD) IDMTL, IA =996.3A, Phase B(FWD) IB=118.1A, Phase C(FWD) (LS) IC = 1112A , Earth Fault (FWD) IDMTL IE =759.1A		The feeder tripped due to ceaseless thunder, lightning, wind along with heavy rainfall. The feeder charged with code "1555"	
04.07.2020	15:21	04.07.2020	15:24	0	-	220kV Bus Coupler	400kV Malbase Substation	Tripped	I>>TRIP.		The feeder tripped due to ceaseless thunder, lightning, wind along with heavy rainfall.	
18.07.2020	4:58	20.07.2020	13:15		0.7	10MVA transformer II LV side.	singyeogon GIS S/S.	Tripped	AVR operated under voltage		The feeder tripped due to ceaseless thunder, lightning, wind along with heavy rainfall, over current and earth fault.	
66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	09.07.2020	15:10	09.07.2020	15:16	0	0.92	10MVA transformer (Areva) (66/33kV)	10MVA transformer (66/33kV)	Eathfault	51SN , 86	Substation	The cause of tripping was due to fault on 33kV feeder IV. Weather condition was raining.
2	19.07.2020	8:45	19.07.2020	9:07	0	0.69	10MVA transformer (Areva) (66/33kV)	10MVA transformer (66/33kV)		86	Substation	The cause of tripping was due to fault on 33kV feeder IV. At 09:07hrs normalised the transformer and 33kV Incomer I.
3	21.07.2020	23:30	22.07.2020	7:32	8	0.66	10MVA transformer (Areva) (66/33kV)	10MVA transformer (66/33kV)	Eathfault	51SN , 86	Substation	Transformer got tripped due to fault on 33kV feeder IV. Didn't test charged due to smoke coming out from 33kV Incomer I. On dated 22.07.2020 at 07:32hrs test charged after carrying out physical inspection on transformer and 33kV incomer I panel. Tranformer was kept under idle charged condition.
4	22.07.2020	9:20	22.07.2020	19:52	10	idle	10MVA transformer (Areva) (66/33kV)	10MVA transformer (66/33kV)	Shutdown	Nil	Substation	Handtripped for checking circuit and rectification works on 33kV Incomer I control circuit.
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.07.2020	01:20	02.07.2020	01:38	0	-2.3	66kV Dhamdum feeder	Nil	General trip	NA	Line segment	Test charged after informing to BPSO and Damdum SubStation.
2	21.07.2020	23:58	22.07.2020	0:13	0:00	2.19	66kV P/ling feeder	Nil	Over current	Over current 51 AX	Line segment	Test charged the line as per instruction given by BPSO and charge withstand.

220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	02.07.2020	1:20	02.07.2020	1:46	0	-4.21	220kV Malbase feeder	N/A	N/A	General trip, zone I trip, B phase fault	N/A	Feeder trip from both end. From here Zone I trip. General trip, B phase fault. Malbase feeder charged after charging from malbase end.
2	02.07.2020	1:20	02.07.2020	18:15	16	-2.85	220kV Singhigoan feeder	N/A	N/A	General trip, zone 1 trip, R phase fault	N/A	When the Malbase feeder tripped same time Singgyeogan feeder also got tripped from both the end. After feeder charged from Malbase end I made test charge two times but breaker could not close showing CB trouble. I informed to BPSO regarding the breaker. BOSO madam told me charge the breaker after rectifying the fault. After rectifying mechanical breaker problem on R Phase by damdum mic group before charging we have inform to BPSO, T/phu and they have given charging code no.4970
3	02.07.2020	1:20	02.07.2020	1:40	0	2.34	66 kV Gomtu	N/A	N/A	General trip, zone 1 trip, Y PH Fault	N/A	When the Malbase feeder tripped same time Gomtu feeder also got tripped from both the end. Gomtu feeder charge after informing to BPSO.
4	03.07.2021	4:48	03.07.2021	4:54	0	1.67	67 kV Gomtu	N/A	N/A	General trip, zone 1 trip, B phase Fault	N/A	Gomtu feeder trip informed to BPSO and test charged feeder stand normal. IL1= Fault mag- 41.83A, Fault angle- 6.40deg. IL2=Fault mag- 64.26A, Fault angle-128deg. IL3=Fault mag- 2989.34A, Fault angle-46.83deg.
5	04.07.2020	15:25	04.07.2020	16:55	1	-4.85	220kV Malbase feeder	N/A	N/A	General trip, DIR, EF trip, VT Fuse fail	N/A	AS the 220KV Buscoupler tripped in Malbase subststion, our CB also got operator at 15:25hrs .We informed BPSO for charging code but told us not require .As our CB could not give operation signal on SCADA. So it took some time to normalise the line . Our substation was feeded by Singyeghaon feeder in the same time.
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	13.07.2020	10:18	13.07.2020	10:25	0	0.310	8MVA Tx-I	33kV Gurungdara feeder-I		Differential R&B-phase with tripping relay 86	Line segment	Test charge the feeder but didn't stand. Informred to ESSD and transformer and feeder charged after isolating all the outgoing feeders at Gurungdara substation.
2	14.07.2020	5:37	14.07.2020	5:39	0	0.230	8MVA Tx-I	33kV Gurungdara feeder-I		Differential R&B-phase with tripping relay 87	Line segment	Test charge and hold normal..
3	16.07.2020	18:13	16.07.2020	18:14	0	0.410	8MVA Tx-I	33kV Gurungdara feeder-I		Differential R&B-phase with tripping relay 86	Line segment	Test charge and hold normal..
4	29.07.2020	19:16	29.07.2020	21:03	0:00	0.98	8MVA Tx-I	33kV Gurungdara feeder-I	Injection of adjusted energy meter.		Substation	Work permit No. 16 issued to Mr. Phub Dorji, Maintenance team to inject the adjusted energy meter reading.
5	29.07.2020	10:30	29.07.2020	19:26	0:00	0.19	5MVA Tx III	33kV Gurungdara fdr II	Injection of adjusted energy meter.		Substation	Work permit No. 15 issued to Mr. Phub Dorji, Maintenance team to inject the adjusted energy meter reading.
66/33kV Olakha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	44019	0.4895833	44019	0.5402778	1	5.1	66/33kV 20MVA, TX	The feeders was not et	Upgrating the relay Ve	TRAFO DIFFL.PROTN Relay 87. I.Device Trip, 8.Sp	Olakha Substation	Tripped while upgrading relay version on HV side. Reset all the operated relays & indication & test charge the line & hold normal.
2	44034	0.3618056	44034	0.3625		5.6	66/33kV 20MVA, TX	33kV I/C I & 33kV C	CO/C&E/F	TRAFO DIFFL.PROTN Relay 87. I.Device Trip, 3.Y F	Line Segments	Reset the relay ,test charge the transformer and hold normal.

SMD Phuentsholing												
August, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.08.2020	18:20	04.08.2020	18:27	0	48	200MVA ICT Transformer (HV)	400kV Malbase Substation	Tripped	S> IDMTL IB=1059A PHASE C [FWD] IC=10		The feeder tripped due to over current on Y & B Phase.
2	04.08.2020	18:20	04.08.2020	18:44	0	8	220kV Samtse	400kV Malbase Substation	Tripped	Over current on Y & B Phase, 67/67N, 86 opt, Earth fault G1 PHASE A [FWD] IA=137.7A PHASE [FWD]<HIS> IDMTL IB=4693A, PHASE C[FWD] IDMTL IC =3188A, EARTH FAULT [REV] IE=2776A		The feeder tripped due to Over current on Y & B Phase and earth fault
3	04.08.2020	18:20	04.08.2020	18:29	0	21	50 MVA transformer III (HV), 212	400kV Malbase Substation	Tripped	OLTC BUCH trip,27 trip, 86 opt., R=80.94,<5.82 deg. Y=59.25A<-87.21 deg, B=14.61 A<143.77A deg. N=92.64A<-39.36		OLTC BUCH trip
4	04.08.2020	18:20	04.08.2020	18:30	0	21	50 MVA transformer III (LV),610	400kV Malbase Substation	Tripped			
5	04.08.2020	18:20	04.08.2020	18:28	0		220kV Bus Coupler	400kV Malbase Substation	Tripped	50/51N trip, o/c trip		O/C Trip
6	05.08.2020	12:54	05.08.2020	12:59	0		220kV Bus Coupler	400kV Malbase Substation	Tripped	50/51N trip, o/c trip		O/C Trip
7	06.08.2020	0:25	06.08.2020	0:29	0	55	200MVA ICT Transformer (HV)	400kV Malbase Substation	Tripped	Earth fault, 67(V) e/f optd., G1 PHASE A [REV] IA=280.3A, PHASE B IB=1542A PHASE C [REV] IC=284.9A EARTH FAULT [FWD]IDMTL <HIS> IE=1762A		Tripped due to heavy rainfall
8	06.08.2020	0:25	06.08.2020	0:30	0	22	50 MVA transformer III (HV), 212	400kV Malbase Substation	Tripped	OLTC BUCH trip,27 trip, 86 opt., IR=90.82,<6.08deg. IY=36.78A<-62.51 deg, IB=64.6 A<103.43A deg. IN=100.51A<23.35		Tripped due to heavy rainfall
9	06.08.2020	0:25	06.08.2020	0:30	0	22	50 MVA transformer III (LV),610	400kV Malbase Substation	Tripped	IR=223.33A<179.83 deg, IY=140.95A<-81.57 deg. IB=216.63 A<-55.3 deg. IN=87.95A<-144.4		Tripped due to heavy rainfall. Disturbance report collected from RET relay panel HV side
10	26.08.2020	9:26	26.08.2020	9:30	0		220kV Bus Coupler	400kV Malbase Substation	Tripped	over current & earth fault on low set. 50/51N opt		Tripped due to over current
11	26.08.2020	19:03	26.08.2020	19:17	0	159	220kV Chhukha Feeder	400kV Malbase Substation	Tripped	86 opt, distance protection main 1, fault in zone 3, IA=3.421kA , IB=330.3A, IC=208.6A	41.26	Over current on R Phase due to chhukha-birpara feeder II CT blast at chhukha end
12	31.08.2020	1:18	31.08.2020	1:22	0	48	200MVA ICT Transformer (HV)	400kV Malbase Substation	Tripped	G1 PPHASE A IA=233.6A, PHASE B(REV)IDMTL IB=2182A, PHASE C(REV) IC=178.4A, EARTHFAULT(REV) IDMTL<HIS>IE=2426A.		Heavy raining, lightning and thundering
13	31.08.2020	1:18	31.08.2020	1:29	0	20	50 MVA transformer III (HV), 212	400kV Malbase Substation	Tripped	IR=127.63<5.21deg,IY=43.88A<14.54deg, IB=72.14A<64.06deg,IN=211.51A<18.02 deg.		Heavy raining, lightning and thundering
14	04.08.2020	18:20	05.08.2020	15:53	21	1.9	220kV Singye Samtse	singyegoan GIS S/S.	Tripped	Zone 2 tripped , V1=127.6kV, V2=63.68kV, V3=60.81kv , I1=82.37A, I2=2559A, I3=2666A		The feeder tripped due to over current on Y & B Phase charged with code "1601"
15	04.08.2021	18:20	04.08.2021	18:39	0	-5.4	66kV Bhutan Concast feeder	singyegoan GIS S/S.	Tripped	Ge neral Trip, Directional trip, o/C Trip ,IEP directional trip ,IL1=0.14kA, IL2=0.24kA, IL3=0.08kA		The feeder tripped due to over current on Y & B Phase charged with code "1601"
16	31.08.2020	1:18	31.08.2020	10:08	8	-2	220kV Singye Samtse	singyegoan GIS S/S.	Tripped	Tripped on overcurrent on Y Phase ,IL1=92.72A, IL2=5362A, IL3=79.31A,IL4=5195A.		Heavy raining, lightning and thundering
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	31.08.2020	01:50	31.08.2020	03:04	0:00	-1.334	66kV Damdum	Whole Gomtu	General trip	YB Phase	Malbase Sub Station	Test charged after informing to BPSO and Damdum SubStation, supply stood normal.
2	31.08.2020	01:50	31.08.2020	02:05	0:00	3.04	66kV P/ling	Whole Gomtu	General trip	NA	Malbase Sub Station	Resume the Gomtu-P/ling supply at 2.05hrs.

66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	29.08.2020	17:41	29.08.2020	19:52	2	0.70	10MVA transformer (Areva) (66/33kV)	Affected all 33kV feeders	Handtripped	Nil	Substation	Handtripped due to smoke coming out from 33kV Incomer I. Carried out physical inspection and found trip coil of 33kV Incomer I got burnt. At 19:52hrs normalised the transformer after replacement of trip coil on 33kV Incomer I.
2	29.08.2020	17:41	29.08.2020	18:23	0	0.88	10MVA transformer (Voltamp) (66/33kV)	Affected all 33kV feeders	Handtripped	Nil	Substation	Handtripped due to smoke coming out from 33kV Incomer I. Carried out physical inspection and found trip coil of 33kV Incomer I got burnt. At 18:23hrs normalised the transformer, 33kV Incomer II and 33kV feeder I.
3	31.08.2020	1:50	31.08.2020	2:04	0	-6.71	66kV Chukha-Pling feeder	Black out at Pling	Tripped at their end	Nil	Chukha end	At 01:50hrs 66kV supply got tripped from chukha end and Gomtu end causing black out at Phuentsholing. At 02:04 66kV Chukha-Pling feeder resumed from Chukha end.
4	31.08.2020	1:50	31.08.2020	2:05	0	3.02	66kV Pling-Gomtu feeder		Tripped at their end	Nil	Gomtu end	At 01:50hrs 66kV supply got tripped from chukha end and Gomtu end causing black out at Phuentsholing. At 02:05 66kV Pling-Gomtu feeder resumed from Gomtu end.
220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	04.08.2020	5:00	04.08.2020	18:25	0:00	-1.8	220kv Singyeghoan feeder	N/A	NA	Zone 1 trip,B phase fault	5km	Test charge done,however fdr. Could not withstand.Fault value record as under: L1: 4 Pre fault mag=14.95A 4Pre fault angle=103.11deg. 4Fault Mag = 15.22A. 4Fault Angle = 99.90 Deg. L2: 4Pre fault mag =14.85A. 4Pre fault angle=37.39deg. 4Fault Mag = 15.48A. 4Fault Angle = 38.29Deg. L3: 4Pre fault mag =0.08A. 4Pre fault angle=63.87deg. 4Fault Mag = 0.097A 4Fault Angle = 98.97Deg
3	26.08.2020	9:24	26.08.2020	9:29	0:00	-4.44	220kv Malbase feddder	N/A	Transant fault	General trip, DIR. EF trip, VT Fuse fail	N/A	TEST charge was done as for the information from BPSO but line could not stand.
6	31.08.2020	1:15	31.08.2020	18:23	0:00	1.28	220kv singaygeong	N/A	N/A	REL 670. General tripped. Zone 1 Tripped.Y-phase fault and VT fuse fail.	N/A	IL1=Fault Mag=98.38A. Fault angle=160.69deg. IL2=fault mag=1345.00A. Fault angle 162.30 deg. IL3= Fault mag=86.00A. Fault angle=161.16. charging code given by BPSO T/phu:1799
7	31.08.2020	1:50	31.08.2020	3:02	0:00	0	66KV Gomtu fdr.	N/A	N/A	REL 670. General tripped	N/A	IL1=Fault Mag=1450A. Fault angle=40.55deg. IL2=fault mag=1473.66A. Fault angle=172.93deg. IL3= Fault mag=47.32A. Fault angle=127.32 deg.charging code given by BPSO T/phu:1799
66/33/11kV Lobeysa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	8/26/2020	20:26hrs	8/26/2020	21:14hrs	0	4.730	66kV LSA to SEM	All 33kV & 11kV outgoing feeders	Line fault	NA	NA	The incomer tripped at 20:26hrs from both end without any relay operation at our end and the supply was resumed from Semtokha at 21:14hrs
2	8/26/2020	20:26hrs	8/26/2020	21:14hrs	0	1.310	66kV LSA to BASOCHU	All 33kV & 11kV outgoing feeders	Line fault	NA	NA	The incomer tripped at 20:26hrs from both end without any relay operation at our end and the supply was resumed from Semtokha at 21:14hrs till Gewathang substation and at 21:28hrs supply extended to Basochu from Gewathang substation.

220/66/11kV Semtokha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	8/26/2020	1903hrs	8/26/2020	1924hrs	0.00	25.990	220kV Semtokha-Chukha feeder	Supply feed from 220kv Rurichu	Trip when R-phase CT of 220kV feeder-II blast at Chukha end	Main-I&II distance relay, trip on Zone-2	At Chukha switchyard	
2	8/26/2020	2025hrs	8/26/2020	2122hrs	0.00	-44.980	220kV Semtokha-Chukha feeder	Whole western blackout, Rurichu all units trip.	Trip along with Chukha when Chukha is trying to Synchronising with feeder-III, backfeed from Malbesa.	Main-I&II distance relay, general trip	At Chukha	
3	8/26/2020	1903hrs	8/26/2020	1918hrs	0.00	3.150	66/11kv 10MVA-I transformer	Semtokha substation all 11kV feeders only	Trip along with 220kV Semtokha-Chukha feeder.	Bach-up relay operated trip on O/C & E/F. IA-138.9A, IB-15.09A, IC-172.2A, IN-131.7A	At Chukha	
4	8/26/2020	1903hrs	8/26/2020	1920hrs	0.00	3.140	66/11kv 10MVA-II transformer	Semtokha substation all 11kV feeders only	Trip along with 220kV Semtokha-Chukha feeder.	Bach-up relay operated trip on O/C & E/F. IA-43.87A, IB-34.66A, IC-68.18A, IN-135.0A	At Chukha	
5	8/26/2020	2038hrs	8/26/2020	2128hrs	0.00	11.100	66kV Semtokha-Olakha	Nil		Emergency shutdown taken to avoid overloading of 66kV Chukha-Olakha line		
66/33/11kV Dechenchholing substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	20:22Hrs	26.08.2020	21:16Hrs	0	0.34	66KV Damji Fdr	Gasa line	Tripped on 86 relay no other relay optd.	86A & 86B	Not known	Test charge the fdr.however couldn't stand, within few minute back the main supply was failed from source, Chukha end. (Whole western grid blackout)
2	26.08.2021	20:30Hrs	26.08.2021	21:14Hrs	0	-6.846	66KV Ssemtokha Incomer		Main supply failed from Source. (Whole western grid black out)			
66/33kV Olakha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	8/6/2020	23:35	8/6/2020	23:36		2.9	20MVA Tr.1	Olakha SS	OC& EF	TRAFD DIFFL.PROTN Relay 87. Indication 1, 3 & 4. (1) Device Trip, (3) Y-Phase Differential Trip & (4) B-Phase Differential trip	RICB	Due to tripping of 33kV O/G. DPH-II, 20MVA -I got tripped
2	8/26/2020	20:25	8/26/2020	21:22		-11.1	Olakha - Semtokha Line	Whole western region Black Out	Due to 220 kV Feeder - II,CT Blast at Chukha Switch Yard	No relay operated	Chukha Switch Yard	Both 66kV & 220 kV tripped at Chukha and Basochu at source
3	8/26/2020	20:25	8/26/2020	21:09		0	Olakha - Changidaphu Line	Whole western region Black Out	Due to 220 kV Feeder - II,CT Blast at Chukha Switch Yard	No relay operated	Chukha Switch Yard	Both 66kV & 220 kV tripped at Chukha and Basochu at source & first supply resumed from Olakha-Changidaphu line, Chukha
4	8/26/2020	20:34	8/26/2020	21:15	0:00	5.8	20MVA Tr.1	Olakha SS	While test charging the Supply from source Chukha / Basochu 20MVA, Trf.I, got tripped at our end	DIR.O/C & E/F PROTN.Relay- 67. Indication 1&6. (1) Device Trip, (6) Earth-Fault Trip & Trip relay -86	Chukha Switch Yard	Resetting all the operated relays & indication,charged the 20 MVA Transformer-I, that is only after resuming the supply from 66kV Olakha - Changidaphu line & hold normal

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66/33/11kV Jemina substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	19:05	26.08.2020	19:17	0:00	5.7	66 kV Chundu Fdr	Black Out	Supply Failed from the Source Chukha	IN>Trip, SOTF operated, 86 relay	Chukha end	Initially supply failed from Chukha at 19:05 Hrs, upon test charging from Chukha end at 19:08 Hrs, the 66 kV Chundu feeder tripped at the Substation end, relay operated are start IN1> 1, SOTF operated & 86 master trip relay, informed to BPSO & at 19:17 Hrs as per the Instruction from BPSO, the feeder charged at stood normal.
2	26.08.2020	20:04	26.08.2020	20:45	0:00	5.7	66 kV Chundu Fdr	Black Out	Supply Failed from the Source Chukha	IN>Trip, SOTF operated, 86 relay	Chukha end	Again supply failed from Chukha at 20:04 Hrs, upon test charging from Chukha end at 20:31 Hrs, the 66 kV Chundu feeder tripped at the Substation end, relay operated are start IN1> 2 & 86 BU & 86 master trip relay, informed to BPSO & at 20:45 Hrs as per the Instruction from BPSO, the feeder charged at stood normal.
66kV Chumdo switching station												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	1904hrs	26.08.2020	1917hrs		(-)4.65MW	66kV Chukha I/C trip	Paro,Pangbasa/Jemina substation	Grid Fail	CB open	Chukha P/H	
2		2003hrs		2025hrs		(-)8.1MW						
(B) 66/33kV Watsa Substation												
1	26/08/2020	20:03hrs	26/08/2020	20:06hrs	0	.490MW	66KV incommer	\Fdr. I and II	66KV supply fail from chukha end		66KV supply fail from chukha end	
66/33/11kV Paro substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	19.02Hrs	26.08.2020	19.06Hrs	0:00	7.53	66kV Incomer-1	Paro olathang S/S & ITS outgoing fdrs	Tripped from chukha	-	chukha	
2	26.08.2020	20.03Hrs	26.08.2020	20.30Hrs	0:00	5.85	66kV Incomer-1	Paro olathang S/S & ITS outgoing fdrs	Tripped from chukha	-	chukha	
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	8/25/2020	16:12	8/25/2020	16:16	0:00	-1	66kV Incomer	all the feeders	transit fault	O/C & E/F	Pangbesa	66kV incomer failed from Pangbesa substation.The same was normalised further.
2	8/26/2020	19:02	8/26/2020	19:06	0:00	-2.175	66kV Incomer	all the feeders	Grid fail	O/C & E/F	Chukha power house	66kV Incomer tripped from Chukha power house.The same was normalised further.
3	8/26/2020	20:03	8/26/2020	20:29	0:00	-1.58	66kV Incomer	all the feeders	Grid fail	O/C & E/F	Chukha power house	66kV Incomer tripped from Chukha power house.The same was normalised further.
66/33kV Pangesa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
(J) 66/33/11kV Pangbesa substation												
1	8/25/2020	16:12Hrs	8/25/2020	16:16Hrs	0	1.07	66kV OG-Haa	Haa Area	OC/EF	Distance Relay	Pangbesa-Haa Line	
2	8/26/2020	19:02Hrs	8/26/2020	19:06Hrs	0	2.53	66kV OG-Haa	Haa Area	Tripped From Chukha	-	Chukha	
3	8/26/2020	20:03Hrs	8/26/2020	20:27Hrs	0	2.21	66kV OG-Haa	Haa Area	Tripped From Chukha	-	Chukha	

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400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.09.2020	6:37	05.09.2020	7:13	0	135	220kV Malbase Birpara Feeder	400kV Malbase Substation	Tripped	Main 1 trip, Zone I trip, IA=528.3A, IB=177.7A, IC=2.979kA	24.97km	The feeder tripped due to over current on B Phase caused by heavy rainfall, lightning & Thundering
2	05.09.2020	6:37	05.09.2020	6:50	0	51	220kV Samtse	400kV Malbase Substation	Tripped	differential trip, IA=594.9A, I2=609.4, I3=595.6, I4=217.4A		The feeder tripped due to over current on B Phase caused by heavy rainfall, lightning & Thundering
3	05.09.2020	23:15	05.09.2020	23:22	0	46	220kV Samtse	400kV Malbase Substation	Tripped	86 opt. IA=3228A, I2=329A, I3=3484, I4=1545A		The feeder tripped due to over current on B Phase caused by heavy rainfall, lightning & Thundering
4	11.09.2020	22:59	11.09.2020	23:07	0	5	220kV Samtse	400kV Malbase Substation	Tripped	O/C & Distance fault, M1 trip, Zone 1 Trip, B/U Trip G1 phase A(FWD) IDMTL IA=2417A, G1 phase B(FWD) IC=148.9A, E/Fault (REV) IE=2878A		Tripped on overcurrent.
5	23.09.2020	14:30	23.09.2020	15:18	0	261	400kV Malbase-Siliguri feeder III	400kV Malbase Substation Tie CB for Siliguri Feeder	Tripped	Main 1 trip, Tie-CB-Trip, Fuse fail, ZM3-Trip IL1=495.4A, 40.87 deg, IL2=297.8A<257.4 deg, IL3=3006A<90.59 deg, IL4=6079A<84.57 deg		Tripped on overcurrent.
6	23.09.2020	14:30	23.09.2020	14:34	0		220kV Bus Coupler	400kV Malbase Substation	Tripped	50/51N trip, o/c trip		Tripped on overcurrent.
7	23.09.2020	15:29	23.09.2020	15:36	0	288	400kV Malbase-Tala feeder III	400kV Malbase Substation	Tripped	No display in MICOM & REL is faulty.		Tripped due to jerk caused by feeder tripped at Tala

8	05.09.2020	23:15	06.09.2020	8:45	9	-36	220kV Singye Samtse	singyegoan GIS S/S.	Tripped	Zone 2 tripped , V1=128.7kV, V2=130.6kV, V3=120.9kv , I1=100.6A, I2=111.1A, I3=123.4A	The feeder tripped due to over current on Y & B Phase charged with code "1857"
9	05.09.2020	23:15	05.09.2020	23:30	0	-1	66kV Bhutan Concast	singyegoan GIS S/S.	Tripped	General Trip, Directional trip, o/C Trip ,IEP directional trip ,IL1=0.17kA, IL2=0.12kA, IL3=0.12kA	The feeder tripped due to over current
10	09.09.2020	3:01	09.09.2020	4:04	1	36	66kV Bhutan ferro Alloy Limited	singyegoan GIS S/S.	tripped	General Trip, Directional trip, o/C Trip ,IEP directional trip ,IL1=0.38kA, IL2=0.45kA, IL3=0.36kA	The feeder tripped due to over current
11	11.09.2020	22:59	12.09.2020	10:19	10	0.43	220kV Singye Samtse	singyegoan GIS & Dhamdhum S/S.	Tripped	86 opt. I1=3780A<293.2d eg, I2=3058A<148.1d eg, I3=72.7A<43.69 deg, I4=2106A<239.6 deg	Heavy raining, lightning and thundering

66/33/11kV Dechenchholing substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	20:22Hrs	26.08.2020	21:16Hrs	0	0.34	66KV Damji Fdr	Gasa line	Tripped on 86 relay no other relay optd.	86A & 86B	Not known	Test charge the fdr. however couldn't stand, within few minute back the main supply was failed from source, Chukha end. (Whole western grid blackout)
2	26.08.2021	20:30Hrs	26.08.2021	21:14Hrs	0	-6.846	66KV Ssemtokha Incomer	Main supply failed from Source. (Whole western grid black out)				

66/33/11kV Dechenchholing substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	26.08.2020	20:22Hrs	26.08.2020	21:16Hrs	0	0.34	66KV Damji Fdr	Gasa line	Tripped on 86 relay no other relay optd.	86A & 86B	Not known	Test charge the fdr. however couldn't stand, within few minute back the main supply was failed from source, Chukha end. (Whole western grid blackout)
2	26.08.2021	20:30Hrs	26.08.2021	21:14Hrs	0	-6.846	66KV Ssemtokha Incomer	Main supply failed from Source. (Whole western grid black out)				
66/33kV Olakha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	9/5/2020	6:38	9/5/2020	6:47	0	-8.3	66kV Olakha - Semtokha Line	Whole western region part was black out	Supply failed from Source	Nil	Line Segments	Due to tripping of 220kV Rurichu line at 220kV Substation at Semtokha & Both 220kV at Chukha and Basochhu tripped.
2	9/5/2020	6:38	9/5/2020	6:47	0	-8.3	66kV Olakha - Changidaphu Line	Whole western region part was black out	Supply failed from Source	Nil	Line Segments	Due to tripping of 220kV Rurichu line at 220kV Substation at Semtokha & Both 220kV at Chukha and Basochhu tripped.

66/33kV Watsa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	5/9/2020	6:38hrs	5/9/2020	6:46hrs	0	.304MW	66KV incommer	Fdr. I and II	66KV supply fail from chukha end		66KV supply fail from chukha end	
2	23/9/2020	6:52hrs	23/9/2020	6:55hrs	0	.420MW	66KV SF6 breaker	Fdr. I and II	O/C and E/F on R,B phase	Overcurrent and Earth fault relay operated	Fdr. I Wanakha	Test charge at 6:53hrs but line could not hold. Line charged after opening isolator of fdr. I wanakha & the line hold.
3	27/9/2020	3:28hrs	27/9/2020	3:35hrs	0	.170MW	66KV SF6 breaker	Fdr. I and II	O/C and E/F on R,B phase	Overcurrent and Earth fault relay operated	Fdr. I Wanakha	Test charge at 3:30hrs but line could not hold. Line charged after opening isolator of fdr. I wanakha & the line hold.
4	28/9/2020	6:56hrs	28/9/2020	7:06hrs	0		66KV SF6 breaker	Fdr. I and II	O/C, OCH, EF & EFH on B phase	Overcurrent and Earth fault relay operated	Fdr. II chapcha	Test charge at 6:57hrs but line could not hold. Line charged after opening isolator of fdr. II Chapcha & the line hold.

October, 2020

400/220/66/11kV Malbase substation

Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.10.2020	15:37	05.10.2020	15:51	0	6	220kV Samtse Feeder	Malbase s/s	Overcurrent & Earthfault	M-1 trip,Zone 1 trip,B/U trip, Carrier Fail, IL1=4129A<278.7deg, IL2= 84.37A<192.2deg, IL3=6931A<42.24deg, IL4=5827A<2.756 deg.	L1-L3 Dist = 12.3km	Weather conditon: Raining, Lightning and thundering. Feeder was charged with code:1404/BPSO.
2	05.10.2020	15:37	05.10.2020	15:57	0	21	50/63MVA Transformer III	Malbase s/s	Transient Fault	OLTC trip, Diff trip & Diff restrain. Diff HARM BLK. IL1=53.09A<-144.62deg, IL2=137.17<-141.17deg, IL3=84.24A<-165.57 deg.	-	Weather conditon: Raining, Lightning and thundering. Feeder was charged with code:1406/BPSO.
3	11.10.2020	10:42	-	-		0.9	20MVA Transformer II	Malbase s/s		Diff trip,Diff HARM BLK, IL1=26.77A<-14.28deg, IL2=680.98<-134.08deg, IL3=659.2A<47.25deg.		Weather condition: Clear.

66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.10.2020	15:37	05.10.2020	15:54	0	-6.53	66kV Chukha-Pling feeder	66kV Chukha-Pling feeder	Tripped	Null	Tripped at their end	At 15:37hrs 66kV Pling-Gomtu and 66kV Chukha-Pling fdr got tripped from their end causing black out at Phuentsholing. At 15:41hrs 66kV supply was extended from Malbase substation after coordinating with BPSO. As per instruction from BPSO normalised 66kV Pling-Gomtu feeder at 15:41hrs and 66kV Chukha-Pling at 15:54hrs from their end.
2	05.10.2020	15:37	05.10.2020	15:41	0	-2.35	66kV Pling-Gomtu feeder	66kV Pling-Gomtu feeder	Tripped	Null	Tripped at their end	
3	05.10.2020		05.10.2020	15:41	15	idle charged	66kV Malbase-Pling feeder	66kV Malbase-Pling feeder		Null	Substation	Since both 66kV feeders got tripped at their end and after coordinating with BPSO at 15:41hrs charged 66kV Malbase feeder which was under idle charged condition. At 16:07hrs as per instruction from BPSO CB kept open at out end (idle charged) with opening code 0869.
4	14.10.2020	10:16	14.10.2020	10:20	0	0.70	66kV Pling-Gomtu feeder	66kV Pling-Gomtu feeder	Overcurrent	I>, Ia- 32.97A, Ib-206.8A, Ic-239.9A, VAB-54.24kV, VBC-17.87kV, VCA-53.12kV, In measured-12.85A, In derived- 13.09A, VAN-35.13kV, VBN-20.51kV, VCN-19.32kV, 186&86	Substation	The cause of tripping was due to transient fault.
7	28.10.2020	15:57	28.10.2020	16:06	0	-3.99	66kV Chukha-Pling feeder	66kV Chukha-Pling feeder	Tripped at both end	Dist prot optd, 186&86	Line	66kV Chukha-Pling feeders got tripped at chukha end as well at our end. At 16:06hrs normalised 66kV Chukha-Pling fdr after getting clearance from BPSO.
8	05.09.2020	6:37	05.09.2020	8:32	1	-6.83	66kV Chukha-Pling feeder	66kV Chukha-Pling feeder	Dist prot optd	Fault imp-2.17, Fault angle-159 deg, fault current-2.48, fault voltage--0.936, 186&86	Substation	Weather condition was heavy rainfall with lightning. At 06:37hrs 66kV Chukha-Pling and 66kV Pling-Gomtu fdr got tripped at our end causing black out at Phuentsholing. Didn't test charge as per instruction from BPSO (220kV system got fail at Chukha end). At 08:02hrs as per instruction from BPSO normalised 66kV Chukha-Pling feeder.
9	05.09.2020		05.09.2020	6:44	6	idle charged	66kV Malbase-Pling feeder	66kV Malbase-Pling feeder		Null	Substation	Since both 66kV feeders got tripped at our end and as per instruction from BPSO at 06:44hrs charged 66kV Pling-Malbase fdr. At 08:05hrs as per instruction from BPSO CB kept open at out end (idle charged).
10	05.09.2020	23:15	05.09.2020	23:21	0	-6.31	66kV Chukha-Pling & 66kV Pling-Gomtu fdr	66kV Chukha-Pling & 66kV Pling-Gomtu fdr	Tripped at their end	Null	Tripped at their end	Both 66kV feeders got tripped at their end causing blackout at Phuentsholing. At 23:21hrs 66kV Chukha-Pling fdr resumed from chukha end.
220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	14.10.2020	10:17	14.10.2020	10:20	0	-9.29	220 kV Singyeghoan feeder	N/A	trip	NA	NA	trip from malbase end

66/33/11kV Gedu substation													
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
1	02.10.2020	12:50	02.10.2020	12:56	0	0.33	8MVA Tx-I	33kV Gurungdara feeder-I		Differential R&B-phase with tripping relay 86	Line segment	Charged and stood normal.	
2	05.10.2020	15:37	05.10.2020	15:41	0	1.67	66kV Chukha-Phutsholing Line		Black out	Tripped from Chukha end	Line segment	66kV supply charged from Chukha.	
3	28.10.2020	15:55	28.10.2020	16:05	0	1.54	66kV Chukha-Phutsholing Line		Black out	Tripped from Chukha end	Line segment	66kV supply charged from Chukha.	
220/66/11kV Semtokha substation													
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
1	27/10/2020	1024hrs	27/10/2020	1042hrs	0.00	13.760	220/66kV 50/63MVA-I	Semtokha substation all 66&11kV feeders only	When FND staffs were removing old fiber cable from cable trench for fiber core location shifting, the cable accidentally touch 66kV line while pulling, tripping both transformers.	Both HV&LV backup relay operated	AT Semtokha Substation switchyard		
2	27/10/2020	1024hrs	27/10/2020	1043hrs	0.00	13.810	220/66kV 50/63MVA-II	Semtokha substation all 66&11kV feeders.	When FND staffs were removing old fiber cable from cable trench for fiber core location shifting, the cable accidentally touch 66kV line while pulling, tripping both transformers.	Both HV&LV backup relay operated	AT Semtokha Substation switchyard		
66/33/11kV Jemina substation													
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
1	28.10.2020	10:22	28.10.2020	10:34	0:00	3.96	66 kV Chumdo Fdr		Black Out	Earth Fault	IN>>	Semtokha end	The line charged at 10:34 Hrs after isolating the Changedaphu feeder by opening the breaker upon instruction from BPSO.
2	28.10.2020	0.431944	28.10.2020	0.463889	0	-5.76	66 kV Changedaphu Fdr	Changedaphu Feeder	Earth Fault	IN>>	Semtokha end	The line charged at 11:08 Hrs upon instruction from BPSO.	
66kV Chumdo switching station													
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
1	28.10.2020	1025hrs	28.10.2020	1031hrs		(-)4.2MW	66kV Chukha I/C trip	Paro,Pangbasa/Jemina substation	Problem at P/H	CB open	Chukha P/H		
66/11kV Haa substation													
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
1	10/28/2020	10:23	10/28/2020	10:28	0	-1.773	all the feeders		Unknown	Chukha power house	66kV incomer failed from the source. The same was normalised further.		
66/33/11kV Paro substation													
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks	
1	28.10.2020	10.25Hrs	28.10.2020	10.31Hrs	0	3.14	66kV Incomer-1	Paro olathang S/S & ITS outgoing fdrs	Tripped from chukha	-	chukha		

November, 2020												
400/220/66/11kV Malbase substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.11.2020	12:15	24.11.2020	12:35	0	-91 MW	220kV Chukha Feeder	Malbase s/s	Busbar protection operated			Busbar protection operated and feeder got tripped
2	24.11.2020	12:15	24.11.2020	12:44	0	21	220kV Samtse Feeder	Malbase s/s	Busbar protection operated	Carrier Fail,RYB-CB Open.B/B trip. IL1=21.91A<33.27 deg, IL2=22.32A<278.8 deg, IL3=22.83A<150.4 deg.	-	
3	24.11.2020	12:15	24.11.2020	12:57	0	-10 MW	220kV Birpara Feeder	Malbase s/s	Busbar protection operated	RYB-CB Open.B/B trip. IL1=90.14A<120.3deg, IL2=95.61A<355.3deg, IL3=86.96A<233.6 deg.		
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.11.2020	12:32	24.11.2020	12:34	0	-8.726	66kV Dhamdum feeder	Whole Gomtu		Nil	Malbase Substation	Supply resumed after 2 minutes
220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.11.2020	12:34	24.11.2020	12:36	0	-7.65	220KV Dhamdum-Singeygoan feeder	N/A	N/A	N/A	N/A	220kV Malbase line tripped from Malbase end.
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	21.11.2020	23:54	22.11.2020	0:00	0	0.36	8MVA Tr	33kV Gurungdara feeder-1		R & B Phase Differential with tripping relay 86.	Line segment	Test charged after confirming with ESSD and stood normal.

220/66/11kV Singhigaon substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	05.10.2020	15:57	05.10.2020	15:57	0:00	0.3	220kV Singye Samtse	singvegoan GIS S/S.	Overcurrent & Earthfault	IL1=3129A, IL2=60.18A, IL3=2333A, IL4=2003A	-	Weather condition: Raining, Lightning and thundering. Feeder was charged with code:1407/BPSO.
66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.11.2020	12:28	24.11.2020	12:41	0	21.60	66kV Pling-Gomtu feeder	66kV Pling-Gomtu feeder	Overcurrent	I>, Ia- 193.2A, Ib- 202.3A, Ic-197.4A, VAB-59.35kV, VBC-59.06kV, VCA-59.08kV, In measured-3.253A, In derived-3.279A, VAN-34.28kV, VBN-34.50kV, VCN-33.70kV, 186&86	Substation	66kV Pling-Gomtu feeder got tripped due to overload. Since 220kV system failed from Malbase substation and 66kV power supply was fed till Dhamdum via Gomtu substation causing overload on Pling-Gomtu feeder.
220/66/11kV Semtokha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	25.11.2020	0852hrs	25.11.2020	1834hrs	9.00	-31.650	220kV Semtokha-Chukha feeder	Nil, feed from 220kV Semtokha-Rurichu feeder				Shutdown taken by DGPC, Chukha for CT&CVT testing at Chukha switchyard.

December, 2020												
66/33/11kV Phuentsholing substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	01.12.2020	1:23	01.12.2020	1:32	0	0.23	5MVA transformer (66/11kV)	11kV fdr II, V and 11kV fdr VII	Tripped	OLTC trip, 86	Substation	5MVA transformer got tripped due to heavy fault on 11kV feeder VII(Hospital). At 01:32hrs normalised the transformer. As per information from ESD O&M, there was flashing occurred at Hospital end (inside the panel at Hospital end). During their inspection, they found rat got electrocuted inside the panel.
2	05.12.2020	6:05	05.12.2020	6:09	0	-4.59	66kV Chukha-Pling feeder	66kV Chukha-Pling feeder	Tripped	DIST OPTD, 86&186	Tripped a both end.	The cause of tripping was due to transient fault. Weather condition was lightning with raining during the time of tripping.
66/33/11kV Gomtu substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.12.2020	6:00	11.12.2020	8:52	2	-12.201	66kV Dhamdum	Whole Gomtu	LA exploded at PCAL	General Trip, Zone -4 trip,Y Ph fault.	Gomtu Sub Station	Trip the supply from Gomtu Substation due to LA blast at PCAL switch yard.
220/66/33kV Dhamdum substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	11.12.2020	14:24	11.12.2020	14:37	0	12.14	66kV Gomtu fdr	N/A	Transient fault	General Trip	N/A	Dhamdum Gomtu feeder trip at 14:24hrs against relay indication General trip.It was charged informing to BPSO at 14:37HRS
66/33/11kV Gedu substation												
Sl. No	Date of Tripping	Time of Outage (Hrs)	Date of Normalization	Time of Fault cleared (Hrs)	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	21.11.2020	23:54	22.11.2020	0:00	0	0.36	8MVA Tr	33kV Gurungdara feeder-I		R & B Phase Differential with tripping relay 86.	Line segment	Test charged after confirming with ESSD and stood normal.
66/33kV Olakha substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	#####	1:25	#####	1:30		5.2	66/33kV 20MVA, Transformer I	All the 33kV Outgoing feeders	Due to tripping of 33kV Outgoing feeders VI (DPH-II)	TRAFO DIFFL. PROT.N. RELAY 87.Indication : 1,3,4 & 5. 1. General Trip .3.Diff Trip Yph.4.Diff Trip Bph.5.Diff Prot.Optd.Trip Relay 86.	At RICB Substation Thimphu	As per the information received from ESD Thimphu, The Transformer was tripped on cable burned at RICB Substation Thimphu on tripping of 33KV outgoing feeder no.VI (DPH-II).Test charged the Transformer & hold normal
2	#####	2:25	#####	2:29		3.1	66/33kV 20MVA, Transformer I	All the 33kV Outgoing feeders	Due to tripping of 33kV Outgoing feeders VI (DPH-II)	TRAFO DIFFL. PROT.N. RELAY 87.Indication : 1,3,4 & 5. 1. General Trip .3.Diff Trip Yph.4.Diff Trip Bph.5.Diff Prot.Optd.Trip Relay 86.	At RICB Substation Thimphu	As per the information received from ESD Thimphu, The Transformer was tripped on cable burned at RICB Substation Thimphu on tripping of 33KV outgoing feeder no.VI (DPH-II).Test charged the Transformer & hold normal
3	#####	2:49	#####	2:52		3.1	66/33kV 20MVA, Transformer I	All the 33kV Outgoing feeders	Due to tripping of 33kV Outgoing feeders VI (DPH-II)	TRAFO DIFFL. PROT.N. RELAY 87.Indication : 1,3,4 & 5. 1. General Trip .3.Diff Trip Yph.4.Diff Trip Bph.5.Diff Prot.Optd.Trip Relay 86.	At RICB Substation Thimphu	As per the information received from ESD Thimphu, The Transformer was tripped on cable burned at RICB Substation Thimphu on tripping of 33KV outgoing feeder no.VI (DPH-II).Test charged the Transformer & hold normal
66/11kV Haa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.12.2020	15:12	24.12.2020	15:21	0	-2.06	66kV Incomer	All the feeders	Unknown	E/F & O/C	Pangbesa s/s	Incomer tripped from Pangbesa substation on over current & earth fault. Supply was resumed further,after informing the concern person.
2	27.12.2020	13:58	27.12.2020	14:07	0	-2.44	66kV Incomer	All the feeders	Unknown	O/C	Pangbesa s/s	Incomer tripped from Pangbesa substation on over current. Supply was resumed further,after informing the concern person.
3	27.12.2020	14:56	27.12.2020	15:02	0	-2.2	66kV Incomer	All the feeders	Unknown	O/C	Pangbesa s/s	Incomer tripped from Pangbesa substation on over current. Supply was resumed further,after informing the concern person.

66/33kV Pangesa substation												
Sl. No	Date of Tripping	Time of Outage	Date of Normalization	Time of Fault cleared	Duration of Outages (hh:mm)	Load before Outage (MW)	Name of Feeders/Equipment Tripped	Name of Substations/Line affected by fault	Reason of Fault	Relay indication and operation	Exact location of fault (Line segment/substation)	Remarks
1	24.12.2020	15:15Hrs	24.12.2020	15:21Hrs	0	2.02	66kV OG to Haa	66kV OG to Haa	O/C and E/F	Distance relay	Pangbisa-Haa	
2	27.12.2020	13:58Hrs	27.12.2020	14:07Hrs	0	2.41	66kV OG to Haa	66kV OG to Haa	O/C (Strong wind)	Distance relay	Pangbisa-Haa	
3	27.12.2020	13:06Hrs	27.12.2020	13:10Hrs	0	2.41	66kV OG to Haa	66kV OG to Haa	O/C (Strong wind)	Distance relay	Pangbisa-Haa	