Additional Agenda for 38th PSC meeting

Time of meeting	:	*10.30 Hrs.*
Date of meeting	:	*01.08.2019 and 02.08.2019*
Venue	:	*NRPC Secretariat, New Delhi*

A.11. Follow up action on tripping discussed during PSC meeting (34th to 37th PSC meeting)

As per CEA Grid Standard and IEGC, each and every tripping needs to be analysed in details and detailed report along with remedial measures report needs to be submitted to NRPC/ NRLDC.

As per approval in PSC meeting, each utility shall submit the detailed report within 7days of the tripping. However, it seems detailed remedial measures report is still awaited for many of the trippings.

In PSC meeting, some of the tripping was discussed due to paucity of time and for remaining tripping, detailed analysis report was asked from the utilities. However, it is observed that after discussion in the PSC meeting, further remedial measures report was not submitted for many trippings. In fact, utilities are not sending the remedial measures report even for the events discussed during the meeting.

Utility wise compilation of the tripping discussed in last three PSC meeting is attached as **Annexure-1**.

Utilities are requested to kindly prepare the presentation based on action taken report and lesson learnt for tripping discussed in last three PSC (34-37th PSC) meeting.

Utilities shall also submit the detailed report and action taken report for remaining tripping which was not discussed during last three PSC meeting. (Complete list of the tripping was mentioned in respective PSC meeting Agenda & Minutes)

Member may like to discuss.

A.12. Tripping other than to be discussed in 38th PSC meeting

As per CEA Grid Standard and IEGC, each and every tripping needs to be analysed in details and detailed report along with remedial measures report needs to be submitted to NRPC/ NRLDC.

For better reliability of power system each and every multiple element tripping should be analyzed properly and remedial measures to be taken by utilities. Total 124 multiple element tripping event reported by NRLDC to RPC and constituents for the month of Jan to May, 2019.

Preliminary reports of all these trippings are available at NRLDC website and already send to concerned utilities. Among 124 events, around 22 events would be discussed in 38th PSC meeting.

For rest events, utilities may kindly submit the details (DR/EL and detailed report along with remedial measure report) to NRLDC and NRPC at mail ID: nrldcso2@posoco.in, nrldcso2@gmail.com, seo-nrpc@nic.in and sep-nrpc@nic.in.

List of all the multiple elements tripping event is available at NRPC website at following link:

http://164.100.60.165/meetings/PCC/pcc38/PCC38_Grid_Incident.xls

Apart from above, NRLDC tried to identify the remedial measures based on PMU data, SCADA data and details received from the constituents. For some of the tripping, remedial measures couldn't be identified due to less information available with NRLDC.

List of all the multiple element tripping along with remedial measures identified, action taken and action pending details is available at NRPC website at following link:

http://164.100.60.165/meetings/PCC/pcc38/PCC38_Grid_Incident_Updated.xls

All the utilities kindly go through the details and share the further action taken report with NRPC/ NRLDC. Status of all these tripping will be discussed during the meeting.

Member may like to discuss.

A.13. Frequent forced outages of transmission elements

This Agenda related to frequent forced outages of transmission elements was regularly discussed during monthly OCC meeting in which NRLDC informed about the tripping of single element more than 3 times in a month.

Despite of regular OCC agenda, remedial measures report and supporting details are still awaited for most of the tripped elements.

Compiled information of monthly transmission elements outage list starting from Oct 2018 to Jun 2019 is attached as Annexure-2. Action taken and identified during the OCC meeting is also part of the details.

Frequent outages of such elements affect the reliability and security of the grid. Hence, utilities are requested to look into such frequent outages and share the remedial measures taken/being taken in this respect.

In last (161st) OCC meeting, NRPC raised concern on non-submission of details to NRPC/ NRLDC and suggested to all the SLDCs to compile the information and share the remedial measures report for last ten months tripping presented in various OCC meeting. All the concerned utility shall prepare the presentation on remedial measures taken and present during 38th PSC meeting.

Members may like to discuss.

A.14. Tripping of Inter-Connecting Transformers (ICTs) during Jan-Jun 2019:

Inter-Connecting Transformer is costliest equipment of transmission system and also essential part of the transmission system for stepping up/ down of the power. It is also useful to feed the major load centre in power system.

Frequent tripping of ICTs captured in the system due to protection mal-operation, protection setting issues, protection co-ordination issues with the line protection and O&M issues etc.

A total of 137 tripping of ICTs occurred in the Northern Region during Jan 2019 to Jun 2019. A list of all these trippings is attached at **Annexure-3**.

Members may take expeditious actions to avoid such tripping in future and discuss the same. Moreover, utilities may impress upon all concerned for providing the Preliminary Report & DR/EL of the trippings in line with the regulations.

Members may like to discuss.

A.15. Availability of station event logger at sub-station

As per clause 43.4.D of CEA Technical Standard for Construction of Electrical Plants and Electric Lines *"Each 765 kV, 400 kV and 220 kV Line shall be provided with facility for disturbance recording, distance to fault locator and time synchronization equipment (TSE). Event logger either stand alone or as a part of sub-station or switchyard automation system shall be provided for each 220 kV and higher voltage class sub-station or Switchyard. TSE complete with antenna, all cables, processing equipment's etc., shall*

be provided to receive synchronizing pulse through global positioning system (GPS) compatible for synchronizing of event logger, disturbance recorder and SCADA/Automation system of the sub- station or Switchyard".

A GPS time stamped station event logger becomes very useful in case of multiple element tripping. The issue of such station event logger availability at substation has been raised in various Protection sub-committee meetings especially in 134th OCC meeting held on 24.04.2017 and 34th PSC meeting held on 04-Aug-17 wherein constituents were requested to provide the substation wise details of availability of station event log in a particular format. However, it has been observed that information is yet to be received.

A format for compilation of information of Event logger at a substation is again attached at **Annexure-3.** Constituents are requested to kindly submit the status of station event logger or SAS based event logger in the attached format for 220kV and above voltage level substations and expedite the working of healthy time synchronized event logger.

During recent analysis of all multiple element tripping from Jan-May 2019, utilities have submitted the station event logger details for 25-30% of the total events.

Members may like to discuss.

A.16. Status of bus bar protection at 220kV and above voltage level substations

According to CEA (Measures relating to Safety and Electric Supply) Regulations-2010, clause section 45(2)(vii), high speed bus bar differential protection along with local breaker back up protection shall be commissioned and shall always be available at all 132kV & above voltage substations, generating stations.

Further, as per CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations-2010, clause 43(4)(c), bus bar differential protection along with local breaker back up protection shall be provided at all 220kV & above voltage substations, generating stations.

In 28th PSC meeting, constituents were requested to furnish the details related to bus bar protection in a particular format. It is observed that the information is yet to be received from most of the utilities.

Constituents are again requested to provide the details of bus bar protection in the attached format (**Annexure-4**) and expedite the commissioning of Bus Bar protection at 132kV & above level.

Members may discuss.

A.17. Frequency of Protection sub-committee meeting

The first protection sub-committee meeting was held on 05.09.2006. Since then, 37 protection meetings have been conducted in a span of around 12 years. The average frequency of the meeting is in every 4 months. However, lately it has been observed that the PSC meetings are being held with low frequency. A summary of frequency of last ten PSC meetings is shown below:

PSC meeting	Date of meeting	Approx. time from previous meeting (in months)
29	09-Feb-15	2
30	21-Sep-15	7
31	7-Jun-16	9
32	30-Nov-16	6
33	22-Feb-17	3
34	4-Aug-17	5
35	20-Jun-18	11
36	19-Sep-18	3
37	21-Jan-19	4
38	1-Aug-19	6

It can be seen that lately the frequency of meeting has decreased. The 35th PSC meeting held almost a year after the 34th meeting.

The grid has evolved manifold. The number of disturbances occurring is the grid have also increased. Quick understanding of disturbances and related issues would help in early mitigation. It has been observed that in case the large time gap in successive meetings, it becomes difficult to address all the issues related to the disturbance. Further, follow up of remedial actions also gets affected.

In view of above, it is proposed to conduct the PSC meeting on monthly basis or at least bi-monthly. In all other Region frequency of PSC meeting is on monthly basis.

Member may discuss.

A.18. Formation of separate Post-Dispatch Analysis department at each SLDCs/ utility.

Post-Dispatch Analysis is very important function for load dispatch centre/ transmission licensee/ generating stations. In most of the RLDCs, Post-Dispatch analysis department is separate department and it is working on following functions:

- Tripping Analysis
  - SoPR data for ISTS licensee
  - Frequent Single element tripping in a month
  - Multiple element tripping in a month
  - Inter-Regional tripping in a month
- FRC computation and analysis
- Load Crash analysis
- Reactive Power Management in its control area
- LVRT/FRT issues or other protection related issues for renewable generators
- Protection database formation and updation
- UFR and df/dt operation
- ADMS (Automatic demand management system) related updates
- Analysis of sudden frequency excursions
- SPS operation and feedback

Post-Dispatch Analysis Group in state will co-ordinate with the site officials and prepare the detailed report of all the incidents and submit the report to NRPC/ NRLDC in stipulated time frame.

Member may like to discuss.

BBMB **Annexure - 1**

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	35/T	Multiple Element tripping at 220 kV Pong HEP at 21:04hrs of 30th Apr 2018	BBMB	1. Date by which new CTs at Pong HEP would be available to be reported. (Action: BBMB; Time: Within 7days) 2. Date by which new numerical bus bar protection at Pong HEP would be available (to replace conventional bus bar scheme) to be reported. (Action: BBMB; Time: Within 7days) 3. Bus bar operation signal in DR configuration of as many 220kV feeders possible to be mapped. (Action: BBMB; Time: Within 7 days) 4. Spare CT, CVT available in with the utility should also be checked once in a year. (General Recommendation to all NR constituents)	
2.	35/F	Multiple element tripping at 220kV Panipat BBMB at 11:29hrs of 19th Nov 2017 and 00:35hrs of 01st Jan 2018	BBMB, Haryana	1. Haryana shall confirm about load loss figure (Action: Haryana, Time: by 15.07.2018) 2. Non-auto reclosing of 220kV Chajjpur circuit to be checked and rectified. (Action: BBMB, Time: by 15.07.2018) 3. Time synchronization of DR (Chajjpur-2) needs to be checked and rectified, as it is not matching with the bus bar trip (DR) and PMU based fault timings. (Action: BBMB, Time: by 15.07.2018) 4. As advised in 34th PSC meeting, at a substation (Action: BBMB, Time: by 15.07.2018): a. Better monitoring tool shall be used for isolator auxiliary contact input to bus bar protection. b. Bus tied operation alarm shall be brought in front panel so that the shift operator could easily monitor the same. c. Line/Bus isolator auxiliary contacts status input to bus bar protection/ stub protection operation needs to be checked after every isolator operation. 5. Compliance report for point number four to be submitted by all NR constituent (Action: All NR constituents,	

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				Time: by 15.07.2018):	
3.	34/I	Multiple Element tripping at 400/220/132kV Dehar HEP(BBMB) at 00:28hrs of 21stApr 2017	BBMB	1. In view of delayed/non-tripping of 400kV circuits from Dehar end, coordination of zone-4 with zone-2 shall be done accordingly. (Action: BBMB; Time: Immediately) 2. Setting of Back-up overcurrent earth fault protection for 220kV bus-coupler to be reviewed as fault was not in 220kV system/bus. The above setting shall be disabled in case of healthy bus bar protection availability at 220kV level. (Action: BBMB, Time: Immediately) 3. Tripping of 400kV Dehar-Panchkula from Dehar end on Back-up overcurrent earth fault to be checked for directionality as the relay would have sensed the fault in reverse direction. (Action: BBMB; Time: Immediately) 4. Reason for non-operation of bus bar protection shall be ascertained and informed along with supporting details. (Action: BBMB; Time: 10-Sep-17) 5. Tripping of 400/220kV 315MVA ICT, 220kVDehar-Kango captured in SCADA SoE but reportedly opened manually. The reason for the same shall be ascertained and informed along with supporting details. (Action: BBMB; Time: 10-Sep-17) 6. Nomenclature of phase sequencing at Dehar shall be modified as Y,B,R instead of R,Y,B (No wiring change is needed).(Action: BBMB; Time: 30-Sep-17)	

Delhi

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	35/K	Multiple Element tripping in Delhi control area and islanded operation of Pragati GT at 12:28hrs of 21st Feb 2018	Delhi	1. As reported by DTL, the overloading of 220 kV Naraina-Ridge Valley could be taken care of by SPS (in operation) at Naraina which shed load on I>700A. Details of SPS to be shared. (Action: Delhi; Time: by 15.07.2018) 2. Separate SPS booklet shall be prepared for SPS implemented in one's control area. The same shall be shared. (Action: All NR constituents; Time: by 30.08.2018)	
2.	34/D	Multiple element tripping at 400kV Mundka(DTL) and other stations on 08th Mar 2017 at 14:09hrs	DTL, APCPL	1. The details of the meeting referred by Delhi representative in which the DEF settings for Delhi ring has been decided shall be shared. (Action: Delhi; Time: on or before 10-Sep-17) 2. Complete DEF setting including parameters like residual voltage, current settings wherever applicable for 400kV and above system shall be shared. by (Action: Delhi, POWERGRID, Haryana, APCPL-Jhajjar; Time: on or before 10-Sep-17) 3. Based on the experiences shared by the members, BPL PLCC system at Jhajjar may be replaced as tripping of 400kV Daultabad-Jhajjar-1 would have been due to spurious signal generated in PLCC system at Jhajjar. (Action: APCPL-Jhajjar; Time: on or before 30-Sep-17) 4. Setting of HV back-up earth fault shall be reviewed and shared. (Action: APCPL-Jhajjar; Time: on or before 10-Sep-17) 5. DR of the units tripping shall be shared. (Action: APCPL-Jhajjar; Time: on or before 10-Sep-17) 6. Time synchronization error of 100ms between NRLDC SoE and Jhatikara end DR shall be looked into and resolved. (Action: POWERGRID; Time: on or before 10-Sep-17)	

Haryana

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	37/I	Multiple Element tripping at 400/220kV Kirori (Haryana) on 20th Dec 2018 at 01:22hrs	HVPNL, HPGCL	1. In 400 kV Khedar-Kirori ckt-1 at Kirori end, carrier was in unhealthy condition. NRPC suggested HVPNL to make it healthy. (Action: HVPNL. HPGCL; Time: Within 10days) 2. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: HVPNL. HPGCL; Time: Within 10days) a. Exact location of fault and nature of fault for both the incident. b. Sequence of tripping needs to be reported and explained. c. Reason of delayed clearance of fault. d. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared e. Sensitive back up earth fault protection setting of 400 kV Khedar (end)-Kirori ckt-1 & 2 to be reviewed. f. 220 kV Kirori (end)-Bhuna ckt: Single phase (R-phase) tripping of line after 1000ms needs to be looked into? After 1200ms of opening of R-phase CB, Y&B-phase also tripped, reason of tripping? g. Tripping of Blue phase of 220 kV Kirori (end)-Masudpur ckt-2 during R-N fault to be checked? R-phase continuously fed the fault for another 900ms, reason to be looked into. h. R-phase of 220 kV Kirori (end)-Masudpur ckt-1 tripped and A/R after 1000ms. Y-N fault also reflected in the line and fault current was higher than R-N fault but line didn't trip, reason to be checked? R-phase voltage measurement in DR is not ok. (Low throughout DR capturing time). This R-phase voltage is from Bus PT so bus PT needs to be checked.	

Haryana

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				i. Availability of time synchronized SCADA SoE to be looked into. j. Detailed report, remedial measures report and supporting DR/EL (only for 400 kV Khedar end) needs to be submitted by HVPNL.	
2.	34/J	Multiple times multiple element tripping at 220/132kV Safidon Station on 21 Apr 2017 at 12:46hrs	Haryana	1. A detailed report covering the following points along with supporting information viz. station event log, remedial measures taken to avoid such tripping in future shall be submitted: (Action: Haryana; Time: on or before 10-Sep-17) a. Tripping of 220kV Safidon-Bastara from Bastara end in zone-1. b. Tripping of 220kV Safidon-PTPS ckt-1&2 in zone-1 from Safidon end whereas tripping of ckt-3 in zone-4. c. Tripping of 220kV Jind-Kirori D/C from Kirori end captured in SCADA SoE. However, no tripping has been reported for the above ckts. 2. As approved in 25th PSC meeting, as a temporary arrangement for bus bar protection, time setting of bus couplerconnected in between main Buses shall be reduced to 100ms (operating time) andreverse reach of feeders shall be reduced to 2 km and with time of operation as160ms. With above settings, in case of actual Bus fault, bus coupler operationwill isolate the faulty buses from other main buses and feeders will also trip. This operation will reduce the fault duration and the healthy buses will remain intact. However, the operationalization of bus bar protection at 220kV Safidon to be expedited.(Action: Haryana; Time: Immediately)	

NHPC

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	36/C	Multiple element tripping at Uri-II HEP at 13:55hrs of 26th May 2018	NHPC	1. Alstom make Micom relay of 400 kV Uri-II (end)-Wagoora ckt to be checked and corrected. (Action: NHPC, Time: Within 15days) 2. Mapping of manual selector switch operation for A/R in numerical relay DR and station event logger to be done. (Action: NHPC, Time: Till November-2018) 3. GPS at Uri-II HEP shall be corrected for time synch. (Action: NHPC, Time: Till November-2018) 4. Reason of tripping of all running units at Uri-II HEP needs to be checked and corrected (Action: NHPC, Time: Within 15days) 5. Reason for closing of Y&B phases at Uri-I (after 100ms of opening of all three phase) without any indication to be checked and corrected. (Action: NHPC, Time: Within 15days) 6. Detailed report considering the aforesaid points shall be submitted. (Action: NHPC, Time: Within 15days)	

NTPC

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	36/I	Multiple Element tripping at 400kV Singrauli (NTPC) & Anpara (UP) Station at 15:24hrs of 02nd Jun 2018	UPPTCL, NTPC and POWERGRID – NR3	1. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: NTPC; Time: Within 7days) a. Bus configuration in antecedent condition at 400 kV Singrauli TPS needs to be looked into b. As per SCADA SoE, reason of opening of bus sectionaliser of Bus-2A and Bus-2B needs to be looked into (as bus bar operation at 400 kV Bus-1 operated). c. Exact reason of operation of bus bar protection at 400 kV Singrauli TPS as pickup setting cater the outage of one of the CT of fully loaded ckt from 400 kV Singrauli TPS. d. Sensitive bus bar protection setting needs to be reviewed. 2. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: UPRVUNL/UPPTCL/SLDC-UP; Time: Within 7days) a. Bus configuration in antecedent condition at 400 kV Anpara TPS needs to be looked into. b. Reason of multiple element tripping at 400kV Anpara TPS. c. Reason of tripping of unit-2 & 4 at Anpara TPS still awaited. d. Protection co-ordination of unit protection with line distance protection needs to be looked into at 400 kV Anpara TPS. e. At 15:26 hrs, from SOE it can be gathered that 400 kV Anpara-Sarnath ckt-I successfully reclosed from Anpara end after 1000ms. Details needs to be looked into 3. A detailed report covering the following points along with DR, station EL shall be submitted: (Action:	

NTPC

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				POWERGRID-NR3; Time: Within 7days) a. Why all three phase main CB opened at Allahabad (PG) end of 400 kV Allahabad-Singrauli ckt-1 in antecedent condition? b. Sensitive over current setting of HVDC Vindhyachal BtB to be checked, corrected and shared.	
2.	36/J	Multiple Element tripping at 400kV Singrauli (NTPC) Station at 15:05hrs of 10nd Jun 2018	NTPC	1. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: NTPC; Time: Within 7days) a. Auxiliary supply arrangement and its single line diagram for 400/132 kV Singrauli stage-1 & 2 units to be shared. b. Unit-1 tripped after some time and unit- 6 & 7 tripped immediately during fault at 132 kV bus of Singrauli TPS. It needs to be relooked. Reason of the same needs to be updated. c. Unit tripping not captured in SCADA SoE. Availability of digital data needs to be looked into. 2. Reason of three phase tripping of 400 kV Anpara (UP)-Singrauli ckt from Anpara (UP) end needs to be checked and corrected. (Action: UPPTCL; Time: Within 7days)	
3.	35/H	Multiple Element tripping at 400/220kV Dadri (NTPC) Station at 17:30hrs of 09th Dec 2017	NTPC	1. All the NR constituents shall follow the better maintenance practices and more frequent thermo-scanning in the switch yard. (Action: All NR constituents; Time: periodically) 2. All the NR constituents should be vigilant during bus shutdown of important station and it needs to be discussed in detail during planning of shutdown. (Action: All NR constituents; Time: periodically) 3. Detailed report along with DR/EL for tripping of 400kV Dadri-Harsh Vihar ckt-1 & 2 to be submitted. (Action: Delhi; Time: by 15.07.2018)	

NTPC

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				4. Reason of tripping of filter bank-5 at HVDC Agra (end) for Agra-BNC to be ascertained and shared. (Action: POWERGRID; Time: by 15.07.2018) 5. Detailed report of filter bank switching along with event log at HVDC Dadri end of HVDC Rihand-Dadri to be shared. (Action: POWERGRID; Time: by 15.07.2018) 6. Non-tripping of 220kV Modipuram, Gobindgarh and Laltokalan station on SPS to be checked and corrected. (Action: POWERGRID, UP, Punjab; Time: by 15.07.2018) 7. Haryana and Rajasthan shall improve the MW load shedding on the dedicated feeders in SPS operation. (Action: Haryana, Rajasthan; Time: by 15.07.2018) 8. Reason of MVAR fluctuations of unit-6 of Dadri Thermal to be checked and observations in this regard to be shared. (Action: NTPC; Time: by 15.07.2018)	

POWERGRID

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	37/H	Multiple Element tripping at 400/220kV Bhiwadi Station at 08:14hrs of 24th Nov 2018	POWERGRID	1. A/R in 220 kV Bhiwadi (PG)-Kushkhera ckt (both end) needs to be checked through end to end testing and put back in service. (Action: POWERGRID/ RRVPNL, Time: Within 7days): 2. ABB make RADSS bus bar protection shall be replaced with new numerical bus bar protection at 220 kV Bhiwadi (PG) (Action: POWERGRID, Time: till March-2019) 3. At Bhiwadi(PG), time of opening of CB as captured from SCADA SoE is not consistent with PMU based fault timings. Time synchronization in view of above needs to be checked at Bhiwadi(PG). Time synchronization will be cross checked with RLDC SCADA SoE log at the time of next shutdown. (Action: POWERGRID)	
2.	36/I	Multiple Element tripping at 400kV Singrauli (NTPC) & Anpara (UP) Station at 15:24hrs of 02nd Jun 2018	UPPTCL, NTPC and POWERGRID – NR3	1. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: NTPC; Time: Within 7days) a. Bus configuration in antecedent condition at 400 kV Singrauli TPS needs to be looked into b. As per SCADA SoE, reason of opening of bus sectionaliser of Bus-2A and Bus-2B needs to be looked into (as bus bar operation at 400 kV Bus-1 operated). c. Exact reason of operation of bus bar protection at 400 kV Singrauli TPS as pickup setting cater the outage of one of the CT of fully loaded ckt from 400 kV Singrauli TPS. d. Sensitive bus bar protection setting needs to be reviewed. 2. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: UPRVUNL/UPPTCL/SLDC-UP; Time: Within 7days) a. Bus configuration in antecedent condition at 400 kV Anpara TPS needs to be looked into. b. Reason of multiple element tripping at 400kV Anpara TPS.	

POWERGRID

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				c. Reason of tripping of unit-2 & 4 at Anpara TPS still awaited. d. Protection co-ordination of unit protection with line distance protection needs to be looked into at 400 kV Anpara TPS. e. At 15:26 hrs, from SOE it can be gathered that 400 kV Anpara-Sarnath ckt-I successfully reclosed from Anpara end after 1000ms. Details needs to be looked into 3. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: POWERGRID-NR3; Time: Within 7days) a. Why all three phase main CB opened at Allahabad (PG) end of 400 kV Allahabad-Singrauli ckt-1 in antecedent condition? b. Sensitive over current setting of HVDC Vindhyachal BtB to be checked, corrected and shared.	
3.	37/D	Multiple element tripping at 400/220 kV Fatehpur (PG) at 12:17hrs of 29th Sep 2018	POWERGRID	1. It was evident from DRs of the above trippings that the relays have functioned as per scheme and settings except LBB of the Tie CB. LBB relay (SIPROTECH- 7SS252) of 400KV Unchahar-2 – ICT-2 Tie was later found to be faulty when tested and same was replaced. All the major remedial measures have already been taken. 2. POWERGRID shall check and share the details for following points: (Action: UPPTCL/ SLDC-UP, Time: Within 15days) a. Reason of tripping of 220 kV Fatehpur (PG)-Fatehpur (UP) ckt-1. b. Digital data status needs to be checked for inter-tripping of 765/400 kV 1500MVA ICTs at Fatehpur (PG). c. Sequence of tripping in time stamped (ms) manner to be established.	
4	36/F	Complete outage of	THDC,	1. Distance Z-1 setting, A/R setting of 400 kV Koteshwar	

POWERGRID

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
		Tehri-Koteshwar HEP complex at 19:15hrs of 29th May 2018	POWERGRID	(THDC) end of 400 kV Koteshwar (THDC)-Koteshwar (PG) ckt-1 shall be checked and corrected. (Action: THDC, Time: Within 7days) 2. DTT (direct trip transfer) to remote end should not sent in case of operation PD (Pole Discrepancy). Koteshwar (THDC) end setting needs to be checked and corrected. (Action: THDC, Time: Within 7days) 3. POWERGRID shall check and report the reason of single phase A/R of 400 kV Koteshwar (PG)-Meerut ckt-2 from Koteshwar (PG) end after 500ms of fault occurrence. (Action: POWERGRID, Time: Within 7days) 4. POWERGRID shall also inform about the reason of over voltage in R-phase at Koteshwar (PG) bus during fault in the system. Is it related to GIS station and its phenomena? (Action: POWERGRID, Time: Within 7days) 5. 51NGT stage-1, 2 settings of GT (Generator Transformer) of the units at Tehri HEP having time delay of 1.2sec (stage-1 for tripping of bus coupler) & 1.6sec (stage-2 for tripping of units) needs to be relooked in view of protection co-ordination with adjacent 400 kV line. It should be tripped after tripping of Z-3 of 400 kV Tehri (THDC)-Koteshwar ckt Z-3. Reset ratio of 51 NGT also needs to be reported and improved if possible. (Action: THDC, Time: Within 15days) 6. In view of all tripped elements not captured in SCADA SoE data, digital SCADA data reporting from Koteshwar HEP to be checked, rectified and ensured in future. (Action: THDC, Time: Within 7days) 7. POWERGRID shall operationalize the DR recorder at Tehri HEP and also provide the necessary software to extract the DR details from the relay panel. (Action: THDC, POWERGRID; Time: Within 15days) 8. Report and remedial measures report to be submitted considering the aforesaid point. (Action: THDC, POWERGRID;	

POWERGRID

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				Time: Within 15days)	
5.	35/E	Complete outage of 400kV Kurukshetra and blocking of HVDC Champa-Kurukshetra Bipole at 03:25hrs of 10th Nov 2017	POWERGRID	1. Kurukshetra station hosts important high capacity WR-NR link in NR (Champa (WR)-Kurukshetra(NR)). Hence, the substation is very important. Multiple lines tripping from Kurukshetra may lead to system contingency. Hence, the over voltage settings of all the lines to be checked and modified in view of grading among different lines, pick up to drop off ratio of relay etc. so as to avoid cascade tripping. (Action: POWERGRID, Time: by 15.07.2018)	
6.	35/J	Multiple Element tripping at 400/220kV Bhiwadi(PG) at 10:33hrs of 22nd Jan 2018	POWERGRID	1. At Bhiwadi (PG), time of opening of CB as captured from SCADA SoE is not consistent with PMU based fault timings. Time synchronization in view of above needs to be checked at Bhiwadi (PG). (Action: POWERGRID; Time: by 15.07.2018) 2. As per SCADA SoE, tripping of feeders at different timings in case of bus fault (not being simultaneous) needs to be checked. (Action: POWERGRID; Time: by 15.07.2018) 3. Back up auxiliary supply for HVDC Pole-1 & 2 needs to be ensured. (Action: POWERGRID) 4. Setting of distance protection of 220kV Bhiwadi (PG)-Bhiwadi (RJ) ckt-1 to be reviewed. (Action: POWERGRID; Time: by 15.07.2018) 5. Detail analysis report also to be submitted by Rajasthan. (Action: Rajasthan; Time: by 15.07.2018)	
7.	35/M	Tripping of multiple lines and generation in Baspa-Karcham-Jhakri-Rampur complex at 17:15hrs of 29th Mar 2018	POWERGRID, SJVNL	1. As per DR, at 17:21hrs, 400kV Jhakri-Panchkula (end)-1, line tripped on DEF protection. Non-timely triggering of distance protection for a fault in line and tripping of line on DEF protection in 900ms even after triggering of Z-2 protection to be checked and rectified. (Action: POWERGRID, Time: by 15.07.2018) 2. Setting of DEF protection at Panchkula (PG) to be reviewed and shared. (Action: POWERGRID, Time: by 15.07.2018)	

POWERGRID

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				3. As per DR, at 17:18hrs, all three phases of 400kV Jhakri (end)-Rampur-2 tripped without auto-reclosing. Reason for the same to be checked and shared. (Action: SJVNL, Time: by 15.07.2018) 4. As per DR of 400kV Jhakri (end)-Punchkula-2, it seems time synchronization error of around 100ms is present. The same needs to be checked and rectified. (Action: SJVNL, Time: by 15.07.2018) 5. As per DR received from Rampur, it seems time synchronization error is present. The same needs to be checked and rectified. (Action: SJVNL, Time: by 15.07.2018) 6. DR configuration at Rampur HEP needs to be looked into in view of following points (Action: SJVNL, Time: by 15.07.2018): a. Name of the element b. DR of which end c. Main-I or Main-II protection d. Mapping of minimum standard signal as approved in PSC meeting 7. Tripping details of Karcham/ Baspa end as its in Himachal control area, needs to be checked and shared. (Action: HP, Time: by 15.07.2018) 8. Jhakri/Rampur/Karcham/Baspa Hydro complex is an important generation complex having more than 3000MW capacity. Simultaneous outage of such large no. of lines of complex lead to very critical grid conditions. In view of this, patrolling of lines in the complex could be carried out to ascertain the reason for large no. of fault incidents. Necessary action wherever found necessary to be taken. (Action: POWERGRID, SJVNL, Time: periodically)	
8.	35/S	Loss of connectivity at 765kV Aligarh(PG) GIS at 00:39hrs of 20th Apr	POWERGRID	1. OEM report, study, findings of the incident including the reason for such high over voltage (operation of over voltage stage-2) to be shared. (Action: POWERGRID; Time: Within	

POWERGRID

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
		2018		3days of receipt of report) 2. Setting of over voltage of lines emanating from 765kV Aligarh (PG) to be shared. (Action: POWERGRID; Time: Within 7 days) 3. DR/EL, detailed report of the incident to be shared along with remedial measures taken/being taken to avoid such incidents in future. (Action: POWERGRID; Time: Within 7 days)	
9.	34/L	Multiple element tripping at 400/220kV Nalagarh Station on 18th May 2017 at 12:55hrs	POWERGRID, HP	1. Station event log to be shared and checked for isolator closing status at the time of fault. The above could establish whether the delay in bus bar protection operation is due to any problem or because of delay in isolator status updation.(Action: POWERGRID; Time: on or before 10-Sep-17) 2. Reason for non-tripping of 400/220kV ICT-3 at Nalagarh on differential pick up as seen from DR shall be ascertained and shared. (Action: POWERGRID; Time: on or before 10-Sep-17) 3. Setting of reverse zone of 220kV feeders at Nalagarh (PG) shall be shared and looked into in view of tripping of 220kV Nalagarh (HPSEB) feeders in reverse zone in more than 600ms. (Action: POWERGRID; Time: on or before 10-Sep-17) 4. Load loss, generation loss occurred in the event shall be confirmed. (Action: HP; Time: on or before 10-Sep-17)	

PTCUL

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	37/G	Multiple element tripping at 400/220 kV Kashipur at 13:28hrs of 25th Oct 2018	PTCUL	1. No representative from PTCUL presented during the meeting, PTCUL shall submit the information (DR/EL, detailed report) and the details considering the points for discussion mentioned below (Action: PTCUL/ SLDC-Uttarakhand, Time: Within 15days): a. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared b. Exact location of fault and nature of fault. c. Sequence of tripping needs to be reported and explained. d. Reason of delayed clearance of fault. e. Delayed clearance of fault in case of operation of bus bar protection for both 220 kV bus at 400/220 kV Kashipur (PTCUL) needs to be relooked. f. Delayed clearance of fault more than 1640ms in case of operation of instantaneous bus bar protection operation also to be checked. g. Healthiness of 220 kV bus bar protection of 400/220 kV Kashipur (PTCUL) needs to be ensured. h. Availability of time synchronized SCADA SoE to be checked and corrected. i. Reason of tripping of 400 kV Moradabad-Kashipur and Nehtaur-Kashipur ckts and its protection co-ordination with back up protection setting of 400/220 kV ICTs at Kashipur (PTCUL). j. Detailed report, remedial measures report and supporting DR/EL needs to be submitted by UPPTCL	

Punjab

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	36/G	Multiple Element tripping at 220kV Sarna (Punjab) on 01st Jun 2018 at 15:50hrs	Punjab and POWERGRID	1. ABB make Centralized Bus Bar Protection at 220 kV Sarna (Punjab) to be corrected. (Action: Punjab; Time: by 31.12.2018) 2. POWERGRID shall correct the reverse zone (Z-4) setting from 500ms to 100ms till the implementation of health bus bar protection at 220 kV Sarna. (Action: POWERGRID; Time: Within 7days)	
2.	36/N	Multiple Element tripping at 400kV Rajpura (Punjab) on 23rd July 2018 at 03:15hrs:	Punjab	1. DR recording time needs to be extended for better analysis of event. It should be -500ms (pre fault) and +2500ms (post fault) for covering the tripping on PD (Pole Discrepancy) (Action: General Recommendation) 2. Punjab STU/ SLDC would separately organise the meeting with Rajpura TPS and find out the exact reason of tripping of Rajpura units and remedial measures. In earlier incident of line fault, tripping of generating unit reported. (Action: Punjab; Time: Within 7days) 3. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: Punjab; Time: Within 7days) a. Reason of tripping of Rajpura units and remedial measures taken along with time frame. b. Reason for initiation of LBB protection in few of the Tie bays at Rajpura (Punjab). c. It seems from SCADA SoE and BCU Event Log data that CB of 415 and 417 bay opened after 350ms and 680ms of fault occurrence. However, fault got cleared within 100ms. Time synchronization of DR of 415 and 417 bay to be checked and corrected.	
3.	35/D	Multiple element tripping at 400/220kV Talwandi Sabo TPS at 02:57hrs of 07th Nov 2017 and 07:13hrs of 12th Nov	PSPCL	1. For 7th Nov 2017 event: a. As per SCADA data, it seems only two out of three units tripped at T.Sabo. Reason and time (in ms) of tripping of units at T.Sabo to be shared. (Action: PSPCL, Time: by 15.07.2018)	

Punjab

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
		2017		b. POWERGRID stated that 400kV T.Sabo-Moga didn't trip from Moga end. Further, as per SCADA data also, MW flow is observed on the line. Hence, status and reason of tripping (if any) of 400kV T. Sabo-Moga from T.Sabo end to be confirmed. (Action: PSPCL, Time: by 15.07.2018) c. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. (Action: Punjab, Time: by 15.07.2018) d. Better line maintenance to avoid frequent tripping in 400 kV ring needs to be expedited. (Action: Punjab, Time: by 15.07.2018) 2. For 12th Nov 2017 event: a. As per PMU and SCADA data, auto-reclosing time difference observed in 400kV T. Sabo-Moga (PG). It seems auto-reclosing from Moga (PG) was delayed (~1300ms) which needs to be checked. (Action: POWERGRID, Time: by 15.07.2018) b. PSTCL reported that 400kV T.Sabo-Dhuri-1 remained charged from Dhuri end but tripped from T.Sabo end. Reason for tripping of aforesaid ckt from T.Sabo to be ascertained and shared. (Action: PSPCL, Time: by 15.07.2018) c. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail. . (Action: Punjab, Time: by 15.07.2018) d. Better line maintenance to avoid frequent tripping in 400 kV ring needs to be expedited. (Action: Punjab, Time: by 15.07.2018)	

Punjab

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
1.	36/A	Multiple Element tripping at 765/400kV Anta (Raj) at 14:40hrs of 02nd May 2018	RVPN	1. Default Programmable Scheme Logic (PSL) configuration of Alstom make (P-741 relay) bus bar protection have common issue of assigning of tripping to master trip relay and it would further trip main and tie CB of connected elements. This default PSL needs to be modified for tripping of main CB only in case of operation of bus bar protection. (Action: General Recommendation) 2. DR recording time would be increased to 2500ms (-500 ms to +2000ms) (Action: General Recommendation) 3. Rajasthan shall also check the SPS operation of Chhabra/ Kawai/ Kalisindh complex and share the report. (Action: Rajasthan, APL; Time: Within 15days) 4. Time synchronization of DR (Anta-Raj) needs to be checked and rectified, as it is not matching with the bus bar trip (DR) and PMU based timings. (Action: Rajasthan, Time: Within 7days)	
2.	36/B	Multiple element tripping at 400/220kV Ajmer (Raj) at 16:55hrs of 24th May 2018 and 17:55hrs of 06th Jun 2018	RVPN	1. DR and Event Log of all the numerical relays needs to be checked within 15days for time synch and shall be time synch every time. (Action: General Recommendation) 2. Rajasthan shall submit the phase sequence of both end of all the POWERGRID connected station. 3. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: Rajasthan; Time: Within 7days) • For 06th Jun 2018: i. In case of operation of distance protection, as Z-1 initiated in flag details, breaker should have operated and cleared the fault. ii. In case of operation of LBB protection, delayed operation of LBB protection (fault duration more than 1000ms), same has been checked through station EL details? iii. Exact location of fault to be reported. iv. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared.	

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				v. Detailed report and supporting DR/EL needs to be submitted vi. Operation of 220 kV bus bar protection/ LBB operation at 400/220kV Ajmer (Raj) to be reviewed and corrected for delayed operation of bus bar/LBB operation. vii. Reason of three phase opening and reclosing of 220 kV Ajmer (400kV)-Ajmer ckt needs to be checked and corrected. viii. Time synchronization of DR to be checked and corrected	
3.	36/K	Complete outage of 400kV Merta(RRVPNL) at 16:22hrs of 19th June 2018	RVPNL	1. Reason of non-operation of 400 kV bus bar differential protection at 400 kV Merta (Raj) shall be checked and corrected. Detailed report of the same to be submitted to NRPC/ NRLDC. (Action: Rajasthan; Time: Within 7days) 2. Rajasthan would check the pickup setting of bus bar differential protection and also check the fault current inward to the bus. (Action: Rajasthan; Time: Within 7days)	
4.	36/P	Multiple element tripping at 400/220 kV Suratgarh STPS (Raj) at 12:08hrs of 01st Aug 2018:	RRVUNL	1. A detailed report covering the following points shall be submitted: (Action: Rajasthan; Time: Within 7days) a. Reason of non-availability of UAT (unit auxiliary transformer) needs to be looked into. b. Setting correction in back up earth fault protection of 400/220 kV ICT-1 & 2 needs to be shared along with time delay setting. c. Time synchronization & status of SCADA SoE needs to be checked and corrected. d. Phase Sequence error at 220 kV Suratgarh TPS needs to be checked as fault was in Yellow-phase (as per PMU data) but in Rajasthan report it was reported as Blue-phase to earth fault? e. DR/EL should be available for event analysis, numerical protection to be implemented at 220 kV Suratgarh TPS (Bus Bar and ICT protection).	
5.	37/ F	Complete outage of 220 kV Kota TPS and Sakatpura (Raj) at	RRVUNL, RRVPNL	1. Time delay of Reverse zone setting at Kota TPS end is still 1000ms. Reverse zone (Z-4 setting) shall be coordinated with Z-2 timing (350/500ms) as per Rama Krishna committee report, same	

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
		21:00hrs of 20th Oct and 14:26hrs of 13th Nov 2018		needs to be modified at Kota TPS. (time delay for reverse zone setting shall be 500ms) (Action: RRVUNL/ RRVPNL/ SLDC-Rajasthan, Time: Within 7days) 2. Back up earth fault setting of 220 kV Bus Couplers needs to be reviewed. (Action: RRVUNL, Time: Within 7days) 3. 220 kV bus bar protection at Sakatpura station shall be available within 30days. (Action: RRVPNL, Time: Within 30days) 4. RRVUNL shall submit the detailed report considering the points for discussion mentioned below (For the incident occurred at 21:00hrs of 20th Oct 2018): (Action: RRVUNL/ RRVPNL/ SLDC-Rajasthan, Time: Within 15days) a. Reason of delayed clearance of fault. b. Failure of which primary and back up protection led to delayed clearance of fault. c. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. d. Back up earth fault setting of 220 kV Bus Coupler-1 needs to be reviewed. e. Sequence of tripping needs to be reported and explained. (Time stamped data for the tripping didn't receive) f. Tripping of all station transformer (220/6.6kV) on back earth fault protection needs to be reviewed in accordance with current & time delay setting. g. Reason of tripping of unit-2 within 200ms of fault occurrence before tripping of all the lines from Kota TPS. h. Arrangement of station auxiliary supply and its back up at 220 kV Kota TPS to be shared. Also reason of tripping of all running units needs to be explained. i. Availability of time synchronized SCADA SoE to be checked and corrected. i. Tripping of units other than 2, 3 & 5	

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				ii. Tripping of 220 kV feeders from remote end of KTPS iii. Detailed report, remedial measures report and complete DR/EL (cfg, dat file) needs to be submitted by RRVPNL. 5. Reverse zone setting in all 220 kV feeders and bus coupler at 220 kV Sakatpura station needs to be checked and corrected. (As per details of 13th Nov 2018, only two feeders at 220 kV Sakatpura station tripped in reverse zone. Bus coupler also didn't trip in this incident). Bus coupler over current setting also needs to be revised for 100ms time delay. (Action: RRVPNL/ SLDC-Rajasthan, Time: Within 7days) 6. RRVPNL shall submit the detailed report considering the points for discussion mentioned below: (Action: RRVPNL/ RRVUNL/ SLDC-Rajasthan, Time: Within 15days) a. Exact location of fault and nature of fault. b. Reason of delayed clearance of fault. c. Failure of which primary and back up protection led to delayed clearance of fault. d. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. e. Status of availability of bus bar protection at 220kV Kota (Sakatpura) having four number of bus bars to be shared. f. As approved in 25th PSC meeting, temporary arrangement for bus bar protection, could be put in place till actual bus bar protection is available. Status of the same to be apprised. Reason of delayed clearance of fault if arrangement was there? g. Sensitive distance protection setting of 220 kV Morak (end)-KTPS ckt to be reviewed. h. Reverse zone (Z-4 setting) to be coordinated with Z-2 timing as per Rama Krishna committee report, same needs to be modified at Kota TPS. i. Rate of change of frequency protection at 220 kV Bhilwara (Raj) needs to be looked into.	

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				j. Availability of time synchronized SCADA SoE to be checked and corrected. i. Tripping of units other than 2, 3 & 5 ii. Tripping of 220 kV feeders from remote end of KTPS k. Detailed report, remedial measures report and complete DR/EL (cfg, dat file) needs to be submitted by RRVPNL.	
6.	35/A	Multiple Element tripping at 400/220kV Bikaner at 11:40hrs of 12th Sep 2017	RRVPNL	1. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: Rajasthan; Time: by 15.07.2018): a. Reason for delayed tripping of bus bar protection and results for diagnosis of the same to be shared. b. As per SCADA SoE, tripping of 400kV Bikaner-Bhadla ckts from Bhadla end at different timings to be ascertained and shared. c. As per PMU, fault is in R-phase, whereas as per DR details fault is in B-phase. The DRs to be checked for mapping w.r.t. polarity. d. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared.	
7.	35/O	Multiple element tripping at 220 kV Sakatpura and KTPS (Kota TPS) at 01:42hrs of 01st Apr 2018	RRVPNL, RRVUNL	1. Expeditious commissioning of bus bar protection at 220kV Sakatpura. Tentative date of commissioning to be informed. (Action: Rajasthan, Time: by 30.07.2018) 2. As per IEGC sec 4.6.3, CEA technical standards for connectivity of electrical plants and electrical lines sec. 43.4.D and CEA Technical standards for connectivity to the grid Regulation, 2007 Schedule part 1.7, Station event log to be installed at Sakatpura. Status of procurement of same needs to be confirmed. (Action: Rajasthan, Time: by 30.07.2018) 3. For a fault in Bus coupler of Bus B & C, elements connected to Bus-B & C would have tripped leaving buses A & D healthy through operation of bus sectionaliser. As per SCADA SoE, bus sectionaliser opened but still the elements connected to other buses tripped. This needs to be investigated further. (Action: Rajasthan, Time: by	

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				15.07.2018) 4. At Sakatpura, directionality of back up E/F protection w.r.t tripping of 220kV Sakatpura-KTPS-1 to be checked and rectified. (Action: Rajasthan, Time: by 15.07.2018) 5. Non-operation of interim alternate bus bar arrangement (Z-4, 160ms) to be checked and rectified. (Action: Rajasthan, Time: by 15.07.2018) 6. Reason for tripping of 220kV KTPS-Beawer, 220kV KTPS-Bundi and 220kV KTPS-Heerapura in Z-1 from KTPS end needs to be ascertained and corrected. (Action: Rajasthan, Time: by 15.07.2018) 7. Reason for tripping of 220kV KTPS-Kota (PG) D/C on power swing to be ascertained and corrected. (Action: Rajasthan, Time: by 15.07.2018) 8. Time synchronization error at following stations needs to be resolved : a. Sakatpura b. Kota TPS c. Vatika d. Dahra 9. 220kV RAPS-Sakatpura-1, tripped from RAPS end only for on distance protection picked up by main-1 relay (Micom P442 relay) only. Setting of distance protection for Micom P442 relay to be shared and reviewed at RAPS. (Action: NPCIL, Time: by 15.07.2018)	
8.	35/Q	Multiple element tripping at 400/220kV Jodhpur (Raj) Station at 21:41hrs of 05th Apr 2018	RRVPNL	1. Reason for tripping of CB (bus-B) of 400kV Akal to be ascertained and shared. (Action: Rajasthan, Time: by 15.07.2018) 2. As per information and details received from POWERGRID during meeting, At Jodhpur, General Trip signal is mapped for LBB protection for all three phases even in case of single phase pole operation. This resulted in operation of LBB during fault auto-reclosing of 400kV Jodhpur-Kankroli. It is to be confirmed that whether LBB operated due to above or actual stuck breaker situation. The above setting of LBB also needs to be rectified. (Action: Rajasthan, Time: by	

Rajasthan

Sr. No.	Incident ID PSC/Tripping No.	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				15.07.2018) 3. As per Rajasthan report, DT sent in to remote end for Merta-2, Akal ckts and not sent for Merta-1 ckt. Also, as per DR of 400kV Jodhpur (end)-Kankroli ckt, DT sent to Kankroli end as well. At Jodhpur, there is one and a half breaker scheme. Reason and logic for DT sent for ckts at Jodhpur station to be shared. (Action: Rajasthan, Time: by 15.07.2018) 4. As per DR details of 400kV Jodhpur(end)-Kankroli, LBB operated in around 130ms in place of recommended setting of 200ms. Also, Setting of LBB protection at Jodhpur to be checked and rectified. (Action: Rajasthan, Time: by 15.07.2018) 5. As per Rajasthan report, Akal and Merta-1 were charged from one CB only. Reason for non-availability of other Tie/main CB to be shared. (Action: Rajasthan, Time: by 15.07.2018) 6. Time synchronization of DR of 400kV Jodhpur (end)-Kankroli needs to checked and rectified. (Action: Rajasthan, Time: by 15.07.2018)	

SJVNL

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
1.	36/Q	Multiple element tripping and SPS operation at Jhakri/Rampur/Karcham complex at 04:02hrs of 29th Aug 2018	SJVNL	1. A/R issue of 400 kV Nalagarh-Rampur ckt-2 shall be discussed and resolved. Kindly check the necessity of PoW (Point on Wave) device, discuss with OeM and if it is not required than kindly bypass it (Action: SJVNL; Time: Within 15 days) 2. Parallel input of the R, Y & B-phase breaker instead of series input to the SPS logic at 400 kV Rampur HEP shall be corrected. (Action: SJVNL; Time: Within 15 days). Same issue shall also be checked at 400 kV Jhakri and Karcham HEP. (Action: SJVNL, Himachal Pradesh (JSW); Time: Within 15 days) 3. SJVNL shall share the following SPS details: a. Logic calculation time. b. Time in which tripping command sent to units after meeting the condition for SPS. c. Logic for various SPS conditions checking. 4. Time synchronization of SCADA SoE shall be checked and corrected. (Action: SJVNL; Time: Within 7 days)	
2.	35/M	Tripping of multiple lines and generation in Baspa-Karcham-Jhakri-Rampur complex at 17:15hrs of 29th Mar 2018	POWERGRID, SJVNL	1. As per DR, at 17:21hrs, 400kV Jhakri-Panchkula (end)-1, line tripped on DEF protection. Non-timely triggering of distance protection for a fault in line and tripping of line on DEF protection in 900ms even after triggering of Z-2 protection to be checked and rectified. (Action: POWERGRID, Time: by 15.07.2018) 2. Setting of DEF protection at Panchkula (PG) to be reviewed and shared. (Action: POWERGRID, Time: by 15.07.2018) 3. As per DR, at 17:18hrs, all three phases of 400kV Jhakri (end)-Rampur-2 tripped without auto-reclosing. Reason for the same to be checked and shared. (Action: SJVNL, Time: by 15.07.2018) 4. As per DR of 400kV Jhakri (end)-Punchkula-2, it seems time synchronization error of around 100ms is present. The	

SJVNL

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				same needs to be checked and rectified. (Action: SJVNL, Time: by 15.07.2018) 5. As per DR received from Rampur, it seems time synchronization error is present. The same needs to be checked and rectified. (Action: SJVNL, Time: by 15.07.2018) 6. DR configuration at Rampur HEP needs to be looked into in view of following points (Action: SJVNL, Time: by 15.07.2018): a. Name of the element b. DR of which end c. Main-I or Main-II protection d. Mapping of minimum standard signal as approved in PSC meeting 7. Tripping details of Karcham/ Baspa end as its in Himachal control area, needs to be checked and shared. (Action: HP, Time: by 15.07.2018) 8. Jhakri/Rampur/Karcham/Baspa Hydro complex is an important generation complex having more than 3000MW capacity. Simultaneous outage of such large no. of lines of complex lead to very critical grid conditions. In view of this, patrolling of lines in the complex could be carried out to ascertain the reason for large no. of fault incidents. Necessary action wherever found necessary to be taken. (Action: POWERGRID, SJVNL, Time: periodically)	
3.	34/E	Multiple element tripping at 400kV Rampur HEP (SJVNL) on 08th Mar 2017 at 13:19hrs	SJVNL, JSW	1. It seems lines tripped on overvoltage from Karcham end in 3sec only. The over voltage stage-1 setting of lines emanating from Karcham shall be reviewed and modified to 110-112%, 5-6sec grading. (Action: JSW-Karcham; Time: Immediately) 2. Time synchronization error as seen from DR(Rampur) as well as SCADA SoE(Nathpa Jhakri) shall be corrected and informed. (Action: SJVNL; Time: on or before 10-Sep-17) 3. Reason for unavailability of digital SCADA data of Rampur, Karcham, Baspa w.r.t. the event shall be ascertained and ensured in future. (Action: JSW-Karcham, Baspa, SJVNL-	

SJVNL

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				Rampur;Time: Immediately)	

THDC

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
1.	36/F	Complete outage of Tehri-Koteshwar HEP complex at 19:15hrs of 29th May 2018	THDC, POWERGRID	1. Distance Z-1 setting, A/R setting of 400 kV Koteshwar (THDC) end of 400 kV Koteshwar (THDC)-Koteshwar (PG) ckt-1 shall be checked and corrected. (Action: THDC, Time: Within 7days) 2. DTT (direct trip transfer) to remote end should not sent in case of operation PD (Pole Discrepancy). Koteshwar (THDC) end setting needs to be checked and corrected. (Action: THDC, Time: Within 7days) 3. POWERGRID shall check and report the reason of single phase A/R of 400 kV Koteshwar (PG)-Meerut ckt-2 from Koteshwar (PG) end after 500ms of fault occurrence. (Action: POWERGRID, Time: Within 7days) 4. POWERGRID shall also inform about the reason of over voltage in R-phase at Koteshwar (PG) bus during fault in the system. Is it related to GIS station and its phenomena? (Action: POWERGRID, Time: Within 7days) 5. 51NGT stage-1, 2 settings of GT (Generator Transformer) of the units at Tehri HEP having time delay of 1.2sec (stage-1 for tripping of bus coupler) & 1.6sec (stage-2 for tripping of units) needs to be relooked in view of protection co-ordination with adjacent 400 kV line. It should be tripped after tripping of Z-3 of 400 kV Tehri (THDC)-Koteshwar ckt Z-3. Reset ratio of 51 NGT also needs to be reported and improved if possible. (Action: THDC, Time: Within 15days) 6. In view of all tripped elements not captured in SCADA SoE data, digital SCADA data reporting from Koteshwar HEP to be checked, rectified and ensured in future. (Action: THDC, Time: Within 7days) 7. POWERGRID shall operationalize the DR recorder at Tehri HEP and also provide the necessary software to extract the DR details from the relay panel. (Action: THDC, POWERGRID; Time: Within 15days)	

THDC

Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PCC	Status of action taken on Recommendations
				8. Report and remedial measures report to be submitted considering the aforesaid point. (Action: THDC, POWERGRID; Time: Within 15days)	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
1.	36/D	Complete outage of 400kV Paricha TPS(UP) at 21:56hrs of 27th May 2018	UPRVUNL, UPPTCL	1. No representative from UPRVUNL presented during the meeting, It was informed to STU/SLDC-UP to collect the information (DR/EL, detailed report) and submit the details considering the points for discussion mentioned below: (Action: UPPTCL/ SLDC-UP, Time: Within 15days) a. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. b. Availability and healthiness of bus bar protection at Paricha TPS at the time of tripping to be shared. c. Reason for delayed clearance of around a second fault to be shared. d. In view of all tripped elements not captured in SCADA SoE data, digital SCADA data reporting from Paricha TPS to be checked, rectified and ensured in future	
2.	36/E	Multiple Element tripping at 400/132kV Anpara-ATPS and 400/220 kV Obra-B TPS at 22:25hrs of 28th May 2018	UPPTCL,	A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: UPPTCL/ SLDC-UP; Time: Within 15days) 1. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. 2. Availability and healthiness of bus bar protection at Obra-B TPS at the time of tripping to be shared. 3. Is Pole discrepancy protection operated at 400 kV Obra-B TPS of 400kV Obra B TPS-Anpara TPS ckt? 4. Reason for delayed clearance of fault to be shared. 5. Reason of delayed bus bar protection operation at Anpara A TPS? (2.3second after fault occurrence time) 6. There is a significant difference between tripping of elements at 400kV Obra B TPS and Anpara TPS. Exact	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				sequence of event needs to be checked and reported. 7. Reason of tripping of units at Obra-B TPS? What protection operated for Obra-B TPS units? 8. Reason of station transformer and 220/132kV ICT tripping at Obra-A TPS? 9. Reason of immediate tripping of Rewa Road-Obra B TPS from Rewa Road end? 10. Reason delayed tripping of 400 kV Obra B TPS-Panki from Obra B end? 11. Such delayed clearance of fault near generating complex may have resulted into major catastrophe in the grid and it shall be prevented for reliable and secure grid operation. 12. Points raised in 148th OCC Meeting: a. Operational issue at Obra-B TPS. If Y&B-phase breaker stucked than that bus should vacate by opening of all the connected line from remote end. b. Communication issue between Anpara-A TPS and Obra-B TPS c. Operational issue as before opening of line side isolator and closing of earth switch O&M staff should check the line voltage in Y&B-phase. d. Origin of fault. e. Reason of fire in Obra-B TPS switchyard. f. Reason of breaker stuck at Obra-B TPS and remedial measures 13. DR/EL and detailed report considering remedial measures is still awaited from UPPTCL.	
3.	36/H	Complete outage of 400kV Rosa TPS(UP) at 23:58hrs of 01st June 2018	UPPTCL, UPRVUNL	1. No representative from UPRVUNL presented during the meeting, It was informed to SLDC-UP to collect the information (DR/EL, detailed report) and submit the details considering the points for discussion mentioned below (Action: UPPTCL/ SLDC-UP, Time: Within 15days):	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				a. At 22:58hrs, 400kV Rosa-Shajahanpur-2 tripped on Z-1, fault cleared timely as seen from PMU. However, 400/220kV ICT-1 also tripped on differential protection. Reason for tripping of ICT, setting of differential protection, coordination between ICT protection and line protection to be looked into and shared. b. Reason for tripping of Unit #3 at Rosa on V/f protection, setting of V/f protection to be looked into and shared. c. Reason for fluctuation in V, Q of three running units, relevant plots showing such variation to be looked into and shared. d. At 23:55hrs, reason for delayed clearance of fault to be looked into and shared. e. At 23:55hrs, sequence of event of tripping of elements around Rosa area to be ascertained and shared f. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared.	
4.	36/I	Multiple Element tripping at 400kV Singrauli (NTPC) & Anpara (UP) Station at 15:24hrs of 02nd Jun 2018	UPPTCL, NTPC and POWERGRID – NR3	1. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: NTPC; Time: Within 7days) a. Bus configuration in antecedent condition at 400 kV Singrauli TPS needs to be looked into b. As per SCADA SoE, reason of opening of bus sectionaliser of Bus-2A and Bus-2B needs to be looked into (as bus bar operation at 400 kV Bus-1 operated). c. Exact reason of operation of bus bar protection at 400 kV Singrauli TPS as pickup setting cater the outage of one of the CT of fully loaded ckt from 400 kV Singrauli TPS. d. Sensitive bus bar protection setting needs to be reviewed.	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				2. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: UPRVUNL/UPPTCL/SLDC-UP; Time: Within 7days) a. Bus configuration in antecedent condition at 400 kV Anpara TPS needs to be looked into. b. Reason of multiple element tripping at 400kV Anpara TPS. c. Reason of tripping of unit-2 & 4 at Anpara TPS still awaited. d. Protection co-ordination of unit protection with line distance protection needs to be looked into at 400 kV Anpara TPS. e. At 15:26 hrs, from SOE it can be gathered that 400 kV Anpara-Sarnath ckt-I successfully reclosed from Anpara end after 1000ms. Details needs to be looked into 3. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: POWERGRID-NR3; Time: Within 7days) a. Why all three phase main CB opened at Allahabad (PG) end of 400 kV Allahabad-Singrauli ckt-1 in antecedent condition? b. Sensitive over current setting of HVDC Vindhyachal BtB to be checked, corrected and shared.	
5.	36/L	Multiple Element tripping at 400 kV Agra (UP) at 15:13hrs of 21st Jun 2018	UPPTCL and	1. As reported by UPPTCL, 400 kV Numerical bus bar protection at Agra (UP) would be installed and in service by Nov-2018. 2. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: UP; Time: Within 7days) a. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				breaker, isolator; relevant alarms and any other relevant detail to be shared. b. Is bus tied operation at 400 kV Agra (UP) is the reason of complete station outage? c. DC earth fault at 400 kV Agra (UP) needs to be rechecked and confirmed. d. As per PMU, Rise in 3-pase voltage occurred at 15:13:58.640hrs whereas tripping of relevant elements in SCADA SoE occurred at 15:13:33.405hrs and 15:13:57.874hrs. Time synchronization of digital SCADA status at 400kV Agra (UP) to be checked and corrected. e. Healthiness of 400 kV bus bar protection to be ensured. f. Reason of operation of bus bar protection for both 400 kV buses at Agra (UP). Similar incident of operation of both bus bar protection at 400 kV Agra (UP) on 04th Mar 2018 was also discussed during 35th PSC meeting. But remedial measures yet to be taken. g. Point to be reported for 04th Mar 2018 incident (details are still awaited from UP): i. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. ii. Lightening Mast design in 400 kV Agra (UP) also needs to be looked into as both bus fault occurred due to lightening in the switchyard. iii. As per SCADA SoE: A. Reason for tripping of 400kV Agra-Unnao ckt from Unnao end in ~140ms of fault to be looked into and shared. B. Reason for opening of 400kV Agra(UP)-Agra(PG) ckt from Agra(PG) end (tie CB during fault and main CB after ~1sec of fault) to be looked into and shared.	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				iv. As per UP report, ICT-3 didn't trip. However, fault cleared in ~320ms. How the fault get cleared if ICT-3 didn't trip. v. As per UP report, bus bar protection of bus-2 operated and LBB of Fatehabad-1 ckt (connected to bus-2) also operated after operation of Z-4 relay (250ms time setting).	
6.	36/M	Multiple Element tripping at 400/220kV Sultanpur (UP) at 20:45hrs of 08th July 2018	UPPTCL	1. Human error needs to be prevented and proper maintenance practices needs to be followed. (Action: General Recommendation) 2. Mal-operation of line reactor protection at 400 kV Sultanpur (UP) end of 400 kV Sultanpur-Obra ckt to be checked and corrected. (Action: UP, Time: Within 7days) 3. Protection co-ordination of 400/220 kV ICT and Zone-3 protection of remote end of Sultanpur (UP) to be checked and corrected. (Action: UP, Time: Within 7days) 4. Remedial measures report to be submitted considering the aforesaid points. (Action: UP, Time: Within 15days)	
7.	36/O	Multiple element tripping at 400/220 kV Panki (UP) at 02:38hrs of 26th July 2018	UPPTCL	1. Disturbance recorder shall be made functional at 400 kV Panki (UP). (Action: UP; Time: Within 30days) 2. DC earthing issue of all 400 kV station shall be attended or priority as it resulted into mal-operation of protection and multiple element tripping (Action: General Recommendation)	
8.	37/A	Multiple times bus bar protection operation at 400 kV Orai (UP) during line fault on any outgoing feeder	UPPTCL	1. Bus Bar Protection at 400 kV Orai (UP) needs to be checked and corrected. Bus Bar Protection for 400 kV Bus-1 operated during A/R of the line. (Action: Uttar Pradesh; Time: Within 15days) 2. Operation of bus bar protection for 400 kV bus-2 within 100ms of fault occurrence needs to be looked into. a. Event of 16th Sep 2018	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				i. Exact location of fault and nature of fault. ii. Sequence of tripping needs to be reported and explained. iii. Mal-operation of 400 kV Bus Bar Protection (400 kV Bus-1) at 400/220 kV Orai (UP) station during line fault in 400 kV Orai-Mainpuri ckt-1 needs to be looked into. iv. Similar incident happened multiple times. Operation of Bus Bar Protection in case of single phase to earth fault is serious cause of concern for grid security. UPPTCL is advised to look into the matter and take corrective action v. Detailed report, remedial measures report and supporting DR/EL needs to be submitted. vi. Operation of 400 kV bus bar protection at 400/220 kV Orai (UP) to be reviewed and corrected b. Event of 29th Nov 2018: i. Exact location of fault and nature of fault. ii. Sequence of tripping needs to be reported and explained. iii. Mal-operation of 400 kV Bus Bar Protection (400 kV Bus-2) at 400/220 kV Orai (UP) station during line fault in 400 kV Orai-Mainpuri ckt-2 needs to be looked into. iv. Similar incident happened multiple times. Operation of Bus Bar Protection in case of single phase to earth fault is serious cause of concern for grid security. UPPTCL is advised to look into the matter and take corrective action v. Detailed report remedial measures report and supporting DR/EL needs to be submitted.	
9.	37/B	Complete outage of 400/220 kV Gorakhpur (UP) at 16:56hrs of 17th Sep and 10:03hrs of	UPPTCL	1. Operating procedure/checklist for maintenance or upgradation activity shall be followed religiously for prevention of any mal-operation/mis-operation. (Action: General Recommendation)	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
		22nd Oct 2018		2. Bus Bar Protection of both side of 400/220 kV Gorakhpur (UP) needs to be thoroughly checked. (Action: Uttar Pradesh; Time: Within 7days) 3. Backup over current setting of 500MVA ICT-1 at Gorakhpur (UP) to be checked wrt sensitive setting as ICT tripped within 100ms. (Action: Uttar Pradesh; Time: Within 7days) 4. Tripping of 400 kV Gorakhpur (UP)- Gorakhpur (PG) ckt-1 from Gorakhpur (UP) end seems to be due to PLCC panel problem. UPPTCL shall kindly check the PLCC panel. (Action: Uttar Pradesh; Time: Within 7days) 5. Alstom make station event logger shall be kept in healthy condition. (Action: Uttar Pradesh; Time: Within 30days) 6. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: Uttar Pradesh; Time: Within 7days) a. Event on 17th Sep 2018: I. Sequence of tripping needs to be reported and explained II. Reason of delayed clearance of fault III. Operation of bus bar protection for both 400 kV buses at Gorakhpur (UP) needs to be relooked. IV. Delayed clearance of fault more than 400ms in case of operation of instantaneous bus bar protection operation also to be checked. V. Healthiness of both 400 kV & 220 kV bus bar protection of 400/220 kV Gorakhpur (UP) needs to be ensured. VI. Back up over current earth fault protection of 500MVA ICTs needs to be looked into. VII. Reason of tripping of 400 kV Gorakhpur (UP)-Gorakhpur (PG) ckt-1 from Gorakhpur (UP) end needs to be	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				explained. (From PG end 400 kV Gorakhpur (UP)-Gorakhpur (PG) ckts tripped in Z-2) VIII. SCADA SoE (not received) of tripping of 400 kV Gorakhpur (UP) end-Azamgarh ckt. IX. Status of availability of DR/EL and extracting software needs to be shared. X. Detailed report, remedial measures report and supporting DR/EL needs to be submitted by UPPTCL b. Event on 22nd Oct 2018: I. Sequence of tripping needs to be reported and explained. II. Reason of delayed clearance of fault. III. Operation of bus bar protection for both 220 kV buses at 400/220 kV Gorakhpur (UP) needs to be relooked. IV. Delayed clearance of fault more than 400ms in case of operation of instantaneous bus bar protection operation also to be checked. V. Healthiness of 220 kV bus bar protection of 400/220 kV Gorakhpur (UP) needs to be ensured. VI. Time synchronization of SCADA SoE to be checked and corrected. VII. Status of availability of DR/EL and extracting software needs to be shared. VIII. Detailed report, remedial measures report and supporting DR/EL needs to be submitted by UPPTCL.	
10.	37/E	Multiple Element tripping at 400/220kV Obra-B TPS at 04:37hrs of 14th Oct 201	UPPTCL, UPRVUNL	1. No representative from UPRVUNL presented during the meeting, It was informed to STU/SLDC-UP to collect the information (DR/EL, detailed report) and submit the details considering the points for discussion mentioned below: (Action: UPPTCL/ SLDC-UP, Time: Within 15days) a. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				breaker, isolator; relevant alarms and any other relevant detail to be shared. b. Exact location of fault and nature of fault. c. Sequence of tripping needs to be reported and explained. d. Reason of multiple element tripping without any fault in the system. e. Arrangement of station auxiliary supply and its back up at 400/220 kV Obra-B TPS to be shared. Also reason of tripping of all running units needs to be explained. f. Reason of tripping of 400 kV transmission line (400 kV Obra-Rewa Road and 400 kV Obra-Sultanpur ckt) needs to be reviewed. g. Availability of time synchronized SCADA SoE to be checked and corrected. h. Detailed report, remedial measures report and supporting DR/EL needs to be submitted by UPPTCL A detailed report covering the aforesaid points along with remaining DR, station EL shall be submitted: (Action: UPPTCL/ SLDC-UP; Time: Within 15days)	
11.	35/B	Multiple element tripping at 400/220kV Lucknow (UP) at 17:27hrs of 22nd Sep 2017 and 17:23hrs of 25th Dec 2017	UPPTCL	1. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: UP; Time: by 15.07.2018) • For 22nd Sep 2017: i. Reason for non-opening of 220kV Unnao ckt from Lucknow end on LBB protection operation of bus coupler to be shared. ii. LBB protection operation for bus coupler needs to be reviewed as tripping didn't occur in the breaker connected to that bus. Fault fed for 1.5second and ICTs finally tripped on back up over current earth fault protection. iii. LBB protection operation of 400/220kV ICT-2 after	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				~1.5sec of fault to be explained. iv. Three simultaneous LBB operations need to be reviewed thoroughly. v. Time synchronization error for 220kV LBB/ Bus Bar Protection numerical relays to be checked. vi. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. • For 25th Dec 2017: i. Reason for delayed clearance of fault needs to be ascertained. In case of operation of bus bar protection fault would be cleared within 100ms. ii. Reason for opening of 220kV Lucknow (UP)-Gomti Nagar ckt to be ascertained. iii. Tripping of other 400kV elements at Lucknow (UP) in interval of msec to be explained. iv. Multiple closing/opening of 400kV Singrauli/Unnao ckts to be explained. v. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared.	
12.	35/C	Multiple element tripping at 400/220kV Muzaffarnagar, Vishnuprayag at 12:02hrs of 09th Oct 2017 and 16:24hrs of 20th Dec 2017	UPPTCL	1. For 09th Oct 2017 event: a. Reason for tripping of 400kV Muzaffarnagar-Ataur in Z-2 from Ataur to be explained. (Action: UP, Time: by 15.07.2018) b. Time synchronization w.r.t. SCADA digital status data at Muzaffarnagar (UP) needs to be checked and corrected. (Action: UP, Time: by 15.07.2018) 2. For 20th Dec 2017 event: a. At a substation having two bus bars, both buses	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				should be coupled to enhance reliability. (Action: All NR constituents, Time: by 15.07.2018) b. DR (COMTRADE files) of bus bar protection relay at Vishnuprayag to be shared. (Action: UP, Time: by 15.07.2018) c. Time synchronization w.r.t. SCADA digital status data at Muzaffarnagar (UP) needs to be checked and corrected. (Action: UP, Time: by 15.07.2018)	
13.	35/G	Multiple element tripping at 400/220kV Sarnath (UP) Station at 01:22hrs of 29th Nov 2017	UPPTCL	1. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: UP; Time: by 15.07.2018) a. As reported by UP, bus bar protection operated at Sarnath. However, as per PMU data, no fault observed. Exact reason for operation of bus bar protection to be ascertained and shared. b. Reason for power flow of 400kV Sarnath-Varanasi ckt-2 becoming zero 5min prior to actual event. c. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared.	
14.	35/I	Multiple element tripping at 400/220kV Rewa Road (UP) on 23, 29 & 30th Dec 2017	UPPTCL	1. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: UP; Time: Within 15days) a. Event on 23rd Dec 2017: i. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail. ii. Non-reporting of digital status SCADA data of Banda and Rewa Road. iii. Preliminary report, DR/EL and detail report is still awaited from UP	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				b. Event on 29th Dec 2017: i. For 400kV Rewa Road-Panki: • Delayed tripping from Panki end. • Non auto-reclosing from Panki end. ii. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail. iii. Reason of delayed clearance of fault. iv. Non-reporting of digital status SCADA data of Banda and Rewa Road. v. Preliminary report, DR/EL and detail report is still awaited from UP vi. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared c. Event on 30th Dec 2017: i. For 400kV Rewa Road-Panki: • Delayed tripping from Panki end. • Non auto-reclosing from Panki end. • Tripping from Rewa Road end after 6sec of fault. ii. Reason of delayed clearance of fault. iii. Reason for LBB protection operation from Rewa Road end after 5sec of fault. iv. Non-reporting of digital status SCADA data of Banda. v. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail. vi. Preliminary report, DR/EL and detail report is still	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				awaited from UP	
15.	35/L	Multiple Element tripping at 400 kV Agra (UP) at 18:09hrs of 04th Mar 2018	UPPTCL	1. A detailed report covering the following points along with remaining DR, station EL shall be submitted: (Action: UP, POWERGRID; Time: Within 15days) a. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. b. Reason of operation of bus bar protection for both 400 kV buses at Agra (UP). c. Lightening Mast design in 400 kV Agra (UP) also needs to be looked into as both bus fault occurred due to lightening in the switchyard. d. As per SCADA SoE: i. Reason for tripping of 400kV Agra-Unnao ckt from Unnao end in ~140ms of fault to be looked into and shared. ii. Reason for opening of 400kV Agra(UP)-Agra(PG) ckt from Agra(PG) end (tie CB during fault and main CB after ~1sec of fault) to be looked into and shared. e. As per UP report, ICT-3 didn't trip. However, fault cleared in ~320ms. How the fault get cleared if ICT-3 didn't trip. f. As per UP report, bus bar protection of bus-2 operated and LBB of Fatehabad-1 ckt (connected to bus-2) also operated after operation of Z-4 relay (250ms time setting).	
16.	35/N	Multiple Element tripping at 400/220kV Sarnath (UP) at 22:07hrs of 30th Mar 2018	UPPTCL	1. It seems 400 kV Anpara-Sarnath line tripped from Anpara end in Z-1 however fault was at the bus of Sarnath (UP). Distance protection setting at Anpara (end) of 400kV Anpara-Sarnath line needs to checked and corrected. (Action: UP, Time: by 15.07.2018) 2. As seen from PMU, reason for Y-N fault followed by R-N fault followed by 3-phase fault to be ascertained and	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				informed. (Action: UP, Time: by 15.07.2018) 3. Reason of three phase tripping of 400 kV Sarnath-Azamgarh line during Y-phase to earth fault in the line to be checked and corrected. (Action: UP, Time: by 15.07.2018) 4. In case of bus fault, delayed clearance of fault (~450ms) to be checked. (Action: UP, Time: by 15.07.2018) 5. As reported by UP, station event logger would be commissioned by Sep'18. Expeditious commissioning of same is requested. (Action: UP) 6. 34th PSC Recommendation: • Better monitoring tool shall be used for isolator auxiliary contact input to bus bar protection. • Bus tied operation alarm shall be brought in front panel so that the shift operator could easily monitor the same. • Line/Bus isolator auxiliary contacts status input to bus bar protection/ stub protection operation needs to be checked after every isolator operation. 7. It was discussed and approved in PSC meeting that Auxiliary contact status of isolator would be regularly checked in every shift and alarm should be available to the operator of the station with DMT (Double Main Transfer Breaker Bus Bar) scheme however it seems, it is yet to be implemented at 400kV Sarnath (UP). 8. NR constituents may kindly share the compliance report of aforesaid recommendation for 220kV and above station (All NR constituents)	
17.	35/P	Multiple element tripping at 400/220kV Bareilly (UP) at 22:39hrs of 05th Apr 2018 and 10:51hrs of 08th Apr 2018	UPPTCL	1. Audit of Bareilly(UP) substation to be carried out especially considering the following points: • Reason for stuck status of trip contacts of 86B and reason for the same not updating in control panel to be ascertained and shared. • N.I.T. switch positioning at Intermediate instead of	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				Transfer lead to tripping of complete 400kV elements at the substation. • As advised in 34th PSC meeting for all NR constituents, at a substation: o Bus tied operation alarm shall be brought in front panel so that the shift operator could easily monitor the same. o Line/Bus isolator auxiliary contacts status input to bus bar protection/ stub protection operation needs to be checked after every isolator operation • Detailed report and remedial measures report to be submitted. The audit report along with remedial measures to avoid above tripping in future shall be shared. (Action: UP, Time: by 20.07.2018)	
18.	35/R	Multiple element tripping at 400/220kV Rewa Road (UP) on 08, 16 & 19th Apr 2018	UPPTCL	1. In view of the lack of information and clarity about both the events, the event would be included again for discussion in the next PSC meeting. 2. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: UP, POWERGRID; Time: Within 15days) a. Event on 08th Apr 2018: i. Exact location of fault to be reported. ii. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. iii. Reason of delayed clearance of fault. iv. Reason of tripping of multiple elements at 01:49hrs without any fault in the system v. Non-reporting of digital status SCADA data of Meja TPS and Rewa Road.	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				vi. Preliminary report, DR/EL and detail report is still awaited from UP. b. Event on 16th Apr 2018: i. Exact location of fault to be reported. ii. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared iii. Reason of delayed clearance of fault. iv. Reason of tripping of 400 kV Obra-Panki line. v. Reason of complete outage of 400 kV Rewa Road (UP). vi. Reason of tripping of multiple elements at 13:49:24hrs on over voltage protection needs to be looked into. vii. Voltage staggering w.r.t. time and voltage. Over voltage setting of all the outgoing line from Rewa Road, Meja TPS and its remote end needs to be shared. viii. Non-reporting of digital status SCADA data of Meja TPS and Rewa Road. ix. DR/EL from Rewa Road (UP) and detailed report of the incident is still awaited from UP. c. Event on 19th Apr 2018: i. Staggering of over voltage protection setting w.r.t. time and voltage. ii. Exact sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant detail to be shared. iii. Reason of simultaneous tripping of all three lines. iv. Reason of rise in the voltage. v. Over Voltage setting to be shared for all outgoing	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				lines from Rewa Road and Meja TPS. vi. Non-reporting of digital status SCADA data of Meja TPS and Rewa Road. vii. Preliminary report, DR/EL and detail report is still awaited from UP. 3. Availability of DR and its extraction software shall be available at the site. 4. Reporting of DR/EL shall be improved. DR/EL of any tripping to be submitted within 24hrs. 5. Availability of digital status of Rewa Road and Meja TPS needs to be improved.	
19.	34/A	Complete 220kV level outage at 400/220/132kV Lucknow(UP) Station at 03:50hrs of 03rd Jan 2017	UPPTCL	1. NRLDC SCADA SoE shall be looked into for clarification on queries like opening of 220kV Lucknow(end)-Unnao ckt in 180ms of fault occurrence, reason for tripping of different feeders/ICTs at different time even in case of LBB protection operation. (Action: UP; Time: on or before 10-Sep-17) 2. The high set setting of ICTs at Lucknow(UP) may be revised to at least 7 times of rated current. (Action: UP) 3. Bus tied operation alarm shall be brought in front panel so that the shift operator could easily monitor the same. (Action: UP; Time: on or before 30-Sep-17)	
20.	34/G	Multiple element tripping at 400/220kV Panki (UP) at 16:30hrs of 06thApr 2017, 10:41hrs of 15th Apr 2017, 21:25hrs of 20th Apr 2017&03:12hrs of 27th May 2017	UPPTCL	1. Maintenance of all 400kV and 220kV breakers at Panki shall be looked into and carried out wherever needed. (Action: UP) 2. In 27-Apr-17 event, reason for tripping of 220kV bus coupler to be shared. (Action: UP; Time: on or before 10-Sep-17) 3. Complete DR/EL details w.r.t. all four events shall be shared. (Action: UP; Time: on or before 10-Sep-17) 4. A complete sequence of events in view of cause of event; protection operation/non-operation; opening, closing of breaker, isolator; relevant alarms and any other relevant	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				detail based on the DR/EL of affected elements shall be submitted for all the four events occurred at Panki. (Action: UP; Time: on or before 10-Sep-17) 5. Internal audit shall be carried out at Panki substation. (Action: UP, Time: on or before 30-Sep-2017)	
21.	34/H	Multiple element tripping at 400/220kV Agra(UP) at 14:26hrs of 18thApr 2017, 12:25hrs of 20th Apr 2017	UPPTCL	1. A detailed report covering the following points along with DR, station EL shall be submitted: (Action: UP, POWERGRID; Time: on or before 10-Sep-17) a. In 18-Apr-17 event the following points still needs further analysis: i. Non operation of any protection at Agra(UP) w.r.t. 400kV Agra(UP)-Unnaockt. ii. Exact location of fault. iii. Status and details of tripping from Agra(PG) end. iv. Reason for final clearance of fault in the end. v. Status and details of tripping of ICTs at Agra(UP). vi. As per SCADA SoE, main CB of 400kV Agra(UP)-Fatehabad ckt-2 opened from Fatehabad end. However, UP representative informed that line didn't trip from Fatehabad end. vii. As per SCADA SoE, tripping of 400kV Agra(UP)-Unnao from Unnao end after ~2sec of auto reclosing to be checked. viii. Complete DRs, Station Event Log details at Agra(UP), Agra(PG), Unnao, Fatehabad for the tripped elements. b. In 20-Apr-17 event the following points still needs further analysis: i. Non operation of any protection at Agra(UP) w.r.t. 400kV Agra(UP)-Unnaockt. ii. Status and details of tripping from Agra(PG) end. iii. Reason for final clearance of fault in the end.	

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Sr. No.	Incident ID	Incident	Utilities involved	Recommendations of PSC	Status of action taken on Recommendations
				iv. As per SCADA SoE, tripping of 400kV Agra(UP)-Unnao from Unnao end after ~4sec of auto reclosing to be checked. v. Complete DRs, Station Event Log details at Agra(UP), Agra(PG), Unnao, Fatehabad for the tripped elements.	

Annexure-2

S. NO.	Element Name	Utility/ SLDC	Oct,18	Nov,18	Dec,18	Jan,19	Feb,19	Mar,19	Apr,19	May,19	Jun,19	Total	Action taken	Action to be taken	Other Status	NRLDC Comment
1	400kV Anpara(UP)-Mau(UP)	UP	3		4	6	6	4		3		**26**	400 kV Anpara-Mau line has some clearance issue due to crossing of 33kV line, whenever line loading increases in the line. Height of 33kV line is being reduced to maintain clearance. Pole discrepancy setting in 400 kV Anpara-Mau line was 500ms instead of 1.5 second, it resulted into three phase of tripping of line before auto reclosing (1000ms). Pole discrepancy setting has been reviewed and corrected. **{Comment for Jan month tripping} Auto reclosure issue in 400 kV Anpara-Mau ckt has already been sorted out. Following were the issues in 400 kV Anpara-Mau line which were sorted out** **o REL-670 Main I distance protection was out of service. It has been taken back in service and CVT connection was also restored.** **o A/R function of Main II distance protection was found damage. It has been checked and corrected** **o 33kV line was lowered down to maintain the clearance in 400kV Anpara-Mau line. (March month comment)**	UP representative informed that auto reclosure issue has been taken up with OeM and would be resolved. NRLDC representative requested UP to put auto reclosure in service at the earliest. Remedial measures report to be submitted.		Auto-reclosing issue
2	220kV Kishenpur(PG)-Ramban(JK)	J&K/ POWERGRID							5	5	5	**15**				Auto-reclosing issue, Tripping without any fault in the system
3	315MVA ICT 1 at 400/220kV Makhu(Pun)	Punjab					14					**14**	Tripping was mainly of ICTs on account of over flux setting and remedial measures is being taken care.			Over fluxing. Sensitive setting needs to be looked into.
4	400kV Kishenpur(PG)-New Wanpoh(PG) ckt -1	POWERGRID		3		5	6					**14**	POWERGRID representative informed that there is crossing of 220kV Kishenpur-Mirbazar line under the LiLo portion of 400kV Kishenpur-Wanpoh ckt. The earth wire of 220kV Kishenpur-Mirbazar creates spark though galloping under snow. Last year the earth wire was loosened to avoid such incidents. However, after that OPGW stringing the problem again occurred. The earth wire is again loosened.			
5	400kV Agra(UP)-Unnao(UP)	UP						4	3		4	**11**		UPPTCL representative informed that A/R issue was persisting in Agra-Unnao ckt. Remedial measure is being taken.		Auto-reclosing Issue
6	400kV Akal(RRVPNL)-Kankani(RRVPNL) ckt-1	Rajasthan				4		4	3			**11**		Rajasthan representative informed that A/R issue in 400 kV Akal-Kankani ckt-1 will be checked. 400 kV Akal-Kankani is new line and there are trees in the line. Complete patrolling is still pending from the company thatswhy line tripped multiple times. Auto reclosure issue will be addressed within 3 days. (April comment)		Auto-reclosing Issue
7	400kV Dadri(NTPC)-Panipat(BBMB) ckt-1	POWERGRID/ NTPC/ BBMB					8		3			**11**	NTPC representative informed that CVT was faulty at Dadri end of 400 kV Dadri-Panipat ckt-1 and same has been replaced in first week of March 2019. 400 kV Dadri-Panipat ckt-1 tripping may be reduced.			Auto-reclosing Issue
8	315MVA ICT 1 at 400/220kV Mukatsar(Pun)	Punjab					9					**9**				Over fluxing. Sensitive setting needs to be looked into.
9	400kV Akal(RRVPNL)-Kankani(RRVPNL) ckt-2	Rajasthan						4		5		**9**				Auto-reclosing Issue
10	765kV Anpara C(UP)-Unnao(UP)	UP				6	3					**9**				Multiple times line fault, thorough line patroling needs to be done
11	220kV Delina(JK)-Kishanganga HEP(NHPC) ckt-1	J&K/ POWERGRID/ NHPC									8	**8**				No fault captured through PMU data, Tripping without any fault in the system
12	220kV Delina(JK)-Kishanganga HEP(NHPC) ckt-2	J&K/ POWERGRID/ NHPC									8	**8**				No fault captured through PMU data, Tripping without any fault in the system
13	400kV Anpara(UP)-Sarnath(UP) ckt-2	UP				5			3			**8**				Correct tripping

Annexure-2

S. NO.	Element Name	Utility/ SLDC	Oct,18	Nov,18	Dec,18	Jan,19	Feb,19	Mar,19	Apr,19	May,19	Jun,19	Total	Action taken	Action to be taken	Other Status	NRLDC Comment
14	500MVA ICT 1 at 400/220kV Dhuri(Pun)	Punjab					8					**8**				Over fluxing. Sensitive setting needs to be looked into.
15	800kV HVDC Champa(WR)-Kurukshetra(NR) ckt -2	POWERGRID						8				**8**	POWERGRID representative informed that these trippings of Champa-Kurukshetra were mainly during testing work.			Common Neutal Area Protection control maloperation
16	400kV Bareilly(UP)-Unnao(UP) ckt-1	UP		3			5					**8**		UP representative inform there was some over voltage problem in the line which has been rectified. NRLDC representative requested UP to look into the reason and rectification of auto-reclosing and PLCC problem also as reported in other two incidents.		
17	400kV Azamgarh(UP)-Gorakhpur(UP)	UP	3								4	**7**		It is requested from UPPTCL to check auto-reclosing at both ends.		Auto-reclosing issue, Tripping without any fault in the system
18	400kV Bareilly(UP)-Unnao(UP) ckt-2	UP				4	3					**7**				Auto-reclosing issue
19	400kV Aligarh(UP)-Panki(UP)	UP							6			**6**				Auto-reclosing issue, Tripping without any fault in the system
20	400kV Alwar(Raj)-Hindaun(Raj)	Rajasthan								3	3	**6**				Auto-reclosing issue, Tripping without any fault in the system
21	400kV Khedar(HVPNL))-Nuhiyawali(HVPNL) ckt-2	Haryana					3	3				**6**			400 kV Khedar-Nuhiyanwali ckt-2 tripped due to over voltage in the line during lightly loaded condition.	Overvoltage; Tripped without fault, Non operation of distance protection.
22	400kV Mainpuri 765(UP)-Orai(UP) ckt-1	UP						3		3		**6**		Details for 400 kV Mainpuri-Orai ckt-1 and Mainpuri-Mainpuri ckt-1 is pending from the site and will be informed later on.		No fault captured through PMU data, Tripping without any fault in the system
23	315MVA ICT 1 at 400/220kV Nakodar(Pun)	Punjab					5					**5**				Over fluxing. Sensitive setting needs to be looked into.
24	315MVA ICT 2 at 400/220kV Mukatsar(Pun)	Punjab					5					**5**				Over fluxing. Sensitive setting needs to be looked into.
25	400kV Ajmer II(RRVPNL)-Bhilwara(RRVPNL) ckt-2	Rajasthan								5		**5**				Difference in A/R dead time of both end of the line
26	400kV Akal(RRVPNL)-Jodhpur(RRVPNL)	Rajasthan				5						**5**				Auto-reclosing issue
27	400kV Aligarh(UP)-Mainpuri 765(UP) ckt-1	UP							5			**5**				Correct tripping
28	400kV Dadri(NTPC)-Panipat(BBMB) ckt-2	POWERGRID/ NTPC/ BBMB				5						**5**	POWERGRID representative informed that CVT error was found in one of the phase at Dadri end and CVT has been replaced.			Overvoltage
29	400kV Jind(HVPNL)-Kirori(HVPNL) ckt-1	Haryana						5				**5**	Haryana representative informed that there were some trees branches which are touching the line (400 kV Jind-Kirori ckt-1) during wind and resulted into tripping of the line. Preventive action has been taken and trees branches has already been trimmed.			
30	765 kV Meerut(PG)-Moga(PG)	POWERGRID		5								**5**	POWERGRID representative informed that due to PLCC problem leading to DT received and driver issue in Reactor the line tripped multiple times. He stated that the problems have been rectified.	NRLDC representative also asked about the outage occurred on 18-Nov-18 at 19:50hrs in which no fault was observed as per PMU data. POWERGRID representative stated that the information related to this would be provided.		

Annexure-2

S. NO.	Element Name	Utility/ SLDC	Oct,18	Nov,18	Dec,18	Jan,19	Feb,19	Mar,19	Apr,19	May,19	Jun,19	Total	Action taken	Action to be taken	Other Status	NRLDC Comment
31	765kV Aligarh(PG)-Kanpur New(PG)	POWERGRID			5							**5**		POWERGRID representative informed that this line tripped due to over voltage stage-1 operation. NRLDC representative requested POWERGRID to kindly raise the over voltage stage-1 setting from 106% to 108%, as earlier sensitive setting was due to less experience of 765 kV lines in the system. Now POWERGRID has enough experience of operation of high capacity 765 kV corridor so setting shall be revised accordingly. POWERGRID representative stated that the information related to change in setting would be provided.		
32	220kV Tanakpur(NHPC)-Sitarganj(PG)	NHPC/ POWERGRID							4			**4**				Protection setting needs to be reviewed in view of multiple times tripping
33	315MVA ICT 1 at 400/220 kV Bassi(PG)	POWERGRID							4			**4**				Over fluxing. Sensitive setting needs to be looked into.
34	400kV Bus 1 at Orai(UP)	UP			4							**4**		NRLDC representative informed that bus bar protection at Orai (UP) mal-operated (at the time of auto reclosing operation in the line) multiple time during line fault in any of the outgoing connected feeders to 400 kV Bus-1 of Orai (UP). NRLDC representative requested UP to arrange internal protection audit with the team comprising of SLDC member, representative from other zone of UPPTCL and POWERGRID (if requires). Team shall submit the audit report and finding to NRPC/ NRLDC. POWERGRID representative also suggested that kindly check the LBB setting, if it is 100ms instead of 200ms than it may create tripping.		
35	400kV Chabra(RRVPNL)-Hindaun(RRVPNL)	Rajasthan				4						**4**				Auto-reclosing issue
36	400kV Gorakhpur(PG)-Motihari(DMTCL) ckt-1	POWERGRID							4			**4**				Auto-reclosing issue
37	400kV Kala Amb(PKATL)-Karchamwangtoo(JSW) ckt-2	PKATL/ JSW				4						**4**				Remedia lmeasures taken yet to be informed
38	400kV Kishenpur(PG)-New Wanpoh(PG) ckt-4						4					**4**				Remedial measures yet to be reported
39	800kV HVDC (Agra-BNC) Pole-2 at Agra HVDC	POWERGRID	4									**4**		POWERGRID representative stated that three trippings occurred due to line fault whereas in one instance pole tripped during testing. NRLDC representative requested POWERGRID and other constituents that the nomenclature of DR configuration channel may also be provided along with the DR files to interpret the DR file.		
40	132kV Mahendranagar(Nepal)-Tanakpur(NHPC)	NHPC/ POWERGRID							3			**3**				Correct tripping
41	220kV AD Hydro(ADHY)-Phojal(HP)	AD Hydro/ HP			3							**3**				Weather related triping, A/R function is not enabled in the line. A/R function shall be enabled at both end of the line
42	220kV Amargarh(NRSS29)-Delina(JK) ckt-1	J&K/ POWERGRID/NRSS 29									3	**3**	Clearance issue in the line, Line patrolling done successfully and remedial measures already taken.			

Annexure-2

S. NO.	Element Name	Utility/ SLDC	Oct,18	Nov,18	Dec,18	Jan,19	Feb,19	Mar,19	Apr,19	May,19	Jun,19	Total	Action taken	Action to be taken	Other Status	NRLDC Comment
43	315MVA ICT 1 at 400/220 kV Obra TPS(UP)	UP							3			**3**				Backup O/C earth fault Protection setting of Obra ICT needs to be reviewed
44	315MVA ICT 2 400/220 kV Akal(RRVPNL)	Rajasthan							3			**3**	315MVA ICT-2 at Akal station tripped due to sensitive over flux setting of ICT. It has been revised.			
45	315MVA ICT 4 at 400/220kV Abdullapur(PG)	POWERGRID					3					**3**				Over fluxing
46	400 kV Aligarh(UP)-Panki(UP)	UP		3								**3**		UP representative informed that bus bar protection at Aligarh is out of service. NRLDC representative requested UP to bring bus bar protection in service at the earliest. Further, any such outage needs to be reported to SLDC/RLDC.		
47	400 kV Anpara(UP)-Obra(UP)-Sultanpur(UP)	UP		3								**3**		NRLDC representative informed that as per PMU data, line didn't auto-reclose in all three tripping incidents. UP was requested to look into the changes in protection setting which were to be done after bypassing Obra(UP) station.		
48	400 kV Azamgarh(UP)-Gorakhpur(UP)	UP		3								**3**		UP representative informed that auto-reclosing is not working at Gorakhpur(UP). The panel is being replaced. NRLDC representative requested UP to enable auto-reclosing feature at Gorakhpur(UP) at the earliest and inform the date by which the the same would be enabled.		
49	400 kV Bikaner(RRVPNL)-Suratgarh(RRVPNL)	Rajasthan				3						**3**				Auto-reclosing issue, Tripping without any fault in the system
50	400 kV Chamera II(NHPC)-Kishenpur(PG)	POWERGRID/NHPC		3								**3**		NRLDC representative requested POWERGRID to provide details w.r.t. the tripping.		
51	400kV Akal(RRVPNL)-Barmer(RRVPNL) ckt-1	Rajasthan				3						**3**				Auto-reclosing issue
52	400kV Banda(UP)-Orai(UP) ckt-2	UP									3	**3**				No fault captured through PMU data, Tripping without any fault in the system
53	400kV Baspa(HP)-Karchamwangtoo(JSW) ckt-2	HP/JSW				3						**3**				Correct tripping
54	400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-1	Rajasthan								3		**3**				Auto-reclosing issue
55	400kV Bhadla(RRVPNL)-Bikaner(RRVPNL) ckt-2	Rajasthan									3	**3**				Auto-reclosing issue
56	400kV Bhadla(RRVPNL)-Merta (RRVPNL)	Rajasthan								3		**3**				Auto-reclosing issue
57	400kV Bhilwara(RRVPNL)-Chittorgarh(RRVPNL) ckt-1	Rajasthan							3			**3**	400 kV Bhilwara-Chittorgarh ckt-1 & 2 tripped due to tree touching. Tree has been trimmed. Time synchronization of DR/EL of both end of 400 kV Bhilwara-Chittorgarh ckts will be checked within 7days.			No fault captured through PMU data, Tripping without any fault in the system
58	400kV Bhilwara(RRVPNL)-Chittorgarh(RRVPNL) ckt-2	Rajasthan							3			**3**	400 kV Bhilwara-Chittorgarh ckt-1 & 2 tripped due to tree touching. Tree has been trimmed. Time synchronization of DR/EL of both end of 400 kV Bhilwara-Chittorgarh ckts will be checked within 7days.			No fault captured through PMU data, Tripping without any fault in the system
59	400kV Bhiwadi(PG)-Hisar(PG)	POWERGRID									3	**3**				Correct tripping
60	400kV Bhiwani(PG)-Hisar(PG)	POWERGRID				3						**3**				Overvoltage
61	400kV Bhiwani(PG)-Jind(PG) ckt-1	POWERGRID							3			**3**				Correct tripping
62	400kV Bikaner(Raj)-Suratgarh(Raj)	Rajasthan					3					**3**				Auto-reclosing issue
63	400kV Bikaner(RRVPNL)-Merta(RRVPNL)	Rajasthan								3		**3**				Auto-reclosing issue
64	400kV Chamera pool(PG)-Jalandhar(PG) ckt-1	POWERGRID					3					**3**				Correct tripping

Annexure-2

S. NO.	Element Name	Utility/ SLDC	Oct,18	Nov,18	Dec,18	Jan,19	Feb,19	Mar,19	Apr,19	May,19	Jun,19	Total	Action taken	Action to be taken	Other Status	NRLDC Comment
65	400kV Dadri(NTPC)-Muradnagar(UP)	POWERGRID/NTPC/UP					3					**3**				Overvoltage
66	400kV Daultabad(HVPNL)-Jhajjar(APCPL) ckt-1	Haryana/ APCPL				3						**3**				Auto-reclosing issue
67	400kV G.Noida 765(UP)-Noida sec-148(UP) ckt-1	UP							3			**3**				Auto-reclosing issue, Tripping without any fault in the system
68	400kV Gorakhpur(PG)-Motihari(DMTCL) ckt-2	POWERGRID							3			**3**		400 kV Gorakhpur-Motihari ckts tripped due to frequent fault in Bihar section or at Motihari (GIS). NRPC further suggested POWERGRID to collect the information from its own end and counterpart, share the details to RPC/ RLDC.		
69	400kV Kashipur(PTCUL)-Nehtaur(UP)	UP/ Uttarakhand	3									**3**		It was reported that in one of the tripping on fault, auto-reclosing occurred from Nehtaur end but failed from Kashipur end. PTCUL requested to check the same at Kashipur end.		
70	400kV Koldam(NTPC)-Ludhiana(PG) ckt-2	POWERGRID/NTPC/PKTCL									3	**3**				Correct tripping
71	400kV Lucknow(UP)-Unnao(UP)	UP						3				**3**	Tripped due to touching of bamboo tree and tree cutting has been done			
72	400kV Mainpuri 765(UP)-Mainpuri(PG) ckt-1	UP						3				**3**		Details for 400 kV Mainpuri-Orai ckt-1 and Mainpuri-Mainpuri ckt-1 is pending from the site and will be informed later on.		Auto-reclosing issue
73	400kV Ratangarh(RRVPNL)-Suratgarh(RRVPNL) ckt-2	Rajasthan							3			**3**				Auto-reclosing issue
74	400kV Rewa Road(UP)-Banda(UP) ckt-1	UP									3	**3**				Auto-reclosing issue
75	500kV HVDC Balia(PG)-Bhiwadi(PG) Pole 2	POWERGRID				3						**3**				
76	500kV HVDC Vindhyachal BtB Block 2	POWERGRID								3		**3**				Sensitive over current setting of HVDC Vindhyachal BtB needs to be reviewed
77	500kV HVDC Vindhyachal(PG) BtB Block 1	POWERGRID							3			**3**				Sensitive over current setting of HVDC Vindhyachal BtB needs to be reviewed
78	765kV Aligarh(PG)-Orai(PG) ckt-1	POWERGRID			3							**3**	POWERGRID representative informed that line tripped due to actual line fault in the line. There was an issue of earth wire clearance, earth wire was loose in the line, it has been attended.			
79	765kV Fatehabad 765(UP)-Lalitpur TPS(LPGCL) ckt-1	UP							3			**3**				Correct tripping
80	765kV G.Noida(UP)-Mainpuri(UP)	UP									3	**3**				Auto-reclosing issue
81	800kV HVDC Agra(NR)-Alipurdwar(ER) Pole-4 at Agra HVDC	POWERGRID								3		**3**		800 kV Agra-Alipurduar Pole-4 tripped due to problem at Alipurduar end. NRPC further suggested POWERGRID to collect the information from its own end and counterpart, share the details to RPC/ RLDC.		

Annexure-3

S. No	Element Name	Type	Voltage Level	Owner	Outage		Revival		Reason / Remarks (As per outage report)	Comment
1	Abdullapur 315 MVA ICT 4	ICT	400/220 kV	PGCIL	22-Jan-19	00:57	22-Jan-19	07:19	Over fluxing	Over fluxing
					8-Feb-19	00:43	8-Feb-19	06:06	Over fluxing	Over fluxing
					21-Feb-19	03:55	21-Feb-19	05:41	Over fluxing	Over fluxing
					27-Feb-19	03:18	27-Feb-19	05:55	Over fluxing	Over fluxing
					3-Mar-19	02:20	3-Mar-19	06:36	Over fluxing	Over fluxing
2	Akal 315 MVA ICT 1	ICT	400/220 kV	RRVPNL	15-Mar-19	00:13	15-Mar-19	00:45	Master Trip (86) Relay Mal-operated	Mal-operation
3	Akal 315 MVA ICT 2	ICT	400/220 kV	RRVPNL	15-Apr-19	04:15	15-Apr-19	06:52	Over fluxing. 400/220 KV 315 MVA ICT-2 had been trip on overflux	Over fluxing
					16-Apr-19	20:16	17-Apr-19	09:40	Details Awaited	Details Awaited
					24-Apr-19	03:38	24-Apr-19	07:19	Over fluxing.	Over fluxing
4	Amargarh 400 (NRSS29) 315 MVA ICT 2	ICT	400/220 kV	NRSS29	24-Jan-19	23:38	25-Jan-19	01:49	OSR (Oil Surge Relay) operation	Mal-operation
					28-Jan-19	12:37	28-Jan-19	14:23	Y phase OSR operated	Mal-operation
5	Bamnauli 315 MVA ICT 3	ICT	400/220 kV	DTL	2-Feb-19	02:22	2-Feb-19	06:37	Master trip (86) relay operated	
6	Bassi 500 MVA ICT 3	ICT	400/220 kV	PGCIL	17-Apr-19	03:51	17-Apr-19	09:15	Over fluxing	Over fluxing
7	Bassi 315 MVA ICT 1	ICT	400/220 kV	PGCIL	3-Mar-19	04:25	3-Mar-19	06:16	Over fluxing	Over fluxing
					16-Apr-19	22:32	16-Apr-19	23:17	Over fluxing	Over fluxing
					17-Apr-19	02:12	17-Apr-19	02:50	Over fluxing	Over fluxing
					17-Apr-19	04:25	17-Apr-19	05:22	Over fluxing	Over fluxing
					18-Apr-19	02:45	18-Apr-19	06:05	Over fluxing	Over fluxing
8	Bassi 315 MVA ICT 2	ICT	400/220 kV	PGCIL	3-Mar-19	04:30	3-Mar-19	06:32	Over fluxing	Over fluxing
9	Bawana 315 MVA ICT 2	ICT	400/220 kV	DTL	11-Mar-19	14:51	11-Mar-19	15:29	Master Trip (86) Relay Mal-operated	Mal-operation
10	Bawana 315 MVA ICT 3	ICT	400/220 kV	DTL	15-May-19	11:46	15-May-19	18:46	Relay maloperation	Mal-operation
11	Bawana 315MVA ICT-4	ICT	400/220 kV	DTL	15-May-19	07:44	15-May-19	12:36	Tripped on O/C, DMT operated	
12	Bhilwara 315 MVA ICT-2	ICT	400/220 kV	RRVPNL	2-Jun-19	12:23	2-Jun-19	15:48	Tripped due to Earth fault	
					23-Jun-19	10:35	23-Jun-19	14:32	Bucholz Relay Operated	Mal-operation
13	Bhiwadi 315 MVA ICT 2	ICT	400/220 kV	PGCIL	30-Mar-19	18:08	30-Mar-19	19:42	Due to inclement weather	Mal-operation
14	Bhiwadi 315 MVA ICT 3	ICT	400/220 kV	PGCIL	30-Mar-19	18:08	30-Mar-19	19:41	Due to inclement weather. Tripped only at 220kV side.	Mal-operation
15	Dadri 500 MVA ICT 3	ICT	400/220 kV	NTPC	7-Feb-19	17:44	7-Feb-19	19:50	Overhead differential protection operated	
16	Dadri 500 MVA ICT 4	ICT	400/220 kV	NTPC	7-Feb-19	17:44	8-Feb-19	18:32	Overhead differential protection operated	
17	Dhuri(400) 500 MVA ICT 1	ICT	400/220 kV	PSTCL	31-Jan-19	03:24	31-Jan-19	10:28	Over fluxing	Over fluxing
					3-Feb-19	00:32	3-Feb-19	08:50	Over fluxing	Over fluxing
					6-Feb-19	20:06	7-Feb-19	07:07	Over fluxing	Over fluxing
					8-Feb-19	00:08	8-Feb-19	07:47	Over fluxing	Over fluxing
					12-Feb-19	01:50	12-Feb-19	07:57	Over fluxing	Over fluxing
					15-Feb-19	01:42	15-Feb-19	07:04	Over fluxing	Over fluxing
					16-Feb-19	02:46	16-Feb-19	07:18	Over fluxing	Over fluxing
					17-Feb-19	03:52	17-Feb-19	07:55	Over fluxing	Over fluxing
					18-Feb-19	03:57	18-Feb-19	07:10	Over fluxing	Over fluxing
18	Dhuri(400) 500 MVA ICT 2	ICT	400/220 kV	PSTCL	7-Apr-19	13:46	7-Apr-19	17:16	PRD operated	Mal-operation
					18-Apr-19	15:22	18-Apr-19	19:29	PRD operated	Mal-operation
19	Fatehabad 315 MVA ICT 3	ICT	400/220 kV	PGCIL	6-Jan-19	04:17	6-Jan-19	06:52	Over fluxing	Over fluxing
					3-Mar-19	04:25	3-Mar-19	06:30	Over fluxing	Over fluxing
20	Gurgaon 315 MVA ICT 1	ICT	400/220 kV	PGCIL	17-Jun-19	17:14	17-Jun-19	18:14	Malfunctioning of of 220v DC contactor of Bus 1	Mal-operation
21	Gurgaon 315 MVA ICT 2	ICT	400/220 kV	PGCIL	17-Jun-19	17:14	17-Jun-19	18:27	Malfunctioning of of 220v DC contactor of Bus 1	Mal-operation
22	Hamirpur 315 MVA ICT 3	ICT	400/220 kV	PGCIL	19-Apr-19	14:36	19-Apr-19	16:52	Mal-operation of PRV relay	Mal-operation
23	Heerapura 250 MVA ICT-2	ICT	400/220 kV	RRVPNL	16-Apr-19	20:53	17-Apr-19	19:40	Tripped on over fluxing at 20:53Hrs on 16.04.2019. S/D availed for replacement of Y-Ph LA w.e.f. 14:32Hrs on 17.04.2019.	Over fluxing
24	Jodhpur II 315 MVA ICT 1	ICT	400/220 kV	RRVPNL	22-Jun-19	11:58	22-Jun-19	17:18	PRD relay operated	Mal-operation
25	Kirori 315 MVA ICT 3	ICT	400/220 kV	HVPNL	2-Mar-19	00:13	2-Mar-19	13:16	Mal-operation of PRV relay (some corrosion found in connection of PRV due to moister)	Mal-operation
26	Kishenpur 315 MVA ICT 1	ICT	400/220 kV	PGCIL	10-Jun-19	15:26	10-Jun-19	16:40	Malfunctioning of Group-A Relay	Mal-operation
					28-Jun-19	15:20	28-Jun-19	15:34	Mal-operation of Back-Up impedance protection relay	Mal-operation
27	Kishenpur 315 MVA ICT 2	ICT	400/220 kV	PGCIL	28-Jun-19	15:20	28-Jun-19	15:35	Mal-operation of Back-Up impedance protection relay	Mal-operation
28	Lucknow Sarojininagar 500 MVA ICT 1	ICT	400/220 kV	UPPTCL	7-Jun-19	00:28	7-Jun-19	04:14	Tripped due to DC supply fault (DC mixing due to moisture in old cabling, as informed by UP SLDC)	O&M issues
29	Makhu 315 MVA ICT 1	ICT	400/220 kV	PSTCL	31-Jan-19	01:28	31-Jan-19	09:16	Over fluxing	Over fluxing
					1-Feb-19	01:52	1-Feb-19	08:54	Over fluxing	Over fluxing
					3-Feb-19	01:14	3-Feb-19	10:41	Over fluxing	Over fluxing
					4-Feb-19	03:06	4-Feb-19	10:10	Over fluxing	Over fluxing
					6-Feb-19	02:50	6-Feb-19	12:13	Over fluxing	Over fluxing
					7-Feb-19	23:42	8-Feb-19	11:31	Over fluxing	Over fluxing
					9-Feb-19	03:55	9-Feb-19	10:13	Over fluxing	Over fluxing
					11-Feb-19	01:43	11-Feb-19	10:38	Details Awaited	Details Awaited
					12-Feb-19	01:15	12-Feb-19	08:40	Over fluxing	Over fluxing
					13-Feb-19	03:09	13-Feb-19	08:40	Over fluxing	Over fluxing
					14-Feb-19	04:51	14-Feb-19	17:11	Details Awaited	Details Awaited
					14-Feb-19	22:57	15-Feb-19	10:27	Over fluxing	Over fluxing
					16-Feb-19	02:32	16-Feb-19	11:05	Over fluxing	Over fluxing
					17-Feb-19	02:28	17-Feb-19	09:46	Over fluxing	Over fluxing
					18-Feb-19	02:22	18-Feb-19	07:56	Over fluxing	Over fluxing
30	Makhu 315 MVA ICT 2	ICT	400/220 kV	PSTCL	30-Jan-19	02:26	30-Jan-19	09:13	Over fluxing	Over fluxing
					31-Jan-19	02:31	31-Jan-19	12:09	Over fluxing	Over fluxing
31	Mathura(400) 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	18-Jun-19	16:07	18-Jun-19	19:24	Tripped due to fault in D. C. system (Aux supply). Load loss ~ 50 MW	O&M issues
32	Mathura(400) 315 MVA ICT 2	ICT	400/220 kV	UPPTCL	20-Apr-19	08:57	20-Apr-19	11:07	OSR (Oil Surge Relay) operation	Mal-operation
					18-Jun-19	16:07	18-Jun-19	19:35	Tripped due to fault in D. C. system (Aux supply). Load loss ~ 50 MW	O&M issues
33	Merta 315 MVA ICT 1	ICT	400/220 kV	RRVPNL	24-Jan-19	22:13	24-Jan-19	22:36	Tripping details awaited	Mal-operation
					31-Jan-19	02:37	31-Jan-19	07:00	Over fluxing	Over fluxing

Annexure-3

S. No	Element Name	Type	Voltage Level	Owner	Outage		Revival		Reason / Remarks (As per outage report)	Comment
34	Mukatsar 315 MVA ICT 1	ICT	400/220 kV	PSTCL	31-Jan-19	20:23	1-Feb-19	06:41	Over fluxing	Over fluxing
					4-Feb-19	03:13	4-Feb-19	06:49	Over fluxing	Over fluxing
					6-Feb-19	00:56	6-Feb-19	08:00	Over fluxing	Over fluxing
					7-Feb-19	00:25	7-Feb-19	10:24	Over fluxing	Over fluxing
					7-Feb-19	23:17	8-Feb-19	10:39	Over fluxing	Over fluxing
					10-Feb-19	02:56	10-Feb-19	07:43	Over fluxing	Over fluxing
					11-Feb-19	04:01	11-Feb-19	10:23	Over fluxing	Over fluxing
					13-Feb-19	04:00	13-Feb-19	08:40	Over fluxing	Over fluxing
					15-Feb-19	00:31	17-Feb-19	09:51	Over fluxing	Over fluxing
					18-Feb-19	03:33	18-Feb-19	09:08	Over fluxing	Over fluxing
35	Mukatsar 315 MVA ICT 2	ICT	400/220 kV	PSTCL	31-Jan-19	01:59	31-Jan-19	07:02	Over fluxing	Over fluxing
					31-Jan-19	23:25	1-Feb-19	06:41	Over fluxing	Over fluxing
					3-Feb-19	00:52	3-Feb-19	07:38	Over fluxing	Over fluxing
					4-Feb-19	03:06	4-Feb-19	08:46	Over fluxing	Over fluxing
					8-Feb-19	03:46	8-Feb-19	05:26	Over fluxing	Over fluxing
					12-Feb-19	01:36	12-Feb-19	08:35	Over fluxing	Over fluxing
					15-Feb-19	02:03	15-Feb-19	06:30	Over fluxing	Over fluxing
36	Mundka 315 MVA ICT 2	ICT	400/220 kV	DTL	26-Apr-19	14:00	26-Apr-19	15:35	Overcurrent Earth fault Protecton operated	
37	Muradnagar New 240 MVA ICT 2	ICT	400/220 kV	UPPTCL	21-Apr-19	09:56	21-Apr-19	11:15	Due to diff buchholz relay operated	Mal-operation
38	Muzaffarnagar 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	29-Mar-19	03:05	29-Mar-19	05:24	OSR (Oil Surge Relay) operation	Mal-operation
39	Muzaffarnagar 315 MVA ICT 2	ICT	400/220 kV	UPPTCL	12-Jun-19	19:58	12-Jun-19	22:50	Buchholz Relay operated	Mal-operation
40	Nakodar 315 MVA ICT 1	ICT	400/220 kV	PSTCL	24-Jan-19	01:53	24-Jan-19	02:56	Over fluxing	Over fluxing
					6-Feb-19	03:49	6-Feb-19	06:48	Over fluxing	Over fluxing
					7-Feb-19	00:04	7-Feb-19	05:48	Over fluxing	Over fluxing
					12-Feb-19	04:26	12-Feb-19	08:34	Over fluxing	Over fluxing
					15-Feb-19	02:27	15-Feb-19	11:47	Over fluxing	Over fluxing
					18-Feb-19	03:45	18-Feb-19	06:59	Over fluxing	Over fluxing
41	Nakodar 315 MVA ICT 2	ICT	400/220 kV	PSTCL	22-Jan-19	09:21	22-Jan-19	13:18	PRV relay oparated	Mal-operation
					24-Jan-19	01:53	24-Jan-19	11:10	Over fluxing	Over fluxing
					7-Feb-19	00:14	7-Feb-19	05:49	Over fluxing	Over fluxing
42	Nawada 315MVA ICT 1	ICT	400/220 kV	HVPNL	15-Apr-19	14:00	15-Apr-19	18:46	WTI-LV (Tertiary winding - 33kV) tripped due to temperature gauge wire burnt	O&M issues
43	Obra 240 MVA ICT 2	ICT	400/220 kV	UPPTCL	5-Apr-19	12:28	5-Apr-19	14:05	Directional Earth fault protection operated	
44	Obra 315 MVA ICT 2	ICT	400/220 kV	UPPTCL	2-Jun-19	20:00	2-Jun-19	21:16	Details awaited (Tripped due to Heavy Rain)	Mal-operation
45	Obra TPS(UPPTCL) 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	5-Apr-19	12:28	6-Apr-19	14:05	Directional Earth fault protection operated	
					7-Apr-19	12:10	7-Apr-19	18:24	Restricted Earth fault Protection operated	
					2-Jun-19	20:00	2-Jun-19	21:43	Tripped due to Heavy Rain. Details awaited	Mal-operation
46	Panipat 450 MVA ICT 2	ICT	400/220 kV	BBMB	22-Jan-19	07:41	22-Jan-19	12:25	Phase to earth fault. Tripped due to neutral ground relay operated	Mal-operation
47	Panki 315 MVA ICT 2	ICT	400/220 kV	UPPTCL	6-May-19	12:58	6-May-19	13:44	Master Trip (86) Relay Mal-operated	Mal-operation
48	Patiala 315 MVA ICT 2	ICT	400/220 kV	PGCIL	18-Mar-19	10:30	18-Mar-19	10:41	Mal-operation during SD of 400KV BUS-1 at Patiala	Mal-operation
					23-May-19	17:02	23-May-19	18:25	OSR (Oil Surge Relay) operation	Mal-operation
49	Phagi 1500 MVA ICT 1	ICT	765/400 kV	RRVPNL	1-Jan-19	12:54	4-Jan-19	19:21	OSR (Oil Surge Relay) operation	Mal-operation
50	Rai Bareilly 200 MVA ICT-2	ICT	220/132 kV	PGCIL	12-Mar-19	05:20	12-Mar-19	06:11	Over fluxing	Over fluxing
51	Rai Bareilly 200 MVA ICT-3	ICT	220/132 kV	PGCIL	12-Mar-19	05:20	12-Mar-19	06:19	Over fluxing	Over fluxing
52	Rajpura (400kV) 500 MVA ICT 3	ICT	400/220 kV	PGCIL	15-Feb-19	04:05	15-Feb-19	06:27	Over fluxing	Over fluxing
					4-Mar-19	04:00	4-Mar-19	06:36	Over fluxing	Over fluxing
53	Ramgarh 400 (RVPNL) 500 MVA ICT 3	ICT	400/220 kV	RRVPNL	30-Jan-19	23:17	31-Jan-19	03:59	PRD trip.	Mal-operation
54	Roorkee 315 MVA ICT 1	ICT	400/220 kV	PGCIL	22-Jan-19	03:56	22-Jan-19	04:11	Phase to earth fault	Mal-operation
					22-Jan-19	04:12	22-Jan-19	09:57	Over fluxing	Over fluxing
55	Roza 200 MVA ICT2	ICT	400/220 kV	UPPTCL	17-Jan-19	20:00	18-Jan-19	03:22	Tripped on differential protection	Mal-operation
56	Sarnath 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	6-Jan-19	13:01	6-Jan-19	16:33	Buchholz trip	
57	Sarnath 315 MVA ICT 3	ICT	400/220 kV	UPPTCL	5-Jan-19	18:40	5-Jan-19	22:00	Details Awaited	Details Awaited
58	Sikar 315 MVA ICT 2	ICT	400/220 kV	PGCIL	13-Apr-19	21:58	13-Apr-19	23:55	Details Awaited	Details Awaited
59	Sonepat 315 MVA ICT 2	ICT	400/220 kV	PGCIL	16-Apr-19	01:28	16-Apr-19	07:10	Over fluxing	Over fluxing
60	Srinagar 315 MVA ICT 1	ICT	400/220 kV	UPCL	1-Jan-19	12:00	1-Jan-19	22:14	Oil level in Y Phase unit of 315 MVA ICT 1 has gone very low	
61	Sultanpur 240 MVA ICT 1	ICT	400/220 kV	UPPTCL	28-Jan-19	09:50	28-Jan-19	11:49	Tripped during BUS changeover	Mal-operation
62	Suratgarh 315 MVA ICT 1	ICT	400/220 kV	RRVPNL	27-Feb-19	03:32	27-Feb-19	07:35	Over fluxing	Over fluxing
					16-Apr-19	21:00	16-Apr-19	23:53	Over fluxing	Over fluxing
63	Suratgarh 315 MVA ICT 2	ICT	400/220 kV	RRVPNL	27-Feb-19	03:32	27-Feb-19	07:05	Over fluxing	Over fluxing
64	Tanda(NTPC) 315 MVA ICT-1	ICT	400/220 kV	NTPC	24-Jun-19	13:13	24-Jun-19	20:12	OSR (Oil Surge Relay) operation	Mal-operation
65	Tanda(NTPC) 315 MVA ICT-2	ICT	400/220 kV	NTPC	21-Jun-19	11:07	21-Jun-19	11:21	CT earth wire found loose, same attended.	O&M issues
66	Unnao 315 MVA ICT 1	ICT	400/220 kV	UPPTCL	27-Feb-19	19:34	27-Feb-19	20:08	Tripped due to Y- LA blast in the HV side of 160 MVA ICT-5	
67	Unnao C 1000 MVA ICT 1	ICT	765/400 kV	UPPTCL	4-Jan-19	13:33	4-Jan-19	18:31	Tripped due to problem in B-PH Relay. Charging attempt has been made @ 18:31Hrs. Again it was tripped at 18:39Hrs. Details of tripping awaited	O&M issues
68	Unnao C 1000 MVA ICT 3	ICT	765/400 kV	UPPTCL	7-Jan-19	03:41	7-Jan-19	13:48	Over fluxing	Over fluxing
					23-Jan-19	04:50	23-Jan-19	06:25	Over fluxing	Over fluxing

Annexure-4

S. No.	Name of the station	Voltage Level (in kV)	Availability of station event logger	Healthiness of Event Logger	Is event logger time synchronised with GPS (Yes/No)	Date of commissioining / rectification of station event logger (in case of non-existence or unhelathy EL)	Remarks

Annexure-5

Format for bus bar protection details by utility for 220kV and above voltage level substations

S.No.	Station name	Voltage	Owner	Bus Bar Scheme	Bus Bar Protection				Local Breaker Back up/Breaker Failure Protection				Remarks
					Make	Type (Electtromechanical/Numerical)	Commmisoned (Y/N)	IN Service (Y/N)	Make	Type (Electtromechanical/Numerical)	Commmisoned (Y/N)	IN Service (Y/N)	
1													
2													
3													
4													
…													
…													
…													