भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

दिनांक: 13.09.2024

सेवा में : संरक्षण उप-समिति के सदस्य (सूची के अनुसार) ।
To: Members of Protection Sub-Committee (As per mail list)

विषय: संरक्षण उप-समिति की 52 वीं बैठक की कार्यसूची |
Subject: Agenda for 52nd Protection Sub-Committee Meeting.

संरक्षण उप-समिति की **52 वीं बैठक, दिनांक 20.09.2024 को 10:30 बजे** से **एनआरपीसी सचिवालय, कटवारिया सराय, नई दिल्ली** में आयोजित की जाएगी | उक्त बैठक की कार्यसूची संलग्न है । यह उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट (http://164.100.60.165/) पर भी उपलब्ध है | कृपया बैठक मे उपस्थिति सुनिश्चित करें ।

The **52nd meeting** of Protection Sub-Committee is scheduled to be held on **20.09.2024** at **10:30 Hrs** at **NRPC Secretariat, Katwaria Sarai, New Delhi**. The agenda for the meeting is attached herewith. The same is also available on NRPC website (http://164.100.60.165/). Kindly make it convenient to attend the same.

Signed by Dharmendra Kumar Meena
Date: 13-09-2024 18:09:23

डी. के. मीणा
अधीक्षण अभियंता (संरक्षण)

Agenda of 52nd Protection Sub-Committee Meeting (20th September, 2024)

Contents

Agenda for 52nd Meeting of Protection Sub-Committee (PSC) of Northern Regional Power Committee

Date and time of meeting	***:***	***20.09.2024 10.30 Hrs.***
Venue	***:***	***NRPC Secretariat, Katwaria Sarai, New Delhi***

A.1. Confirmation of minutes of 51st meeting of Protection Sub-Committee

A.1.1 51th PSC meeting was held on 23.07.2024. Minutes of the meeting were issued vide letter dtd. 17.08.2024. No comment has been received till the date.

Decision required from Forum:

Forum may approve the minutes of 51st PSC meeting.

A.2. Submission of protection performance indices to NRPC Secretariat on monthly basis (agenda by NRPC Secretariat)

A.2.1 *As per clause 15 (6) of IEGC 2023;*

- *Users shall submit the following protection performance indices of previous month to their respective RPC and RLDC on monthly basis for 220 kV and above (132 kV and above in NER) system, which shall be reviewed by the RPC:*

  a) *The **Dependability Index** defined as* $D = Nc/Nc+Nf$

  b) *The **Security Index** defined as* $S = Nc/Nc+Nu$

  c) *The **Reliability Index** defined as* $R = Nc/Nc+Ni$

  where,

  Nc is the number of correct operations at internal power system faults,

  Nf is the number of failures to operate at internal power system faults,

Nu is the number of unwanted operations,

Ni is the number of incorrect operations and is the sum of Nf and Nu

- *Each user shall also submit the reasons for performance indices less than unity of individual element wise protection system to the respective RPC and action plan for corrective measures. The action plan will be followed up regularly in the respective RPC.*

A.2.2 In earlier PSC meeting, it was decided that each utility shall submit the Performance indices of previous month by 7th day of next month.

A.2.3 Accordingly, the status of the indices reported for the months from June-2024 to August-2024 is attached as **Annexure- I.**

A.2.4 Further, based on submitted data by the utilities as on date, the summary of events of June-2024 to August-2024 that caused indices less than unity is also attached as **Annexure-II.** Most of the concerned utilities have submitted the reason for the same and corrective action taken to resolve the related issue. However, who have not submitted, may send at the earliest.

A.2.5 In view of above, it is requested that utilities may submit the performance indices of previous month by 7th day of next month element wise along with the reason for indices less than unity and corrective action taken.

Decision required from Forum:

Members may deliberate on delay from utilities in submission of indices, and action taken in cases where indices are less than one.

A.3. Annual protection audit plan for FY 2024-25 and third-party protection audit plan (agenda by NRPC Secretariat)

Annual Internal Audit Plan:

A.3.1 As per clause 15 of IEGC 2023;

- *Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.*

A.3.2 In the 48th, 49th, 50th and 51st PSC meetings, all utility were requested to submit the annual protection audit plan.

A.3.3 In view of above, some utilities have submitted their annual audit plans (enclosed as **Annexure- III**) and others may submit annual audit plan for FY 2024-25 at the earliest.

Third party protection audit:

A.3.4 As per clause 15 of IEGC 2023:

All users shall also conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years or earlier as advised by the respective RPC.

A.3.5 In view of above, some utilities have submitted their third-party protection audit plans (enclosed as **Annexure-IV)** and other remaining may submit the same at the earliest.

A.3.6 Further, the utilities may update the status of 3rd party protection audit as per the submitted audit plans. Subsequently, the audit reports along with compliance status may be submitted to NRPC Secretariat regularly.

Decision required from Forum:

Utilities may submit annual audit plan for FY 2024-25 & 3rd Party Protection audit plan and comply the same timely. Compliance report for the audited substation may be submitted.

A.4. Compliance of recommendations of protection audit (agenda by NRPC Secretariat)

A.4.1 As per clause 15 of IEGC 2023*;*

- *All users shall conduct internal audit of their protection systems annually, and any shortcomings identified shall be rectified and informed to their respective RPC. The audit report along with action plan for rectification of deficiencies detected, if any, shall be shared with respective RPC for users connected at 220 kV and above (132 kV and above in NER).*

- Utilities have submitted the internal audit report based on the audit done at their substations. The submitted reports are attached as **Annexure-V**. The submitted reports of 3rd Party audit are attached as **Annexure-VI.**

A.4.2 However, compliance of audit recommendations has not been reported to NRPC Secretariat.

A.4.3 Further, the concerned utilities may submit the protection audit report (for audited S/s as per submitted plan) to NRPC Secretariat and may update the compliance status regularly.

Decision required from Forum:

Forum may discuss audit report as well as action taken by utilities on recommendations of audit.

A.5. Violation of protection standard in case of tripping of the Inter-Regional lines of voltage class 220 kV and above (agenda by NRPC Secretariat)

A.5.1 NLDC vide letter dated 21.8.2024 has informed the violation of protection standard in case of tripping of Inter Regional Lines of voltage class 220 kV and above.

A.5.2 As per section 3.e of Grid Standards Regulation of CEA, 2010, fault is to be cleared within the following time:

SI. NO.	Nominal System Voltage in kV rms	Maximum time of fault clearing in msec
1	400	100
2	220	160

A.5.3 NLDC has prepared the list of tripping of Inter Regional Lines of voltage class 220 kV and above, during the month of July 2024 in which violations have been observed. The same is attached as **Annexure-VII.**

A.5.4 It has been observed that fault had not cleared within specified time during these incidents (Annexure-VII).

A.5.5 In view of above, it is requested to the concerned to take appropriate actions/remedial measures to get fault cleared within specified time above-mentioned.

A.5.6 Further, all the utilities are also requested to ensure to ensure the fault clearance of the 220kV and above Inter-Regional lines within specified time to avoid any violation of protection standards.

Decision required from Forum:

Forum may deliberate and direct all utilities to ensure the fault clearance of the 220kV and above Inter-Regional lines within specified time as per Grid Standards Regulation of CEA, 2010.

A.6. Review of Overvoltage protection stage -1 settings across Northern Region (agenda by NLDC)

A.6.1 In the 75th NRPC meeting (held on 28.08.2024), the grid event happened at 13:53 hrs on 17th June 2024 due to tripping of HVDC Champa-Kurukshetra was briefed and recommendation of committee constituted by MoP to analyse the above event, were discussed.

A.6.2 Further, it was directed that overvoltage protection settings of 765kV and 400kV lines of Northern Region may be reviewed and proper grading may be done by the utilities.

A.6.3 The Committee, constituted by MoP recommended the followings for implementing overvoltage Stage-I protection settings:

a. Pick up voltage & time delay setting of Antitheft lines to be kept low with sufficient time gap from other lines at S/s

b. Parallel lines grading to be done such that one line should trip early by setting at low voltage and other line should trip last by keeping setting at high voltage.

c. Highly loaded lines should be given last priority in tripping.

d. Net MVAr relief (based on line charging MVAr & MVAr compensation in line) based on the simulation to be considered for arriving at the priority of line tripping. Lines providing high net MVAr relief to be tripped early.

e. Grading to be done in such a manner that one major incoming and outgoing line shall remain connected after tripping of lines at any node.

f. Protection setting of remote end station of a line need to be coordinated so as

to avoid tripping of line from other end.

g. Drop-off to pick-up ratio of Relays implemented for overvoltage protection shall be more than 99.5%.

A.6.4 In view of above, it is proposed to form a committee including members from Grid India, PowerGrid and other transmission licensee under the aegis of NRPC to finalize the grading which shall be put up in upcoming Protection Sub-Committee meeting for approval.

Decision required from Forum:

Members may please discuss.

A.7. Sensitive Earth Fault relay (to be kept on Alarm Mode only) of 440/220KV 315MVA ICT at 2X600MW Kalisindh Thermal Power Station, Jhalawar (agenda by RVPN)

A.7.1 RVPN vide letter (**Annexure-VIII**) dated 12.8.2024 has intimated that Sensitive Earth Fault protection (SEF) is used on 400/220kV , 315 MVA ICT at Kalisindh with tripping mode, and recently few tripping occurred on 400/220 kV, 315 MVA lCT due to SEF Protection (details attached in the annexure-VIII) causing a large area disturbance i.e. Jhalawar, Bhawanimandi & Aklera.

A.7.2 RVPN has mentioned that 220kV GSS Jhalawar, Bhawanimandi and Aklera supply is presently fed radially through (400/220kV,315MVAICT) Kalisindh Generating Station (KSTPS).

A.7.3 SEF (Sensitive Earth Fault) protection is used in 440/220kV 315MVA ICT with tripping mode having time 1.5Sec. (DT)

A.7.4 Recently few trippings occurred on 440/220kV,315MVA ICT on SEF (Sensitive Earth Fault) because of jumper snapping (Broken Conductor) in 220 KV lines. Due to this, supply of large area having 03 Nos. above 220kV GSS& connected 132kV GSS disturbed.

A.7.5 RVPN has submitted that SEF Protection may operate because of unbalance current due to broken conductor of 220 kV line. The RVPN has enabled broken conductor

protection in 220 & 132 KV lines on alarm mode. In case any alarm observed, the line shall be manually tripped after checking current in all phases.

A.7.6 SEF relay is connected on neutral CT having CT ratio 500/1 and current plug setting is 0.l A (i.e. 45.4 Amp only), TMS- 1.5 Sec. DT mode.

A.7.7 At Kalisindh Thermal Power Station, Jhalawar the backup protection is also available on ICT which may take care of unbalance current in case of jumper snapping or actual phase to earth fault.

A.7.8 Such protection with tripping mode is nowhere used in RVPN Transmission system, this protection (SEF) is also not included in the recent Protection Philosophy.

A.7.9 In view of above, RVPN has requested to disable tripping through SEF relay or increase the setting from existing value & keep it on alarm mode only for 440/220kV,315MVA ICT at Kalisindh Thermal Power Station, Jhalawar.

Decision required from Forum:

Forum may kindly discuss and resolve the issue accordingly.

A.8. Excessive SPS tripping of 2x315 MVA, 400/220kV ICTs at STPS Suratgarh (agenda by RVPN)

A.8.1 RVPN vide letter (**Annexure-IX)** dated 20.8.2024 submitted there was excessive trippings on SPS at 400/220kV 2X315MVA ICTs at STPS, Suratgarh causing a large area disturbance.

A.8.2 SPS of 400/220kV 2x315 MVA ICTs at STPS Suratgarh was approved in the 49th PSC meeting held on 25.1.2024 and has been commissioned on dated 06.05.2024 to meet out the N-l contingency.

A.8.3 Further, RVPN submitted that excessive interruptions (i.e. 39 Nos w.e.f. 18/5/24 to 22/7/24) has been observed due to operation of newly commissioned SPS at STPS Suratgarh since commissioning and a large load approx. 150 MW was affected due to same.

A.8.4 After analysis of trippings, it is observed that these trippings were due to operation of Over Current element of relay either by gradual overloading, poor power factor, poor voltage profile, Traction load etc. or some other reasons instead of "N-l contingency".

A.8.5 RVPN mentioned that after analyzing fault records /DR & discussion with RVUN officials, it is found that the present settings of Over current protection element of numerical relay used for SPS initiation is "Anyone Phase" on full Load current.

A.8.6 In view of above, RVPN has recommended the followings to update in the existing approved SPS scheme of STPS Suratgarh to avoid the power supply disturbance caused by gradual overloading instead of "N-l Contingency".

a) To update the settings of over current element used for SPS start on "ALL Phase" instead of "Any Phase". As in most of the trippings, there is very much unbalance between the phases and the same may cause undesired initiation of SPS.

b) To update the Current Setting (I>) from full load to 125 % of load on each ICT as per thermal capability of each ICT's.

c) To incorporate C.B. status in the tripping circuit of SPS on each 220 KV lines at both ends to avoid unnecessary trippings.

d) To Split the first stage of time delay of 1.0 sec (approx load relief of 150MW) at 220 KV GSS Bhadra by providing timer with 0.85 Sec (with load relief of 20 MW) and with 1.0 Sec (with load relief of rest 140 MW).

A.8.7 Further, RVUNL vide mail dated 06.09.2024 shared the comments on the proposal of RVPN. The same is attached as **Annexure-X.**

Decision required from Forum:

Forum may deliberate on the above proposal and resolve the issue accordingly.

A.9. Status of remedial actions recommended during 51st PSC meeting (agenda by NRLDC)

A.9.1 As per the discussion in 51st PSC meeting, necessary remedial actions were recommended based on the analysis and discussion of the grid events. It is expected that necessary actions would have taken place. In view of the same, constituents are requested to share the status of remedial actions taken. Constituents can email the details via mail to NRLDC and NRPC.

Decision required from Forum:

Members may like to discuss.

A.10. Status of Bus bar protection (agenda by NRLDC)

A.10.1 Clause - 4 in schedule - V of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022 reads as *"Bus bar protection and local breaker backup protection shall be provided in 220kV and higher voltage interconnecting sub- stations as well as in all generating station switchyards".*

A.10.2 During analysis of many grid incidents/disturbances, it has been found that the Busbar protection at the affected substation was not present or non-operational which resulted in considerably increasing both the number of affected elements and fault clearance time. Accordingly, it becomes critical to monitor and keep Busbar protection at all the 220 kV and above voltage level substations healthy and operational.

A.10.3 Continuous follow-ups have been done at OCC & PSC forum to expedite the commissioning of bus bar protection at 220kV & above stations and to ensure their healthiness. On the basis of details received till date, it is observed that status of bus bar protection has been improved however, further improvement is desired.

A.10.4 Constituent wise status of bus bar protection where bus bar protection is either not installed or installed but not operational along with present status as per detail received from constituents is attached as **Annexure-XI**.

Constituents are requested to share the present status of remedial action taken/to be taken regarding commissioning and healthiness of bus bar protection at 220kV & above substations and also expedite the implementation of bus bar protection.

Decision required from Forum:

Members may like to discuss.

A.11. Replacement of electromechanical relays with numerical relays (agenda by NRLDC)

A.11.1 Clause-37.2(c) of IEGC, clause-15(4) of CEA Grid standards and clause-48(4) of CEA Construction Standards 2022 mandates that *''each line or transformer or reactor or any other bay shall be provided with facility for disturbance recording, event logging and time synchronizing equipment''.*

A.11.2 During analysis of grid incidents/disturbances, it has been found that there are few stations where electromechanical relays are still in use and thus disturbance recorders are not available there which accounts for violation of Clause-37.2(c) of IEGC, clause-15(4) of CEA Grid Standards and clause 48(4) CEA Construction Standards 2022.

A.11.3 In addition, clause-3 in part III (Grid Connectivity Standards applicable to Transmission Line and Sub-Station) of Standards for Connectivity to the Grid, 2007 reads as

''*Two main numerical Distance Protection Schemes shall be provided on all the transmission lines of 220 kV and above for all new sub-stations. For existing sub-stations, this shall be implemented in a reasonable time frame''*

A.11.4 It is known that Disturbance recorder (DR) is essential for analysis of grid incidents/disturbances. Its non-availability eventually affects the proper analysis of grid incidents/disturbances and monitoring of protection system.

A.11.5 Continuous follow-ups have been done at OCC & PSC forum. During the meeting, all the constituents/SLDC/STU were requested to review the same in their control area and take expeditious actions to replace electromechanical relays with numerical relays.

A.11.6 Constituent wise details of static/electromechanical type protection relays at their respective substations along with its present status per detail received from constituents is attached as **Annexure-XII**.

A.11.7 Constituents are requested to share the status of remedial action taken/to be taken regarding replacement of static/electromechanical relay with numerical relays at 220kV & above substations and expedite the process of replacement of static/electromechanical relay with numerical relays.

Decision required from Forum:

Members may like to discuss.

A.12. Availability and Standardization of recording instrument (Disturbance recorder and Station Event Logger) (agenda by NRLDC)

A.12.1 As per IEGC clause 17

1) *All users shall keep the recording instruments (disturbance recorder and event logger) in proper working condition.*
2) *The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals.*

A.12.2 IEGC clause 37.2 (c) also mandates the submission of Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) within 24 hrs of the event.

A.12.3 During FTC process, cases of non-availability of station event logger and non-standardisation of recording instruments have been observed.

A.12.4 Data of recording instruments (DR/EL) are very helpful in grid event analysis and is being used in availability verification of transmission lines. Complete and conclusive analysis of any grid event is not possible without these recording instruments and thus their standardisation is very important.

A.12.5 Therefore, availability of disturbance recorder with standardisation, time sync and correct nomenclature and station event logger need to be ensured by users at the station of their respective control area.

A.12.6 Deliberation on this subject was done during 50th and 51st PSC meeting. Details were received from UP (Lucknow & Gorakhpur zone) & Haryana only.

A.12.7 In view of above, all the constituents are requested to share the updated details w.r.t. availability and standardisation of disturbance recorder and event logger at the station of their respective control area in format attached as **Annexure-XIII.**

Decision required from Forum:

Members may like to discuss.

A.13. Analysis of the tripping events occurred during July-2024 to August-2024 and status of remedial action taken (agenda by NRLDC)

a) Frequent elements tripping during August 2024: The following transmission elements were frequently tripping during the month of August'24:

S.	Element Name	No. of	Utility/SLDC

No.		forced outages	
1	220 KV Anta (NT)-Sakatpura(RS) (RS) Ckt-1	4	NTPC/ Rajasthan
2	220 KV Dandhari KalanI(PS)-Ludhiana(PG) (PSTCL) Ckt-2	3	PG/Punjab
3	220 KV NAPP(NP)-Khurja(UP) (UP) Ckt-1	6	NAPP/UP
4	220 KV Saharanpur (PG)-Shamli(UP) (UP) Ckt-1	4	PG/UP
5	400 KV Agra-Unnao (UP) Ckt-1	4	UP
6	400 KV Bhadla-Merta (RS) Ckt-1	5	Rajasthan
7	400 KV Dadri (NT)-Panipat(BB) (PG) Ckt-1	3	NTPC/PG

A.13.1 The complete details are attached at **Annexure-XIV**.

A.13.2 It may be noted that frequent tripping of such elements affects the reliability and security of the grid. Hence, utilities are requested to analyse the root cause of the tripping and share the remedial measures taken/being taken in this respect.

b) Protection related issues in multiple elements tripping and status of remedial measures:

In some of the tripping incidents occurred during July-August 2024, there was some issues related to protection system. List of the such tripping incidents is attached as **Annexure-XV.** Concerned utility are requested to apprise the status of remedial actions to forum.

c) Detailed analysis of multiple elements tripping events:

The list of major tripping events occurred during July-2024 to August-2024 is attached as **Annexure-XVI**. Concerned constituents/utilities are requested to share the detailed analysis of the tripping elements along with status of remedial action taken/to be taken.

d) Frequent operation of breaker failure protection and necessary remedial actions

In many of the events, LBB operations was reported due to failure of breaker opening on protection operation. It shows that there are issues related circuit breaker healthiness. Following multiple elements tripping occurred due to non-opening of breaker and LBB operation:

i) Multiple elements tripping at 400/220kV Lucknow (UP) on 14th July

ii) Multiple elements tripping at 220kV Khodri (Utt) on 19th July
iii) Multiple elements tripping at 400/220kV Patial (PG) on 19th July
iv) Multiple elements tripping at 220kV Nara (UP) on 11th August
v) Multiple elements tripping at 400/220kV Muzaffarnagar (UP) on 21st August
vi) Multiple elements tripping at 220kV Laltokalan(PS) on 22nd August

In view of above, constituents are requested to ensure proper maintenance of circuit breakers and their associated equipment's.

Decision required from Forum:

Members may like to discuss.

A.14. Corrective action for healthiness of 500kV Mundra-Mahindergarh SPS (agenda by NRLDC)

A.14.1 On 17th May 2024 on outage of both pole (carrying total ~1500MW), SPS of 500kV HVDC Mundra-Mahindergarh inter regional link didn't operate. This issue was discussed during 51st PSC meeting and ADANI was requested to share the details w.r.t. SPS operation during the meeting.

A.14.2 Further, NRLDC in coordination with NLDC conducted an online discussion meeting with concerned stakeholders (SLDCs, ADANI, POWERGRID) on 12th August 2024, for further remedial actions required to make this SPS healthy.

A.14.3 Following actions were decided during the meeting:

i. POWERGRID, ADANI and concerned states were requested to identify the issue in communication links and take expeditious actions to make the all the communication link healthy. POWERGRID & ADANI shall review the healthiness of SPS system at different load centres and communication path between them in coordination with the SLDCs.

ii. States were requested to go through the details of load feeders mentioned in SPS document and share the changes / modifications as per present scenario and share the inputs w.r.t. unavailability in identified load feeders and load shedding. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load relief through respective feeders.

iii. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of avail-

ability of communication path for incorporation of proposed revised/additional feeders.

A.14.4 Load end details received from UP, Haryana, Rajasthan & Delhi. Details are attached as **Annexure-XVII**. Details yet to be received from Punjab.

A.14.5 Regarding communication network and hardware system, ADANI has submitted the status of their healthiness. As per details submitted, counter status was found OFF at Alwar, Ratangarh, Gobindgarh, Malerkotla, Bamnauli, Shamli and Dhanonda.

A.14.6 NLDC has also submitted that the rearrangement of loads in SPS of HVDC Mundra-Mahendragarh and the viability of OPGW network for transmission to SPS signals to identified loads to be proposed by PowerGrid.

A.14.7 In view of above, POWERGRID and ADANI are requested to share the status of remedial action taken / planned to be taken. Desired remedial actions need to be expedited.

Decision required from Forum:

Members may like to discuss.

A.15. Implementation and updation of Protection setting Database (agenda by NRPC Secretariat)

A.15.1 As per clause 14(3) of IEGC, 2023

RPCs shall:

(a) maintain a centralized database and update the same on periodic basis in respect of their respective region containing details of relay settings for grid elements connected to 220 kV and above (132 kV and above in NER). RLDCs shall also maintain such database

(b) ……

(c) provide the database access to CTU and NLDC and to all users, RLDC, SLDCs, and STUs of the respective regions. The database shall have different access rights for different users.

A.15.2 Further as per clause 14(4) of IEGC, 2023:

(4) The changes in the network and protection settings of grid elements connected to 220kV and above (132 kV and above in NER) shall be informed to RPCs by CTU

and STUs, as the case may be.

A.15.3 In view of above, all the utilities have to submit the protection settings of their elements connected to 220kV and above. Further, the revisions in the settings need to updated in the database.

A.15.4 However, reporting of protection settings is not regular by utilities. In view of above, it is requested that all utilities may submit the protection settings of their elements connected to 220kV and above. Revision of settings may also be intimated in order to update the protection setting database.

Decision required from Forum:

Members may like to discuss.

A.16. Review and uniformity of df/dt (ROCOF) protection philosophy in Northern Region (agenda by NLDC)

A.16.1 Multiple incidents of load shedding on df/dt (ROCOF) protection operation have been reported during recent past. Major operations were reported from Punjab control area. Delhi, Rajasthan & UP have also reported load shedding on df/dt operation during some of the incidents. Incidents during which df/dt operation have reported is attached as **Annexure-XVIII.**

A.16.2 In view of frequent incidents of tripping of distribution feeders on df/dt operation, analysis and review of df/dt operation is necessary. Communication has already been sent to SLDCs via mail to provide details of stage wise quantum of load relief on df/dt operation and protection setting adopted (average cycle, time delay etc.). Partial details received from Delhi and Punjab.

A.16.3 SLDCs are requested to share the adopted philosophy of df/dt protection and confirm whether uniform philosophy has been adopted throughout the state or not.

A.16.4 Details may be shared at the earliest so that analysis and review of df/dt operation and its philosophy may be done.

A.16.5 Further review of df/dt protection setting also need to be done to ensure its uniformity and to avoid undesired operation and load loss. Non triggering of DR results difficulty in analysis of tripping.

Decision required from Forum:

Members may like to discuss.

A.17. Provisional protection clearance during FTC in July-August-September 2024 (agenda by NRLDC)

A.17.1 Provisional protection clearance during FTC in July-August-September 2024 allowed by NRLDC is attached as **Annexure-XIX.**

Decision required from Forum:

Concerned Utilities may share agenda for approval of PSC forum and may intimate NRPC Secretariat for updation of database.

A.18. Recommendations of the committee to analyse the grid event happened at 13:53 hrs on 17th June 2024 due to tripping of HVDC Champa-Kurukshetra (agenda by NRPC Secretariat)

A.18.1 On 17th June 2024, a grid event occurred at 13:53 hours in the Northern Region, leading to a substantial load reduction of approximately 16.5 GW. This event started with the tripping of both bipoles of the +/-800 kV HVDC Champa (WR) – Kurukshetra (NR) link, which was transferring 4500 MW of power from the Western Region (WR) to the Northern Region (NR). The tripping of this HVDC link triggered a series of events. There was a sudden voltage drop across the stations in the Northern region which resulted in a significant load drop of around 16.5 GW in the Northern region. There was simultaneous reduction of around 2800 MW of RE-based generation in the Rajasthan RE complex. There was also trippings of conventional generating units leading to a generation loss of 3909 MW at the all-India level. The significantly higher load loss resulted in the rise in frequency of the Indian power system from 50.03 Hz to 50.68 Hz. The load drop resulted in a rise in the voltages of stations in the Northern region. This high voltage resulted in the tripping of 18 nos. of EHVAC lines in the Northern Region on over-voltage protection. The power system was normalised after the revival of all the poles of HVDC Champa-Kurukshetra by 15:51 Hrs.

A.18.2 Ministry of Power vide its order no. 6/3/2024-Trans dated 25.06.2024 constituted a Committee under the Chairmanship of Member (GO&D), CEA to analyse the above-mentioned issues during which about 16.5 GW of consumer load in Northern Region got interrupted for a brief period. The composition of the Committee is given as under:

(i) Member (GO&D), CEA Chairman
(ii) Director (SO), GRID-INDIA Member
(iii) Deputy Chief Operating Officer, CTUIL Member
(iv) Executive Director, NTAMC (POWERGRID) Member
(v) Professor, Electrical Engineering, IIT Delhi Member
(vi) Member Secretary, NRPC Member Convener

A.18.3 Accordingly, the Committee conducted five meetings and detailed analysis of the grid event was carried out by teams of CEA, IIT-Delhi, NRPC, NLDC, NRLDC, POWERGRID, SLDC Delhi & DISCOMs of Northern Region States and the Report was finalized and submitted its report to MoP on 24.7.2024.

A.18.4 The committee has found some major observations, the brief of which are as below-

(i) **Outage of all four poles of HVDC Champa - Kurukshetra link (N-4 scenario)-** There was tripping of +/-800 kV HVDC Champa-Kurukshetra link (4500 MW) triggered load loss event. Localized storm caused jumper swing and flashover. It Redundancy in DMR has also been observed. Over 30 trippings of HVDC link from Jan-Jun 2024. Detailed fault analysis and remediation needed to enhance reliability.

(ii) **Cause of Voltage dip and high Reactive Power Drawl by loads: -** There was significant voltage drops across Northern Region and Reactive power absorption increased, exacerbating voltage issues.

(iii) Analysis of behavior of Load during the event: Voltage reduction caused stalling of induction motors: total 16.5 GW load Reduced in NR. Stalling of motors at comparatively higher voltages (~0.85 - 0.9 p.u. voltage).

(iv) **Impact on Conventional and Renewable Energy Generation:** Approximately 2800 MW of RE generation was reduced with around 1500 MW recovering within 4 minutes. 16 Conventional Generating Units tripped.

(v) Reactive Power Support from Generating Units in NR: Heavy reactive power drawl by loads were observed. Many RE plants have opposite response.

(vi) High Voltage Scenario: Total 18 (no.) of transmission lines (765kV and 400kV) tripped on OV, causing a partial blackout at the 765/400kV Aligarh (PG) S/s.

(vii) Frequency Response by Generating Units: More than 50% capacity of the inter-state generators and more than 85% capacity of the intrastate generators exhibited inadequate governor response during the event.

(viii) Reactive Power Management: The event highlighted the need for effective reactive power management. Heavy reactive power drawl was observed, leading to further voltage reductions.

(ix) Information sharing and Co-ordination: Timely report submissions and communication are essential.

A.18.5 The committee recommended the following remedial measures for avoiding the recurrence of such grid event:

(i) **Reactive Power Management (Dynamic/Static) by STU and DISCOMs:** In order to maintain voltage stability, reactive power support is desired from all grid

connected utilities without leaning over each other so as to ensure minimum reactive exchange at different voltage levels.

(ii) **Planning for dynamic reactive power sources near load centers based on load composition:** Adequate static/dynamic reactive devices may be planned at the distribution level near loads so that there is minimum drawl from reactive sources at the transmission (STU) level. The dynamic reactive power sources shall be commissioned near load centre stations based on the composition and quantum of individual load type.

(iii) **Enhance reliability of HVDC Link:** Committee recommended POWERGRID to the followings-

- **a.** Review of protection schemes to avoid frequent outages.
- **b.** Review of transmission line design including cross arms, jumpers, etc.
- **c.** Design of filter switching logic to support system voltage.

(iv) Implementation of Overvoltage protection setting: followings were recommended for implementing overvoltage Stage-I protection settings:

- **a.** Pick up voltage & time delay setting of Antitheft lines to be kept low with sufficient time gap from other lines at S/s
- **b.** Parallel lines grading to be done such that one line should trip early by setting at low voltage and other line should trip last by keeping setting at high voltage.
- **c.** Highly loaded lines should be given last priority in tripping.
- **d.** Net MVAr relief (based on line charging MVAr & MVAr compensation in line) based on the simulation to be considered for arriving at the priority of line tripping. Lines providing high net MVAr relief to be tripped early.
- **e.** Grading to be done in such a manner that one major incoming and outgoing line shall remain connected after tripping of lines at any node.
- **f.** Protection setting of remote end station of a line need to be coordinated so as to avoid tripping of line from other end.
- **g.** Drop-off to pick-up ratio of Relays implemented for overvoltage protection shall be more than 99.5%.

(v) Frequency Response by Generating Units as per IEGC 2023: It was recommended that the performance of generating units where inadequate primary response was observed shall be discussed at RPC level.

(vi) **Compliance of CEA Standards by Renewable Generating Plants:** RE generators must comply the CEA Standards. Committee recommended the followings-

- **a.** Protection settings of inverters/WTG shall be coordinated in such a way that it accounts for the voltage rise/drop between inverter/WTG terminal & Point of interconnection (POI). Overvoltage /undervoltage trip settings should be configured accordingly.
- **b.** The reactive power controller settings (droop, deadband, power factor, operating modes) in inverters/WTGs should be configurable and shall be set in consultation with the respective load dispatch centre.
- **c.** The protection settings of elements in collector system viz. transformers, cables etc. shall such that it allows RE plants to ensure the compliance of CEA standards at POI.
- **d.** RE plants shall ensure that the event records shall be shared with SLDC/ RLDC within the stipulated time for event analysis. All such data shall be retained in a retrievable format in a suitable archival system.

(vii) Retain of Conventional generators near load centers for providing grid support during such events: The presence of thermal generators near the load centres may significantly improve the voltage profile and can provide dynamic reactive power support in case of contingencies improving the stability.

(viii) Compliance of Standards by Load Serving Machines: The stalling of motors at high voltage (0.85-0.9 pu) is to be investigated and the motors serving load need to be compliant with IS/IEC.

(ix) **Amendments in Existing Regulations:** For ensuring reliable operation, provisions related to different emerging types of loads (Electrolysers etc.) may be added in the existing CEA standards.

Decision required from Forum:

Forum may discuss and direct the concerned to take appropriate actions based on the recommendations of Committee.

*****

Members of Protection Sub-Committee (FY 24-25)

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*	*Organizations from where nominations are not received for PSC, memebers of NRPC have been mentioned. Nomination for PSC forum may be sent at the earliest.*		

Annexure-I

Status of perfomance indices report of June 2024		
S. No.	**Utility**	**Status of Protection Performance indices**
1	PGCIL	Received (NR-2,3)
2	NTPC	Received (Unchahar, Tanda, Dadri, Koldam)
3	BBMB	Received (Transmission)
4	THDC	Received (Tehri, Koteshwar HEP)
5	SJVN	Received
6	NHPC	Received
7	NPCIL	Received (RAP- 1-2, 5-6), NAP (1-2)
8	DTL	Received
9	HVPNL	Received
10	RRVPNL	Received
11	UPPTCL	Received
12	PTCUL	Received
13	PSTCL	Received
14	HPPTCL	Received
15	IPGCL	Receivied (PPCL)
16	HPGCL	Not Recevied
17	RRVUNL	Received
18	UPRVUNL	Not Received
19	UJVNL	Received (Dharashu, Uttrakashi, Khodri, chibro, vyasi)
20	HPPCL	Not Recevied
21	PSPCL	Not Recevied
22	HPSEBL	Not Recevied
23	Prayagraj Power Generation Co. Ltd.	Received
24	Aravali Power Company Pvt. Ltd	Received
25	Apraava Energy Private Limited	Received
26	Talwandi Sabo Power Ltd.	Not Recevied
27	Nabha Power Limited	Received
28	Lanco Anpara Power Ltd	Not Recevied
29	Rosa Power Supply Company Ltd	Received
30	Lalitpur Power Generation Company Ltd	Received
31	MEJA Urja Nigam Ltd.	Not Recevied
32	Adani Power Rajasthan Limited	Received (Kawai)
33	JSW Energy Ltd. (KWHEP)	Not Recevied
34	AESL	Received (ATIL, MTSCL, GTL)
35	Tata Power Renewable Energy Ltd.	Received
36	UT of J&K	Not Recevied
37	UT of Ladakh	Not Recevied
38	UT of Chandigarh	Not Recevied
39	ATIL, BKTL, FBTL	Not Recevied
40	INDIGRID	Received
41	POWERLINK	Not Recevied
42	ADHPL	Received
43	Sekura Energy Limited	Not Recevied
44	WUPPTCL	Received
45	SEUPPTCL	Not Recevied
46	Vishnuprayag Hydro Electric Plant (J.P.)	Not Recevied
47	Alaknanda Hydro Electric Plant (GVK)	Not Recevied

Status of perfomance indices report of July 2024		
S. No.	**Utility**	**Status of Protection Performance indices**
1	PGCIL	Received (NR-2)
2	NTPC	Received (Dadri, Koldam)
3	BBMB	Received (Transmission)
4	THDC	Received (Tehri, Koteshwar HEP)
5	SJVN	Received (Rampur)
6	NHPC	Received
7	NPCIL	Received (RAP- 1-6)
8	DTL	Received
9	HVPNL	Received
10	RRVPNL	Received
11	UPPTCL	Received
12	PTCUL	Received
13	PSTCL	Received
14	HPPTCL	Received
15	IPGCL	Received (PPCL)
16	HPGCL	Not Recevied
17	RRVUNL	Received
18	UPRVUNL	Received (DTPS-Anpara)
19	UJVNL	Received (Dharashu, Uttrakashi)
20	HPPCL	Not Recevied
21	PSPCL	Not Recevied
22	HPSEBL	Not Recevied
23	Prayagraj Power Generation Co. Ltd.	Received
24	Aravali Power Company Pvt. Ltd	Received
25	Apraava Energy Private Limited	Received
26	Talwandi Sabo Power Ltd.	Received
27	Nabha Power Limited	Received
28	Lanco Anpara Power Ltd	Not Recevied
29	Rosa Power Supply Company Ltd	Received
30	Lalitpur Power Generation Company Ltd	Received
31	MEJA Urja Nigam Ltd.	Not Recevied
32	Adani Power Rajasthan Limited	Received (Kawai)
33	JSW Energy Ltd. (KWHEP)	Not Recevied
34	AESL	Received (ATIL, OCBTL)
35	Tata Power Renewable Energy Ltd.	Received (Sourya, TPGEL, TPREL)
36	UT of J&K	Not Recevied
37	UT of Ladakh	Not Recevied
38	UT of Chandigarh	Not Recevied
39	ATIL, BKTL, FBTL	Received
40	INDIGRID	Received
41	POWERLINK	Not Recevied
42	ADHPL	Received
43	Sekura Energy Limited	Not Recevied
44	WUPPTCL	Received
45	SEUPPTCL	Not Recevied
46	Vishnuprayag Hydro Electric Plant (J.P.)	Not Recevied
47	Alaknanda Hydro Electric Plant (GVK)	Not Recevied

Status of perfomance indices report of August 2024		
S. No.	**Utility**	**Status of Protection Performance indices**
1	PGCIL	Received (NR-2)
2	NTPC	Received (Dadri, Unchahar)
3	BBMB	Not Recevied
4	THDC	Received (Tehri HEP)
5	SJVN	Received (Rampur)
6	NHPC	Received
7	NPCIL	Received (RAP- 1-6), NAP-(1-2)
8	DTL	Received
9	HVPNL	Received
10	RRVPNL	Received
11	UPPTCL	Received
12	PTCUL	Received
13	PSTCL	Not Recevied
14	HPPTCL	Not Recevied
15	IPGCL	Received (PPCL)
16	HPGCL	Not Recevied
17	RRVUNL	Received
18	UPRVUNL	Received (DTPS-Anpara)
19	UJVNL	Received (Dharashu, Uttrakashi)
20	HPPCL	Not Recevied
21	PSPCL	Received (GGSSTPS)
22	HPSEBL	Not Recevied
23	Prayagraj Power Generation Co. Ltd.	Not Recevied
24	Aravali Power Company Pvt. Ltd	Received
25	Apraava Energy Private Limited	Received
26	Talwandi Sabo Power Ltd.	Received
27	Nabha Power Limited	Received
28	Lanco Anpara Power Ltd	Not Recevied
29	Rosa Power Supply Company Ltd	Received
30	Lalitpur Power Generation Company Ltd	Received
31	MEJA Urja Nigam Ltd.	Not Recevied
32	Adani Power Rajasthan Limited	Received (Kawai)
33	JSW Energy Ltd. (KWHEP)	Not Recevied
34	AESL	Not Recevied
35	Tata Power Renewable Energy Ltd.	Received (Sourya, TPGEL, TPREL)
36	UT of J&K	Not Recevied
37	UT of Ladakh	Not Recevied
38	UT of Chandigarh	Not Recevied
39	ATIL, BKTL, FBTL	Received (ATIL, BKTL)
40	INDIGRID	Not Recevied
41	POWERLINK	Not Recevied
42	ADHPL	Received
43	Sekura Energy Limited	Not Recevied
44	WUPPTCL	Received
45	SEUPPTCL	Not Recevied
46	Vishnuprayag Hydro Electric Plant (J.P.)	Not Recevied
47	Alaknanda Hydro Electric Plant (GVK)	Not Recevied

Reasons for Performance Indices less than Unity- June 2024

ATIL

Case-1 500kV Mundra - Mohindergarh HVDC Pole-2 tripped on 14.6.2024

No. of unwanted operation -1

No. of correct operation -1

Reason for indices less than unity - Malfunction of Pole-2 Current converter to C&P measuring system at Mahendragarh end

Corrective action taken- Current converter replaced.

NTPC (Unchahar)

Case-1 Tripping of line

No. of unwanted operation -1

No. of correct operation -6

No. of failures to operate-0

Reason for indices less than unity - Auto reclose block issued.

Corrective action taken- Distance protection relay shall be tested in next shutdown for the actual cause

Case-2 Tripping of GT

No. of unwanted operation -1

No. of correct operation -5

No. of failures to operate-0

Reason for indices less than unity - Rain water ingress inside GCB panel leading to pre synch earth fault protection.

Corrective action taken- Root cause was found and eliminated by Civil and EMD.

POWERGRID (NR-2)

Case-1 Tripping of SAMBA 315MVA ICT-III on 8.6.2024

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity - Due to maloperation of Sukrut make PRV caused by failure of microswitch make Jai Balaji

Corrective action taken- Defective microswitch replaced with spare**.**

Case-2 Tripping of LUDHIANA -400/+600 MVAR SVC

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity – Tripping due to flashover in TSC branch caused by entry of CAT

Corrective action taken- Proper sealing of SVC yard done.

Case-3 Tripping of LUDHIANA -400/+600 MVAR SVC

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity – SVC tripped on operation of TSC (Thyristor Switched Capacitor) current supervision protection caused by cable nsulation failure at gland point.

Corrective action taken- IR measurement for all and other cables done. Proper glanding of cable done.

PPGCL

Case-1 Tripping of 765kV 1500MVA ICT-1 at BARA

No. of unwanted operation -1

No. of correct operation -1

No. of failures to operate-0

Reason for indices less than unity- Tripped due to mall operation of master relay. New future FGD bay work is going on. At fault time, some interruption came in dc circuit.

Corrective action taken- Isolated the FGD dc circuit from running 765kV and 400kV switchyard.

RVPN

Case-1 400/220 Kv 500 MVA ICT-II AT 400 KV GSS KANKANI on 16.06.2024

No. of Unwanted operation – 1

Reason for indices less than unity – DC fault due to control wiring damaged, wiring replaced with DC change over relay

Corrective Action taken – Control wiring replaced. Damaged DC change over relay also replaced.

Case-2 220 KV Sakatpura- Dahara Line on 21.06.2024

No. of Unwanted operation – 1

Reason for indices less than unity - Due to VT selection relay problem

Corrective Action taken – VT selection relay problem rectified**.**

Case-3 220 KV JHALAWAR-AKLERA Line on 24.06.2024

No. of Unwanted operation – 1

Reason for indices less than unity – CB tripped without any relay signal.

Corrective Action taken – CB problem rectified.

Case-4 220 KV Saurya Urja Line-I at 400KV GSS Bhadla on 30.06.2024

No. of Unwanted operation – 1

Reason for indices less than unity – Relay panel caught fire following relay are burnt Dist Prot. M1, 195 A, 295 A, 86 A. No reason of fire eruption established.

Corrective Action taken – New panel arranged and will soon be commissioning.

Case-5 220/132 KV, 100 MVA TRF BHEL MAKE at 220 KV GSS BHAWAD on 02.06.2024 and 24.06.2024

No. of Unwanted operation – 2

Reason for indices less than unity – LBB relay automatically went to default setting values.

Corrective Action taken – Relay settings revised on dated 24.06.2024.

Case-6 220 /132 KV, 160MVA BHEL Make, 220 KV GSS HINDAUN on 06.06.2024 and

220/132 KV 100MVA, Tr. No. 1 at 220KV GSS SAWA on dated 07.06.2024

No. of Unwanted operation – 2

Reason for indices less than unity – Water logging in relay terminal box during heavy rain.

Corrective Action taken – Reay terminal box cleaned, dried and sealed.

Case-7 220/132 kV, 100 MVA transformer-II at 220 KV GSS RVPNL Lalsot on 10.06.2024

No. of Unwanted operation – 1

Reason for indices less than unity – High impedance differential protection relay defective

Corrective Action taken – High Impedance differential protection relay replaced.

SJVN

Case-1 Tripping of Generating unit-2 at Rampur HPS on 30.6.2024

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Temperature measuring instrument mal-operated.

Corrective Action taken- The temperature measuring instrument replaced with the new one.

TATA POWER SOURYA LIMITED, BANDERWALA

Case-1 Tripping of 220/33KV 125MVA ICT-3 AT BTPSL_SL_BIK2_PG

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Tripped due to inadvertent setting of Definite time earth fault remain at lower side.

Corrective Action taken- Not received from utility.

NHPC

Case-1 Tripping of Chamera-I-Chamera-II Line

No. of unwanted operation -1

No. of correct operation -1

No. of failures to operate-0

Reason for indices less than unity- Over Current Protection Operated.

Corrective Action taken- Not received from utility.

DTL

Case-1 Tripping of 400kV Mundka-Bawana-1,2

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Tripped due to Main-2 relay seen the fault of other line in its zone-1.

Corrective Action taken- The issue was communicated to GE and the corrective action taken as per the recommendation of OEM.

UPPTCL

Case-1 Tripping of 315MVA ICT-2,3 at 400kV S/s Bareilly, 220kV feeders from Bareilly to Dohana-I, Pilibhit-2, C B Ganj-I and 220kV Bus coupler (Lucknow Zone)

No. of unwanted operation -0

No. of incorrect operation -1 for each element

No. of failures to operate-0

Reason for indices less than unity- Tripping due to mal operation of LBB protection of Pilibhit-2 feeder.

Corrective Action taken- Fault has been corrected.

Case-2 Tripping of 220kV Khurja-Dadri line on 19.06.2024 (Meerut Zone)

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Line was mistakenly tripped at Khurja end by firm engineer during checking of main -2 relay.

Corrective action taken- Not received from utility.

Case-3 Tripping of 220kV Khurja NAP line on 14.06.2024 (Meerut Zone)

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Line tripped at Khurja end due to erratic force 3 phase trip generated on distance protection (due to wrong PSL).

Corrective action taken- Problem in the PSL has been rectified.

Case-4 Tripping pf 160MVA 220/132kV ICT-III at 220kV Baraut Substation (Meerut Zone)

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Erratic tripping due to settings of REF relay was wrongly programmed as 2 winding Transformer instead of Auto Transformer.

Corrective action taken- Settings have been corrected as Auto transformer on 14.06.2024.

Case-5 Tripping of 500MVA ICT-II at 400kV Substation Motiram Adda (Gorakhpur Zone)

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Tripping due to cable fault and polarity issue in NCT.

Corrective action taken- Fault removed.

Case-6 Tripping of 160MVA ICT- I at 220kV Substation Maharajganj (Gorakhpur Zone)

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Tripping due to wiring problem in relay panel.

Corrective action taken- Fault rectified.

Case-7 Tripping of 220kV Kirawali-Sikandra line (Agra Zone)

No. of unwanted operation -1

No. of correct operation -1

No. of failures to operate-0

Reason for indices less than unity- Tripping due to malfunctioning of PLCC panel.

Corrective action taken- Fault rectified.

Case-8 Tripping of 220kV Kirawali-PGCIL line (Agra Zone)

No. of unwanted operation -2

No. of correct operation -3

No. of failures to operate-0

Reason for indices less than unity- Tripping due to malfunctioning of PLCC panel.

Corrective action taken- Fault rectified.

Case-9 Several trippings at 400kV Sarnath Substation -400/220 KV 315 MVA ICT-III, 220 KV Beerapatti TSS Feeder, 220/132 KV 160 MVA TF-I, 220/132 KV 200 MVA TF-I, 220/132 KV 160 MVA TF-III (Prayagraj Zone)

No. of unwanted operation -1 for each element

No. of correct operation -0 for each element

No. of failures to operate-0 for each element

Reason for indices less than unity- Due to wrong operation of PRV of 500 MVA ICT-II because of cable damage Protection

Corrective action taken- Fault rectified.

PSTCL

Case-1 Tripping of 220 kV Bassi Pathana-G-1 ckt

No. of unwanted operation -2

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Maloperation of relay.

Corrective action taken- Direction set right on standalone E/F relay at Bassi Pathana and also settings revised at Gobindgarh end.

Case-2 Tripping of 220 kV Sandhwan-Muktsar(220) ckt.

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Maloperation of relay (tripped at Sandhawan end on zone-4 while no tripping at Muktsar end).

Corrective action taken- Relay will be tested after paddy season.

Case-3 Tripping of 100 MVA, 220/66 kV Power Transformer-6 at 220kV /s Badal

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Due to storm & wind- Rain water ingress in CT Marshalling box.

Corrective action taken- It has been covered now.

Case-4 Tripping of 220 kV Dhandari-Jamalpur ckt.I at Dhandari end only

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- DT received from Jamalpur BBMB end. Mal-operation.

Corrective action taken- To be investigated by Communication wing.

Case-5 Tripping of 220 kV Pakhowal-PGCIL ckt

No. of unwanted operation -0

No. of correct operation -0

No. of failures to operate-0

No. of incorrect operation-1

Reason for indices less than unity- Carrier not healthy at PGCIL end.

Corrective action taken- PGCIL may apprise. Not received from utility.

Case-6 Tripping of 315 MVA, 400/220 kV ICT-2 at 400kV S/s Makhu

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Due to cut on Control cable entering the Bucchholz relay- maloperation.

Corrective action taken- Defective part of control cable removed.

Case-7 Tripping of 220 kV Dasuya-Alawalpur ckt in zone -1 at Alawalpur and zone-2 at Dasuya

No. of unwanted operation -0

No. of correct operation -2

No. of failures to operate-0

O. of incorrect operation-1

Reason for indices less than unity- In spite of CR relay issued Z-2 trip.

Corrective action taken- Issue of relay configuration has been set right.

Case-8 Tripping of 100 MVA, 220/66 kV Power Transformer-3 at 220kV S/s Nabha

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- WTI tripping. Maloperation- no reason found.

Corrective action taken-

Case-9 Tripping of 160 MVA, 220/66 kV Power Transformer-4 at 220kV S/s Nabha

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Mal-operation, Due to ingress of moisture in OLTC Buchholz.

Corrective action taken- Relay has been covered.

Case-10 Tripping of 100 MVA, 220/66 kV Power Transformer-3 at 220kV S/s Udhoke

No. of unwanted operation -3

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Control cable damaged and NCT connections found loose.

Corrective action taken- Control cable changed and NCT connections tightened.

Case-11 Tripping of 220/66 kV, 160 MVA Power Transformer-4 at 220kV S/s Chogawan

No. of unwanted operation -1

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- CTs were replaced and accordingly differential protection settings were not updated.

Corrective action taken- Settings have been changed.

Case-12 Tripping of 220 kV Butari-Railway ckt, 220 kV Butari-Verpal ckt, 220 kV Butari-BBMB ckt, 100 MVA,220/66 kV P.T/F T-1, 100 MVA,220/132 kV P.T/F T-5, 100 MVA,220/66 kV P.T/F T-4

No. of unwanted operation -1 for each element

No. of correct operation -0

No. of failures to operate-0

Reason for indices less than unity- Mal-operation of BBPS Relay.

Corrective action taken- Not received from utility.

Case-13 Incorrect operations due to unhealthiness of carrier

Lines subjected- 220 kV Ferozepur Road - Ladhowal ckt, 220 kV Patti-Verpal ckt, 220 kV Numehal-Nakodar ckt, 220 kV Mahilpur-Bhakra ckt.II, 220 kV G-1-RTP ckt.II, 220 kV Sahnewal-PGCIL ckt, 220 kV Ablowal-Passiana ckt, 220 kV Malerkotla-Sandaur ckt.II, 220 kV Dhuri-Dhuri(400) ckt, 220 kV Doraha-PGCIL ckt, 220 kV Ghulal-Sahnewal ckt, 220 kV Badhni-PGCIL ckt

Due to unhealthiness of carrier, the concerned ends have been getting tripped in zone-2 leading to delayed clearance.

Corrective action taken- Not received from utility.

Reasons for Performance Indices less than Unity- July 2024

RVPN

Case-1 220 KV Dausa - Mandawar Line AT 220 KV GSS DAUSA on 03.07.2024

No. of unwanted operation -1

Reason for indices less than unity - VT supply failed due to problem in VT selection relay.

Corrective action taken- VT selection relay repaired and problem rectified.

Case-2 220 KV KUCHAMAN-MAKRANA LINE at 220 KV GSS Kuchaman on 06.07.2024

No. of unwanted operation -1

Reason for indices less than unity – Tripping due to DC problem at 220 KV GSS Kuchaman.

Corrective action taken- DC problem rectified.

Case-3 Multiple trippings of 220 KV lines at Ratangarh on 08.07.2024

220kV Sri Dungargarh-Ratangarh Line - No. of unwanted operation -2

220 KV RATANGARH- KHETRI-I- No. of unwanted operation -2

220 KV RATANGARH- KHETRI-II- No. of unwanted operation -2

Reason for indices less than unity – Tripping due to DC problem due to heavy rain at 400/220 KV GSS Ratangarh.

Corrective action taken- DC problem rectified.

Case-4 220KV Dausa - PGCIL Bassi Ckt-I Line at 220KV GSS Dausa on 24.07.2024

No. of unwanted operation -1

Reason for indices less than unity – CB tripped at Dausa end due to heavy air leakage from Pneumatic Drive of Y-Ph CB pole

Corrective action taken- CB repaired.

Case-5 220Kv Bikaner-Gajner-I line at 400 KV GSS Bikaner on 26.07.2024

No. of unwanted operation -1

Reason for indices less than unity – May be a DC fault, exact reason could not be identified.

Corrective action taken- Under observation.

Case-6 400 kV Bikaner-Merta Line at 400 KV GSS Bikaner on 22.07.2024

No. of unwanted operation -1

Reason for indices less than unity – May be a DC fault, exact reason could not be identified.

Corrective action taken- Under observation.

Case-7 220/132 KV 160 MVA Transformer-I at 220 KV GSS Bhiwadi on 04.07.2024

No. of unwanted operation -1

Reason for indices less than unity – Water logging in relay terminal box during heavy rain.

Corrective action taken- Reay terminal box cleaned, dried and sealed.

Case-8 220/132 KV, 160 MVA Transformer at 220 KV GSS RAWATSAR on 14.07.2024
No. of unwanted operation -1

Reason for indices less than unity – Water logging in relay terminal box during heavy rain.

Corrective action taken- Reay terminal box cleaned, dried and sealed.

Case-9 220/132KV 100 MVA ICT-I AT 220 KV GSS IG NAGAR on dated 25.07.2024

No. of unwanted operation -1

Reason for indices less than unity – Water logging in relay terminal box during heavy rain.

Corrective action taken- Reay terminal box cleaned, dried and sealed.

Case-10 220/132 KV, 100 MVA Transformer-I at 220KV GSS DECHU on 02.07.2024

No. of unwanted operation -1

Reason for indices less than unity – High impedance differential protection relay defective.

Corrective action taken- High Impedance differential protection relay replaced.

Case-11 220/132KV, 100 MVA Transformer-II AREVA at 220kV GSS GULABPURA on 16.07.2024

No. of unwanted operation -1

Reason for indices less than unity – High impedance differential protection relay defective.

Corrective action taken- High Impedance differential protection relay shall be replaced soon.

Case-12 220kV 160MVA Transformer-II at 220KV GSS GAJNER on 26.07.2024

No. of unwanted operation -1

Reason for indices less than unity – DC Fault due to heavy rain.

Corrective action taken- DC fault rectified.

RRVUNL

Case-1 Tripping of GT-1 at 220kV KSTPS kota on 19.7.2024

No. of unwanted operation -1

No. of correct operation-3

No. of failure to operate-0

Reason for indices less than unity – tripped due to malfunctioning of UAT Protection Relay RET650.

Corrective action taken- The faulty Relay has been taken out of circuit and is being sent to the OEM, M/s. HIEL (Formerly M/s. ABB India Ltd.) for analysis of the same.

SJVN

Case-1 Tripping of 68.67 MW generating unit no. 6 of Rampur HPS on 07.07.2024.

Number of unwanted operations = 1

Reason for indices less than unity – High TGB vibration above permissible limit. High TGB vibration occurred due to labyrinth seal damaged at runner.

Corrective action taken– The same was replaced.

UPPTCL

Case-1 Tripping of 220kV Kanduni-PG 2 line on 25.7.2024 (Lucknow zone)

No. of unwanted operation -1

No. of correct operation-1

No. of failure to operate-0

Reason for indices less than unity – DT received at Kanduni end.

Corrective action taken–Fault at 400kV Substation Khuri road (POWERGRID) removed.

Case-2 Tripping of 400/220kV 500MVA ICT-1 at 400kV Substation Azamgarh (Gorakhpur Zone)

No. of unwanted operation -1

No. of correct operation-1

No. of failure to operate-0

Reason for indices less than unity- Tripped on PRV due to DC cable fault.

Corrective action taken- Rectified on 14.7.2024.

Case-3 Tripping of 220kV Khurja NAPP line (Meerut Zone)

No. of unwanted operation -2

No. of correct operation-1

No. of failure to operate-0

Reason for indices less than unity- At Khurja Substation Damaged cable carrying signals to trip circuit and has operated due to water logging in trenches during severe rain.

Corrective action taken- Control cables of both trip circuits were replaced on 31.7.2024.

Case-4 Tripping of 220kV Debai NAPP line (Meerut Zone)

No. of unwanted operation -2

No. of correct operation-1

No. of failure to operate-0

Reason for indices less than unity- Line tripped at Debai end due to SOTF/TOR when distance protection picked in Zone-3**.**

Corrective action taken- Protection settings have been checked and revised.

PSTCL

Case-1 Tripping of 500 MVA, 400/220 kV ICT-1 at 400 kV S/S Dhanansu

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Ingress of moisture due to Rain.

Corrective action taken- Officials have been asked to cover it properly.

Case-2 Tripping of 100 MVA, 220/132 kV Power Transformer-2 at 220 kV S/S Science City

No. of unwanted operation -2

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Control cable of NCT damaged.

Corrective action taken- Replaced.

Case-3 Tripping of 500 MVA, 400/220 kV ICT-1 at 400 kV S/S Dhuri

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Due to ingress of moisture in PRD & OSR.

Corrective action taken- Officials have been asked to cover it properly.

Case-4 Tripping of 100 MVA, 220/66 kV Power Transformer-4 at 220kV S/s Patran

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Due to rain & bird's dropping resulting in flashover at LA jumper HV side.

Corrective action taken- Not received from utility.

Case-5 Tripping of 220 kV Muktsar-Ghubaya ckt

No. of unwanted operation -1

No. of correct operation-1

No. of failure to operate-0

Reason for indices less than unity- Mal-operation of PDR of CB.

Corrective action taken- Connections tightened in CB marshallaing box.

Case-6 Tripping of 220 kV Muktsar-Sandhwan ckt, 220 kV Muktsar-Sadiq ckt, 220 kV Muktsar-Katorewala ckt, 220 kV Muktsar-Bathinda ckt.I, 220 kV Muktsar-Bathinda ckt.II

No. of unwanted operation -0

No. of correct operation-0

No. of failure to operate-0

No. of incorrect operation- 1 on each element

Reason for indices less than unity- Bus fault developed subsequent to tripping of 220 kV Muktsar-Ghubaya circuit. BBPS failed to operate.

Corrective action taken- Issue is being analysed.

Case-7 Tripping of 220 kV Butari-BBMB Jalandhar ckt in Zone-1 from BBMB end and E/F at Butari end

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Protection coordination issues of E/F relay.

Corrective action taken- Issue is being resolved.

Case-8 Tripping of 100 MVA, 220/66 kV Power Transformer-3 at 220kV S/s Rehana Jattan

No. of unwanted operation -2

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Bucchholz Trip Stage-II, Master operated, due to DC leakage.

Corrective action taken- Partially attended.

Case-9 Tripping of 100 MVA, 220/66 kV, P.T/F T-3 at 220kV S/s Dera Bassi

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Bucchholz Trip Stage-II, Master operated, due to Control cable punctured.

Corrective action taken- Control cable replaced.

Case-10 Tripping of 220kV Bhateri-Faggan Majra ckt. I

No. of unwanted operation -0

No. of correct operation-0

No. of failure to operate-0

No. of incorrect operation- 1

Reason for indices less than unity- Operation of O/C on adjacent circuit due to snapping of conductor.

Corrective action taken- Not received from utility.

Case-11 Tripping of 220 kV Passiana-Ablowal ckt and 220 kV Passiana-Rajla ckt from Passiana end only

No. of unwanted operation -1 for each element.

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- DC leakage.

Corrective action taken- Partially attended.

Case-12 Tripping of 100 MVA, 220/66 kV Power Transformer-2 at 220kV S/s Sarna

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Control cable damaged by reptiles.

Corrective action taken- Control cable replaced.

Case-13 Tripping of 220 kV Verpal-Udhoke ckt and 220 kV Verpal-Wadala Granthian ckt

No. of unwanted operation -1 for each element.

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Maloperation of DPRs due to damaging of bush of ICT at Wadala granthian.

Case-14 Tripping of 160 MVA, 220/66kV Power Transformer-2 at 220kV S/s Malerkotla

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity- Earth stick comes in induction during attending hot point at 66 kV Naudhrani.

Corrective action taken- Not received from utility.

Case-15 Tripping of 220 kV Bhawanigarh-Nabha ckt at Bhawanigarh end only

No. of unwanted operation -0

No. of correct operation-0

No. of failure to operate-1

Reason for indices less than unity- failed to trip from Nabha end.

Corrective action taken- Not received from utility.

Case-16 Incorrect operations due to unhealthiness of carrier

Lines subjected- 220 kV Kotla Janga-Kartarpur ckt.II, 220 kV Bathinda-GHTP ckt.I

Due to unhealthiness of carrier, the concerned ends have been getting tripped in zone-2 leading to delayed clearance.

Corrective action taken- Not received from utility.

POWERGRID – NR-2

Case-1 Tripping of PATIALA 315MVA ICT-I & 500MVA ICT- III

No. of unwanted operation -1 for each element

Reason for indices less than unity- ICTs tripped on operation of 220KV Bus-1 Protection caused by operation of LBB protection of 220KV Nabha-1 due to problem in B-pole CB Patiala (PG).

Corrective action taken- Not received from utility.

Case-2 Tripping of DEHAR 315 MVA ICT-I at 220kV side only

No. of unwanted operation -1

Reason for indices less than unity- Tripped due to maloperation of Micom P743 Breaker failure relay owned by BBMB Dehar.

Corrective action taken- BBMB may apprise.

Reasons for Performance Indices less than Unity- August 2024

POWERGRID- NR-2

Case-1 Tripping of 220KV SALAL-JAMMU-II at Jammu end on 07.08.2024

No. of unwanted operation -1

Reason for indices less than unity - Line tripped from Jammu end only due to maloperation of Trip supervision contactor. Dead earth fault was persisting at that time (JKPTCL Station)

Corrective action taken- Not received from utility. (Jammu may also update)

Case-2 Tripping of 220KV SARNA-DASUYA-I on 16.08.2024

No. of incorrect operation -1

Reason for indices less than unity – Line successfully Auto Reclosed on B-N fault from Dasuya (PSTCL) but tripped from Sarna (PSTCL) due to maloperation of A/R scheme at Sarna (PSTCL). DTPC cable issue.

Corrective action taken- Not received from utility (PSTCL may also update)

Case-3 Tripping of 400KV BHIWANI (BBMB) - RAJPURA (PSTCL) LILO PORTION on 31.08.2024

No. of unwanted operation -1

Reason for indices less than unity – Line tripped from Rajpura (PS) end only due to DT received at Rajpura (PS) PSTCL end caused by maloperation of PLCC at BBMB Bhiwani. PLCC maloperation. PLCC and bay at Bhiwani are owned by BBMB

Corrective action taken- Not received from utility (BBMB may also update).

Case-4 Tripping of PATIALA 315MVA ICT-II & 500MVA ICT-IV on 24.07.2024

No. of unwanted operation -1 for each element.

Reason for indices less than unity – ICT-4 TBCB bay wiring issue. During shifting of ICT-4 (214) bay to TBC, +ive voltage extended to trip bus of 220kV Bus-2, resulting in operation of 220KV Bus-2.

Corrective action taken- Rectified.

CCGT Bawana, IPGCL

Case-1 Tripping of Generator Transformer GT – 4 on 18.8.2024 & 25.8.2024

No. of unwanted operation -2

No. of correct operation-2

No. of failure to operate-0

Reason for indices less than unity – On differential tripped due to CT Secondary wire of R – Phase Yard CT (Core 4 & Core 5) from CT Junction Box to CT MK found grounded.

Corrective action taken- New cable laid from R – Phase CT Junction Box to CT MK for Core 4 as well as Core 5

PSPCL (GGSSTPS)

Case-1 the following feeders tripped in Zone-2

1. 220 kV feeder Jadla-1 on 24.08.2024
2. 220 kV feeder Jadla-2 on 24.08.2024
3. 220 kV feeder Gobindgarh-2 on 27.08.2024

Reason for indices less than unity –Due to the unhealthiness of Carrier Communication.

Corrective action taken- Not received from utility.

RVPNL

Case-1 Tripping of 400 KV Merta - Bikaner Bay at 400 KV GSS MERTA on 09.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – DC cable problem initiated the breaker tripping.

Corrective Action taken – DC cable replace and problem rectified.

Case-2 Tripping of 400/220KV 315 MVA ILT-2ND AT 400 KV GSS RATANGARH on 02.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – Due to DC mixing of source 1 and source 2 at 400KV GSS Ratangarh in 400/220KV 315MVA ILT-2 panel.

Corrective Action taken – DC problem rectified.

Case-3 Tripping of 220 KV Manoharpur - Kukas line at Manoharpur on 01.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – DC problem due to damage of DC cable at 220 KV GSS Manoharpur.

Corrective Action taken – DC problem rectified.

Case-4 Tripping of 220kV Sri Dungargarh - Ratangarh line at 220KV GSS Ratangarh on 06.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – CB tripped at Ratangarh end without any indication due to DC problem.

Corrective Action taken – DC problem rectified.

Case-5 Tripping of 220kV Bhilwara Kankroli (PG) line at Bhilwara end on 08.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – PSL of relay was found wrong, the relay tripped with Carrier healthy signal.

Corrective Action taken – PSL corrected.

Case-6 Tripping of 220 kV Kankroli- Bamantukda Line at 220 KV GSS Bamantukda on 11.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – LBB relay setting found incorrect.

Corrective Action taken – LBB relay setting corrected.

Case-7 Tripping of 220KV Khetri- Ratangarh Ckt-II line at 220 KV GSS Khetri on dated 21.08.2024

No. of Unwanted operation – 1

Reason of unwanted operation – VT selection relay operation defective, VT output became near to zero.

Corrective Action taken – Problem of VT selection relay rectified.

Case-8 Tripping of 220/132 KV 160 MVA Transformer at 220 KV GSS VATIKA on 30.08.2024

No. of Unwanted operation – 2

Reason of unwanted operation – Main 2 differential relay was installed at the panel with incomplete CT wiring and was put out of ckt by removing DC supply. Workmen unknowingly put on the DC supply fuses.

Corrective Action taken – Main 2 differential relay again put out of circuit.

DTL

Case-1 400kV Mundaka- Bawana Ckt-1

No. of unwanted operation -2

No. of correct operation-0

No. of failure to operate-0

Reason of unwanted operation – Not submitted.

Corrective Action taken- Not received from utility.

PTCUL

Case-1 Tripping of 315 MVA ICT -II (400/220 KV) at 400 KV S/S Kashipur

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason of unwanted operation – transformer tripped without flags due to DC Earth fault.

Corrective Action taken- Not received from utility.

UPPTCL

Case-1 220kV Parichha to Moth line (Jhansi Zone)

No. of unwanted operation -0

No. of correct operation-1

No. of failure to operate-1

Reason for indices less than unity – At 220kV S/s Moth Bus coupler breaker trip on E/F high set, while line CB did not trip.

Corrective Action taken- Fault got rectified**.**

Case-2 220kV Debai to Khurja line (Meerut Zone)

No. of unwanted operation -0

No. of correct operation-0

No. of failure to operate-1

Reason for indices less than unity – CB at 220kV Debai end failed to trip as trip signal was transferred to TBC breaker due to mal functioning of BCU.

Corrective Action taken- Trip transfer scheme is permanently shifted to main CB till the time BCU trouble is rectified.

Case-3 Tripping of 500MVA ICT-1 at 400kV Substation Azamgarh (Gorakhpur Zone)

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity –ICT tripped on PRV due to mal functioning of PRV contact due to accumulation of water vapour.

Corrective Action taken- Not received from utility.

Case-4 Tripping of 160MVA ICT (220/132kV) -1 at 400kV Substation Agra (Agra Zone)

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity – Due to control cable fault.

Corrective Action taken- Not received from utility.

Case-5 Tripping of 400kV Aligarh Panki line (Agra Zone)

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity – Due to DC Earth fault.

Corrective Action taken- Not received from utility.

Case-6 Tripping of 500MVA ICT-1 (LV side) at 400kV Substation Panki (Agra Zone)

No. of unwanted operation -3

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity – Due to DC Earth fault.

Corrective Action taken- Not received from utility.

Case-7 Tripping of 500MVA ICT-I (HV side) at 400kV Substation Panki (Agra Zone)

No. of unwanted operation -1

No. of correct operation-0

No. of failure to operate-0

Reason for indices less than unity – Due to DC Earth fault.

Corrective Action taken- Not received from utility.

Status of Protection Audit Plan for FY 2024 -25

S. No.	NRPC Member	Category	Status
1	PGCIL	Central Government owned Transmission Company	Received (NR-1,3)
2	NTPC	Central Generating Company	Received
3	BBMB		Received
4	THDC		Received
5	SJVN		Received
6	NHPC		Received
7	NPCIL		
8	DTL	State Transmission Utility	Received
9	HVPNL		Received
10	RRVPNL		
11	UPPTCL		Received for Jhansi, Lucknow, Meerut zone
12	PTCUL		Received
13	PSTCL		Received
14	HPPTCL		Received
15	IPGCL	State Generating Company	Received (PPCL)
16	HPGCL		
17	RRVUNL		Received
18	UPRVUNL		Received (obra -B)
19	UJVNL		Received (Dharasu, Tiloth)
20	HPPCL		
21	PSPCL	State Generating Company & State owned Distribution Company	
22	HPSEBL	Distribution company having Transmission connectivity ownership	
23	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received
24	Aravali Power Company Pvt. Ltd		Received
25	Apraava Energy Private Limited		Received
26	Talwandi Sabo Power Ltd.		
27	Nabha Power Limited		
28	Lanco Anpara Power Ltd		
29	Rosa Power Supply Company Ltd		Received
30	Lalitpur Power Generation Company Ltd		Received
31	MEJA Urja Nigam Ltd.		
32	Adani Power Rajasthan Limited		Received (Kawai)
33	JSW Energy Ltd. (KWHEP)		Received
34	AESL	Other transmission licensee	
35	Tata Power Renewable Energy Ltd.		Recevied (TPGEL, BTPSL)
36	UT of J&K	UT of Northern Region	
37	UT of Ladakh		
38	UT of Chandigarh		
39	ATIL	Other transmission licensee in NR	
40	INDIGRID		Received
41	POWERLINK		
42	ADHPL		Received
43	Sekura Energy Limited		
44	WUPPTCl	Other transmission licensee in UP	
45	SEUPPTCL	Other transmission licensee in UP	
46	Vishnuprayag Hydro Electric Plant (J.P.)	Other Generating Units in UP	Received
47	Alaknanda Hydro Electric Plant (GVK)	Other Generating Units in UP	

Status of 3rd Party Protection Audit Plan

S. No.	NRPC Member	Category	Status	Schedule submitted as per utililty	Present Status Comlpleted (yes/no)
1	PGCIL	Central Government owned Transmission Company			
2	NTPC	Central Generating Company	Received (Tanda)	By 17.07.2025	
3	BBMB				
4	THDC				
5	SJVN		Received	FY-2025-26 for RHPS, Nov 24- March 25 for NJHPS	
6	NHPC		Received	FY-2025-26	
7	NPCIL				
8	DTL	State Transmission Utility			
9	HVPNL				
10	RRVPNL				
11	UPPTCL				
12	PTCUL				
13	PSTCL				
14	HPPTCL				
15	IPGCL	State Generating Company			
16	HPGCL				
17	RRVUNL				
18	UPRVUNL		Received (DTPS-Anpara)	01.05.2024	Revised schedule will be submitted
19	UJVNL				
20	HPPCL				
21	PSPCL	State Generating Company & State owned Distribution Company			
22	HPSEBL	Distribution company having Transmission connectivity ownership			
23	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received	Dec-24	
24	Aravali Power Company Pvt. Ltd				
25	Apraava Energy Private Limited		Received	By May, 2025	
26	Talwandi Sabo Power Ltd.				
27	Nabha Power Limited				
28	Lanco Anpara Power Ltd				
29	Rosa Power Supply Company Ltd		Received	By 30.09.2024	
30	Lalitpur Power Generation Company Ltd		Conducted	26.03.2024	
31	MEJA Urja Nigam Ltd.				
32	Adani Power Rajasthan Limited		Received (Kawai)	September, 2024	
33	JSW Energy Ltd. (KWHEP)		Received	December 2024 to March 2025	
34	AESL	Other Transmission Licensee			
35	Tata Power Renewable Energy Ltd.	IPP having less than 1000 MW installed capacity (alphabetical rotaional basis)			
36	UT of J&K	UT of Northern Region			
37	UT of Ladakh				
38	UT of Chandigarh				
39	ATIL	Other transmission licensee in NR			
40	INDIGRID				
41	POWERLINK				
42	ADHPL		Received	30.09.2024	
43	Sekura Energy Limited				
44	WUPPTCl	Other transmission licensee in UP	Received	*2024-25	
45	SEUPPTCL	Other transmission licensee in UP			
46	Vishnuprayag Hydro Electric Plant (J.P.)	Other Generating Units in UP			
47	Alaknanda Hydro Electric Plant (GVK)	Other Generating Units in UP			

* Revised Schedule

Protection Audit report – 400/220 KV GIS Chamba Substation

Observations during Protection Audit carried out on 28th June -29th June 2024

1. Settings for protection relays to be implemented as per Latest Template & COE observations. All the protection templates need to be upgraded with the latest version and new fault current level. PSL/ Application configuration/CFC also needs to be modified as per the new templates wherever applicable.

2. Preventive maintenance record of protection system for not available with site except 400kV Bus Reactor-2, 400kV Chamba-Lahal ckt-1&2 & 207 bay (Majra line).

3. Tap position of ICT-1 R-phase is showing erroneous value i.e. -28 in SAS and same needs to be rectified.

4. ICT-2 WTI HV Y-Phase & WTI LV R-Phase are showing erroneous value in SAS. WTI HV Y-Phase: 76°& WTI LV R-Phase: -8.21°. same needs to be rectified.

5. BR-1 WTI is reporting erroneous value i.e 70° in SAS whereas 32° in WTI, same needs to be rectified.

6. In BR-1, Group-B Protection DC fail alarm persisting in DIFF relay but not showing SAS, on fail of actual DC-2, no change in alarm, same needs to be rectified.

7. In BR-1, on switch off Power supply of REF, Diff & BUI relay, no event/alarm of relays unhealthy in SAS, needs to be rectified.

8. ABB make CSD of BR-1 is not reporting to SAS.

9. Mutual Compensation wiring of Main-1 Relay (REL670) of 400kV Chamba-Lahal Ckt-1&2 not connected properly, same needs to be corrected.

10. Goose IED absent alarm is persisting in Main-2(P444) of 220kV Chamba-Karian, 220kV Chamba- Majra Line but not reporting to SAS, needs to be rectified.

11. Goose receives fail alarm persisting in Main-1 relay of 400kV Chamba-Lahal Ckt-2, same needs to be rectified.

12. CN-1 Carrier fail alarm persisting in 220 KV Chamba-Karian line (Bay-206).

13. 220KV Chamba- Majra Line PLCC counters are not reporting in SAS.

14. Most of indication lamps for CB/Isolators status are not working.

15. LT system (Tertiary & HPPCL supply) Voltage is not reporting in SAS-1 but reporting in SAS-2, needs to be rectified.

16. DG is working in Manual Mode. However, ACDB B/C is not working in Auto Mode, therefore DG unable to operate on Auto Mode. Same needs to be rectified.

17. Battery Room Temp is not reporting in SAS.

18. 50V Battery Charger-1 & 2 current and voltage are not reporting correctly needs to be rectified. SAS Value: Charger-1: -18V & 600A, & Charger-2: -18V & -4.5A.

19. 220V Battery Charger-1 & 2 current is not reporting correctly needs to be rectified. SAS Value: Charger-1: -0A, & Charger-2: -0A.

20. In 220V Battery Charger-1, Ammeter found defective, same needs to be replaced.

21. Firefighting pressure showing Zero in SAS, needs to be rectified.

22. Fire diesel engine is not functional in auto mode, same needs to be made functional in auto mode.

23. Out of 8 cameras, 7 are working and 1 (Camera No.-08) is not functional, same needs to be made functional.

24. DC voltage measured during audit, no DC earth fault present. Setting for E/F relay kept as 0.3 mA.
    a. 220V Source 1: +123.4V, -123.2V 48V Source 1: +0.5V, -51.5V
    b. 220V Source 2: +122.6V, -124.2V 48V Source 2: +0.7V, -52.0V

25. DC earth fault is simulated in 220 V DC Source-2. No Voltage deflection detected in DC source-1. No mixing found.

26. Logic for PRD trip with NO/NC & OTI/WTI trip with time delay 20ms and Buch Alarm/Trip with time delay 200ms is implemented in ICT-1,2 & BR-1,2.

27. 02 nos. Carrier switch out signals simulated. Found ok and reported to SAS.

28. Smoke detectors simulated from 3 no. zones (Zone-2, Zone-3 & Zone-5). Found ok and reported to SAS.

Rectification during Audit-

1. ICT-1 RY phase voltage is showing 93kV in SAS, rectified during audit.
2. In BR-2, REF relay found out of time sync, rectified during audit.
3. In BR-2, REF Stabilizing Resister found defective, replaced and value set as per Template i.e. 219 Ω during audit.

AUDITEE	AUDITOR
VIKENDER SINGH, DM	NARESH KUMAR, AM
ABHISHEK KUMAR, JE	

Protection Check-List

Name:- 400/220KV GIS CHAMBA Month and Year of Commissioning:- December 2011 Date of audit:- 28TH to 29th JUNE-2024			Status (OK/ Not Ok)	Remarks
Element	**Description**			
Main-I/Main-II	Check the settings Parameters with respect to the template updated with latest in-feed values		OK	To be updated as per Latest template and COE observation
	Check the Signal Matrix/PSL/Application Configuration/Masking with respect to the Input and Output assignment as per scheme		OK	
	Check the Logic for DT send		OK	
	Check the Logic for 86A and 86B trip		OK	
	Check the Logic for single phase tripping		OK	
	Check the Logic for LBB Initiations		OK	
	Check the Logic for A/R starts		OK	
	Check the Logic of STUB protection & Line Isolator open status (to be enable for one & Half CB scheme having no Line side CT and to be disable for DMT scheme & having Line side CT)		NA	
	Check that the wiring of Line Isolator open is connected at correct input for Stub Protection		NA	
	Check the Logic for SOTF protection		OK	
	Check that OV protection is analog (Voltage) as well as time graded for Double Ckt/Parallel lines		OK	
	Check that the VT fail shall block the tripping		OK	
	Check the current, voltage and angle in the relay		OK	
	Check for mutual compensation wiring (if applicable) and Check setting and configuration according to wiring.		OK	400kV Lahal-1&2 Main-1, wiring found not ok.
	Whether all relays are accessible from remote dedicated PC for setting & DR extraction in control room		OK	
	Whether Main-I & Main-II protections of all line are time synchronised with GPS based time synchronised equipment.		OK	
PLCC	Check the healthiness of PLCC protection panels		OK	Ch-1 fail of 220 KV Karian line (Bay-206)
	Check alarm during OUT position of Carrier IN/OUT Switch in Control room as well as in RTAMC/NTAMC		OK	
Auto Reclosure	Check the logic and configuration of the AR Start and Block		OK	
	Check the dead time and reclaim time settings		OK	
	Check the Logic and Configuration of the AR Lockout		OK	
	Check the logic & wiring for Priority Ckt in one & Half CB scheme.		NA	
	Whether priority scheme is working properly (check previous A/R DR)		NA	

Protection Check-List

LBB relay/PU relay	Check the relay settings (particularly, pick-up, retrip time and back-trip time)		OK	TEMPLATE NOT AVAILABLE.
	Check that single phase initiation is wired and configured correctly for lines		OK	
	Check the logic that re-trip trips the same breaker		NA	
	Check the Signal Matrix/PSL/Application Configuration with respect to the Input and Output assignment as per scheme		OK	
	Check the logic that back-trip trips the associated bus-bar(for Main-CB LBB) OR both the Main-CB (for Tie CB LBB)		OK	
	In case of half dia, check that the Tie Bay LBB instantaneously trips the Bus connected to future bay(also check the wiring)		NA	
	For bays commissioned in the extension projects have Tie-LBB wiring changed from "Tripping the bus" to "Tripping the Main CB"		NA	
	Dead Zone/ End zone Protection is disabled; Topology is independent of switch status in One and Half CB scheme		NA	
	Check/measure phase wise current in LBB/PU relay		OK	
Reactor/Transformer Differential	Check the differential current and bias current in the relay		OK	
	Check the relay settings as per the template		OK	TO BE UPDATED AS PER COE OBSERVATIONS & LATEST TEMPLATE
	Check the relay configuration for proper input and output contact assignment.		OK	
	Check the tripping logic wrt the scheme.		OK	
	In case of single phase transformer with spare, check the correct implementation of spare selection in trip logic		NA	
REF protection	Check the current in the relay		OK	
	Check the relay settings as per the template		OK	TO BE UPDATED AS PER COE OBSERVATIONS & LATEST TEMPLATE
	Check the relay configuration for proper input and output contact assignment.		OK	
	Check the tripping logic wrt the scheme.		OK	
	In case of single phase transformer with spare, check the correct implementation of spare selection in trip logic		NA	
	Check for the CT selection scheme and logic		NA	
Back-up	Check the current and voltage in the relay		OK	

Protection Check-List

impedance				
	Check the VT selection logic in BCU/relay panel		OK	
	Check that at a time only one bus VT is selected		OK	
	Check the relay settings as per the template		OK	TO BE UPDATED AS PER COE OBSERVATIONS & LATEST TEMPLATE
	Check the relay configuration for proper input and output contact assignment.		OK	
	Check the tripping logic wrt the scheme.		OK	
	Check that VT fail blocks the tripping		OK	
	Check for implementation of NGR protection scheme		NA	
CSD	Check whether CSD installed with ICT/Reactor is working properly as per its requirement. (Check recent graph/DR)		OK	BR-1 CSD IS NOT Reporting to SAS.
	Check provision of bypassing of CSD is provided		OK	
	Check DR trigging of other relay on Manual operation of CB in case CSD is not having the provision of extraction of DR/graph.		OK	
General	Check that the two trippings of PRD, Buchholz etc are wired to two separate relays		OK	
	Check that the relays powered by DC-1 are supervised by relays powered by DC-2 and Vice-versa		OK	
	Check Relay Failure and Relay disconnected alarms for all the relays.		OK	
	Check for time-sync status of the relay		OK	
	Check the DR channel standardisation		OK	TO BE UPDATED AS PER LATEST CIRCULAR.
	Check pre-commissioning test reports (whether print-outs of DR and EL enclosed)		OK	
	Check the logic of Bus earth switch interlock		OK	
	Check the auto download of DR		NOT OK	TO BE IMPLEMENTED.
	Check for implementation of relevant CC-AM circulars		OK	
	Check the single point earthing of CT secondary core on sample basis.		OK	
	Check the earthing interconnecting link/strip connected in inter panel/adjacent panel		OK	
	Back up of important data of sub-station		OK	
Bus Bar Protection	Whether duplicate bus bar protection provided in 400 & 765 kV Bus bar		OK	

Protection Check-List

	Check the topology of both the CUs		NA	
	Check the Diff current and restrain current		OK	
	Check /Measure the Spill current in bus-bar relay		OK	
	Check that CB status is permanently shorted in one and half CB scheme		NA	
	Check the operation of the selector switch and correct alarms in SCADA		OK	
	Check the settings and Configuration of the CU		NA	
	Simulate PU disconnected and check for Bus Bar Block		NA	
	Check the setting of CT supervision/CT fail/CT circuitry fault alarm		OK	
	Check logic for LBB initiation on bus bar trip		OK	
	Check the logic for BUS Bar Tripping on SF6 Gas compartment zone trip in case of GIS Station.		NA	
	Check that the Bus-Bar bay selection is independent of the topology status in One and Half CB schemes		NA	
SAS	As per Annexure-I (SAS Checklist)		OK	
Alarms	Simulate the alarms as per Annex-II for at least 20% bays, Minimum 6 bays.		OK	
DC System	Check DC voltage at the farthest point in the switchyard (+ to Earth, - to earth)		OK	
AC system	Check auto operation of DG set		OK	
FFPH	Check auto operation of HVW and Diesel driven pump		OK	Diesel Engine Not working on Auto Mode.
Smoke detection system	Simulate smoke detection in any kiosk and check for alarm		OK	

AUDITEE	AUDITOR
VIKENDER SINGH, DM	NARESH KUMAR, AM
ABHISHEK KUMAR, JE	

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit-M/O-MAY 2024 , Date of Audit - 22.5.2024.

A. General Information

(i) Name of Utility:- 220 KV GSS HAMIRGARH

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-20.03.1996

(iv) Type of Bus Switching Scheme:- Two Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- AEN (MPT&S) RVPNL BHILWARA

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL HAMIRGARH

B. Check List for Protection Audit

S. No	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Transformer Protection Panel:					
(1)	**Name of Transformer (Rating/Capacity)**	**220/132,160MVA Transformer-I (ALSTOM Make)**				
	Tripping by Buchholz relay (Alarm)	Yes	Functional	Conventional		
	Differential Protection	Yes	Functional	Numerical	pickup- 0.2 pu,slope 1 - 0.3,slope 2-0.7	
	2nd Harmonic Block (Setting)	Yes	Enabled		15%	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (HV Side)	Yes	Functional	Numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (LV Side)	Yes	Functional	Numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Backup Over Current	Yes	Functional	Numerical	54%, CTR-800/1	
	Event logger Operation	No	(No Event logger Installed)			
	Earth Fault Protection	Yes	Functional	Numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Over Flux Protection	Yes	Enabled	Numerical	alarm -110%,5 sec ,Trip- As per inverse curve characteristics	
	Event logger Operation	No	(No Event logger Installed)			
	Local Breaker Back Up	YES	Feature enabled in Bus bar scheme,no separate LBB Relay	**Numerical**		
	Retrip		enabled		100 msec	
	Current and Time Setting	yes			120% Inormal,100 msec	
	Separate Single and three Phase Initiation	no			three phase initiation	
	Earth Fault	no	DISABLED			
	Event logger Operation	no				

ASSISTANT ENGINEER (MPT&S)
RRVPNL, BHILWARA

Dt. of Audit – 22.05.2024.

Name of Transformer (Rating/Capacity)	**220/132,100MVA Transformer-I (BHEL Make)**				
Tripping by Buchholz relay (Alarm)	Yes	Functional	Conventional		
Differential Protection	Yes	Functional	Static	pickup- 0.2 pu,slope 1 - 0.2,slope 2-0.7	
2nd Harmonic Block (Setting)	Yes			15% (Inbuilt)	
Event logger Operation	No	(No Event logger Installed)			
Restricted Earth Fault Protection (HV Side)	No			20%	
Event logger Operation	No	(No Event logger Installed)			
Restricted Earth Fault Protection (LV Side)	No			20%	
Event logger Operation	No	(No Event logger Installed)			
Backup Over Current	Yes	Functional	numerical	57% CTR-400,1 A	
Event logger Operation	No	(No Event logger Installed)			
Earth Fault Protection	Yes	Functional	numerical	20%	
Event logger Operation	No	(No Event logger Installed)			
Over Flux Protection	Yes	Enabled	numerical	alarm -110%,5 sec Trip- As per inverse curve characteristics	
Event logger Operation	No	(No Event logger Installed)			
Local Breaker Back Up	YES	Feature enabled in Bus bar scheme,no separate LBB Relay	**Numerical**		
Retrip	No	Enabled		100 msec	
Current and Time Setting	No			120% Inormal,100 msec	
Separate Single and three Phase Initiation	No			three phase initiation	
Earth Fault	No	DISABLED			
Event logger Operation	No	(No Event logger Installed)			

ASSISTANT ENGINEER (MPT&S)
RRVPNL, BHILWARA

Date of Audit - 22.05.2024.

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility - 220 KV GSS HAMIRGARH

(ii) Name of Voltage Level of Sub Station - 220/132 KV

(iii) Date of Commissioning - 20.03.1996

(iv) Type of Bus Switching Scheme - Two Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- AEN (MPT&S) RVPNL BHILWARA

(vi) Name of representative from utility whose audit being carried out - XEN 220KV GSS RVPNL HAMIRGARH

B. Check List for Protection Audit

S No	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w r t regulatory provisions
	Distance Protection Panel:M-I/II					
(i)	**Name of Line**	**220KV Hamirgarh-Bhilwara line**				
	Pole Discrepancy Relay	YES	Functional	ELECTROMECHANICAL	1 sec	
	PLCC Panel	Yes	Functional			
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled	Numerical	As per latest Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	YES	Disabled			
	Aided Scheme	YES	Enabled			
	Fault Locator	YES	enabled			
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes	ENABLED			
	Breaker Contacts	Yes	ENABLED			
	Carrier Receive	YES	ENABLED			
	Time Synchronization	YES				

(I)	**Name of Line**	**220KV Hamirgarh-Bhilwara line**				
	Pole Discrepancy Relay	YES	Functional	ELECTROMECHANICAL	1 sec	
	PLCC Panel	Yes	Functional			
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled	Numerical	As per latest Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	YES	Disabled			
	Aided Scheme	YES	Enabled			
	Fault Locator	YES	enabled			
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes	ENABLED			
	Breaker Contacts	Yes	ENABLED			
	Carrier Receive	YES	ENABLED			
	Time Synchronization	YES				

ASSISTANT ENGINEER (MPT&S)
RRVPNL, BHILWARA

Date of Audit - 22.05.2024.

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility - 220 KV GSS HAMIRGARH (ii) Name of Voltage Level of Sub Station - 220/132 KV

(iii) Date of Commissioning -20.03.1996 (iv) Type of Bus Switching Scheme - Two Main Bus and Aux. Bus

(v) Name and Organization of Audit Team - AEN (MPT&S) RVPNL BHILWARA

(vi) Name of representative from utility whose audit being carried out - XEN 220KV GSS RVPNL HAMIRGARH

B. Check List for Protection Audit

S No	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w r t regulatory provisions
1	**DC System**		Functional	Electromechanical	20%	
	No. Of Independent DC Source	1				
	Potential Between +ve & Earth (Source-I)	116 V				
	Potential Between -ve & Earth (Source-I)	118 V				
2	**Event Logger Panel**	No				
3	**Event Logger Time Synchronised**	No				
	Disturbance Recorder	No				
	DR Time Synchronised	No				
4	**Bus Bar Protection**	yes				
	Stability Check	yes				
	FL Output for this Event	yes				
	DR if Available	yes				
5	**DG Set**	No				
6	**Mock Testing of Sample Protection Associated with Transmission line**	yes				
7	**LBB/BFR**	No				
	Retrip	No				
	Current and Time Setting	No				
	Separate Single and Three Phase initiation	No				
	Earth Fault	No				
	Event Logger Operation	No				

ASSISTANT ENGINEER (MPT&S)
RRVPNL, BHILWARA

Date of Audit – 22.05.2024.

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility - 220 KV GSS HAMIRGARH

(ii) Name of Voltage Level of Sub Station - 220/132 KV

(iii) Date of Commissioning -20 03 1996

(iv) Type of Bus Switching Scheme - Two Main Bus and Aux Bus

(v) Name and Organization of Audit Team - AEN (MPT&S) RVPNL BHILWARA

(vi)Name of representative from utility whose audit being carried out - XEN 220KV GSS RVPNL HAMIRGARH

B. Check List for Protection Audit

S No	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	NA	No reactor Installed			
	Tripping by Buchholz relay (Alarm)	No				
	Differential Protection	No				
	2nd Harmonic Block (Setting)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (LV Side)	No				
	Event logger Operation	No				
	Backup Over Current	No				
	Event logger Operation	No				
	Earth Fault Protection	No				
	Event logger Operation	No				
	Over Flux Protection	No				
	Event logger Operation	No				

ASSISTANT ENGINEER (MPT&S)
RRVPNL, BHILWARA

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Indira Gandhi Nagar
iii)	Date of Commissioning:	25.02.2011
iv)	Type of Bus Switching Scheme	Two Main Bus (One & Half scheme)
v)	Name and Organization of Audit Team	Sh. Mukul Yadav, AEN-III (MPT&S), RVPN, Jaipur
		Sh. Munesh Kumar Meena , JEN-I O/o AEN-III (MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K. Jain, SE (Prot. Engg.) RVPNL Jaipur

B. Checklist for Protection Audit

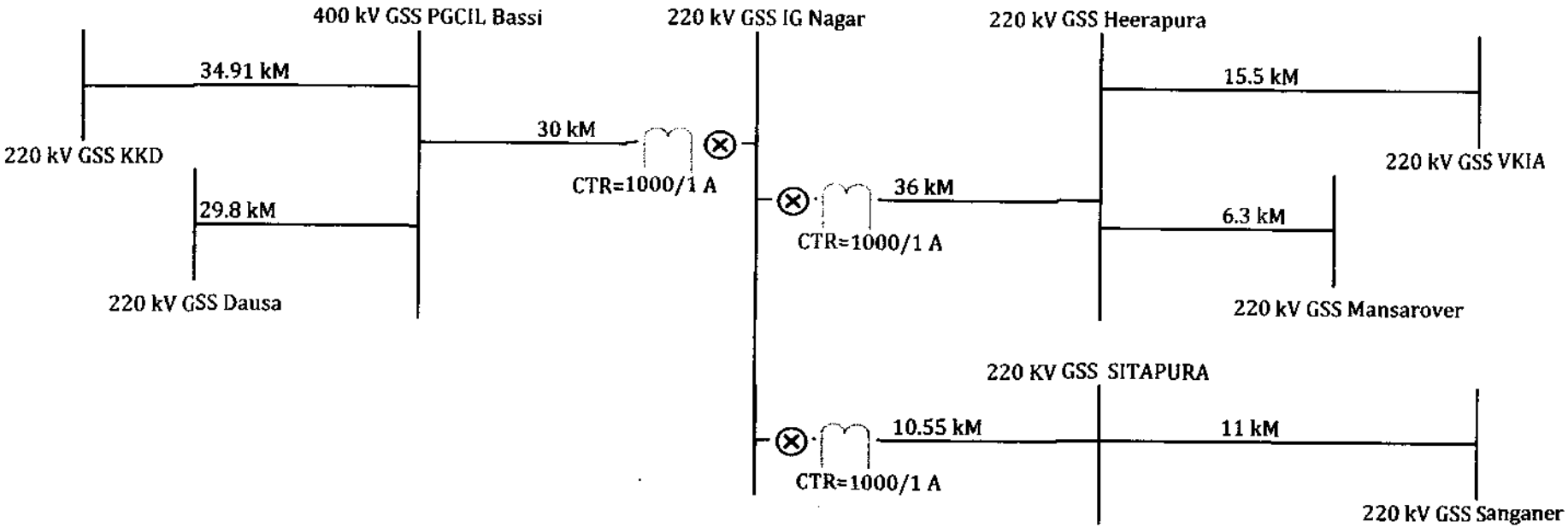
S.No.	Check		Functional/ Non-Functional/ Enabled/Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Distance protection Panel:M-I/II						
(i)	**Name of Line**	**220 kV PGCIL Bassi Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=4.897 Ohm, T1=0 ms Z2=9.162 Ohm, T2=350 ms Z3=13.958 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying

S.No.	Check		Functional/ Non-Functional/ Enabled/Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relays	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
(ii)	**Name of Line**	**220 kV Heerapura Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 Sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=5.877 Ohm, T1=0 ms Z2= 7.989 Ohm, T2=350 ms Z3=10.825 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
Distance protection Panel:M-I/II						
(iii)	**Name of Line**	**220 KV Sitapura Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=1.722 Ohm, T1=0 ms Z2=3.275 Ohm, T2=350 ms Z3=4.622 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			

S.No.	Check		Functional/ Non-Functional/ Enabled/Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying

Name. Signature & Contact No. of team Carrying out Protection audit:	1. Mukul Yadav, AEN-III (MPT&S), Jaipur 9413382334	
	2. Munesh Kr. Meena, JEN-I O/o AEN-III (MPT&S), Jaipur 9413383124	
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:	1. Dinesh Kumar Jain, SE (Prot.Engg.), RVPN, Jaipur, 9413393540	

Distance relay calculation for 220 KV IG Nagar-PGCIL Bassi Line



EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)

XE/XL=1/3((Xo/X1)-1)

kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

Principle line Length	:	30 KM.
Shortest Line Length considered on Remote Bus		29.8 KM.
Longest line length Considered on Remote Bus		34.91 KM.

kZ0	**kZ0 angle**
0.734	**-1.83**

Conductor Used : **Zebra**

Conductor Parameters :

	R	**X**	**Z**	**Angle**
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29
CTR:	1000/1 Amp= 1000			
PTR:	220000/110 V= 2000			
CTR/PTR:	0.5			

Zone 1(Forward) Reach: 80 % of the Line to be Protected

Zone 2(Forward) Reach: 50 % of the Shortest Line on remote Bus+100 % of the Protected Line

Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (IG Nagar to PGCIL)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 4.897 **Ohm** **T1= Instt.**

Zone 2 forward Reach= 100% of line length (IG Nagar to PGCIL)+50 % of the Shortest Line on remote Bus(PGCIL-Dausa)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 9.162 **Ohm** **T2=350 ms**

Zone 3 forward Reach=100% of line length (IG nagar to PGCIL)+110 % Longest line length on Remote Bus(PGCIL-KKD)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 13.958 **Ohm** **T3=1000 ms**

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.408 **Ohm** **T4=160 ms**

Directional O/C & E/F relay calculation for 220 kV IG Nagar-PGCIL Bassi Line

Fault MVA of 220 kV BUS	:	8555	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

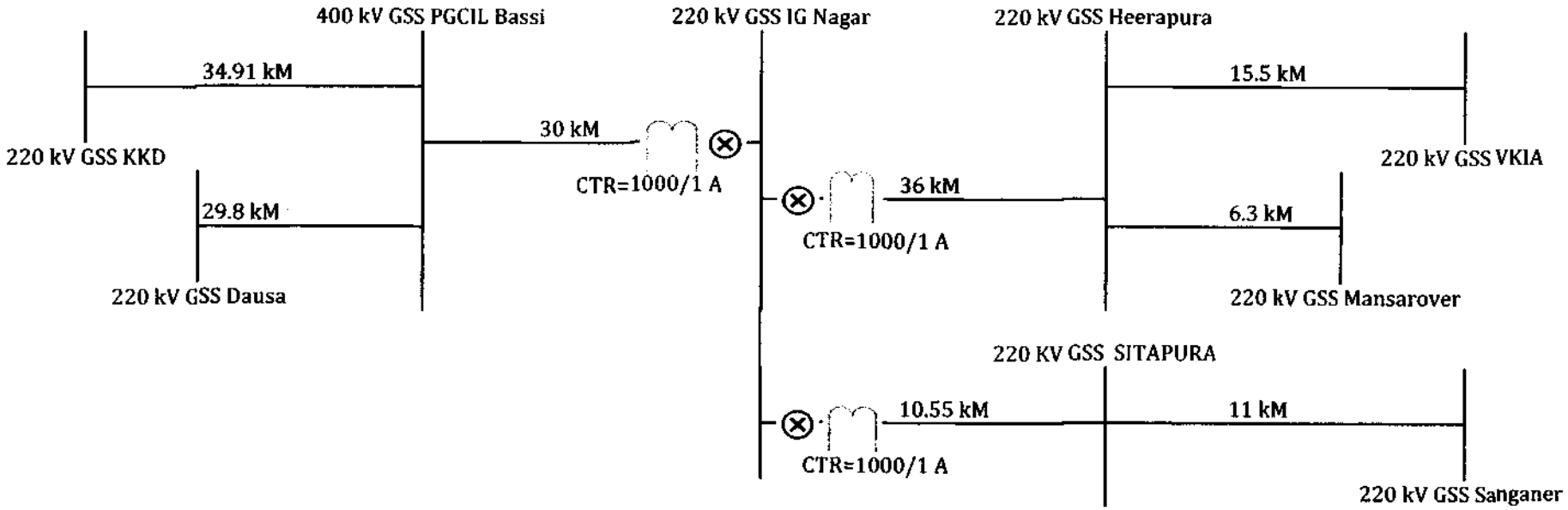
Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	100% i.e.	1000	Amp
Plug Setting Multiplier	13.762		
Time of Operation	0.5	Seconds	
TMS	**0.192**		

Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	20 % i.e.	200	Amp
Plug Setting Multiplier	42.905		
Time of Operation	0.5	Seconds	
TMS	**0.227**		

Distance relay calculation for 220KV IG NAGAR -Heerapura Line



Principle line Length : 36 KM.
Shortest Line Length considered on Remote Bus 6.3 KM.
Longest line length Considered on Remote Bus 15.5 KM.

Conductor Used : **Zebra**

Conductor Parameters :

	R	X	Z	Angle
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29

CTR: 1000/1 Amp= 1000
PTR: 220000/110 V= 2000
CTR/PTR: 0.5

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)
XE/XL=1/3((Xo/X1)-1)

	kZ0	kZ0 angle
kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1	**0.734**	**-1.83**

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (IG Nagar to Heerapura)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 5.877 Ohm T1= Instt.

Zone 2 forward Reach= 100% of line length (IG Nagar to Heerapura)+50 % of the Shortest Line on remote Bus(Heerapura-Mansarover)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 7.989 Ohm T2=350 ms

Zone 3 forward Reach=100% of line length (IG Nagar to Heerapura)+110 % Longest line length on Remote Bus(Heerapura-VKIA)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 10.825 Ohm T3=1000 ms

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.408 Ohm T4=160 ms

Directional O/C & E/F relay calculation for 220 kV IG Nagar-Heerapura Line

Fault MVA of 220 kV BUS	:	8555	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

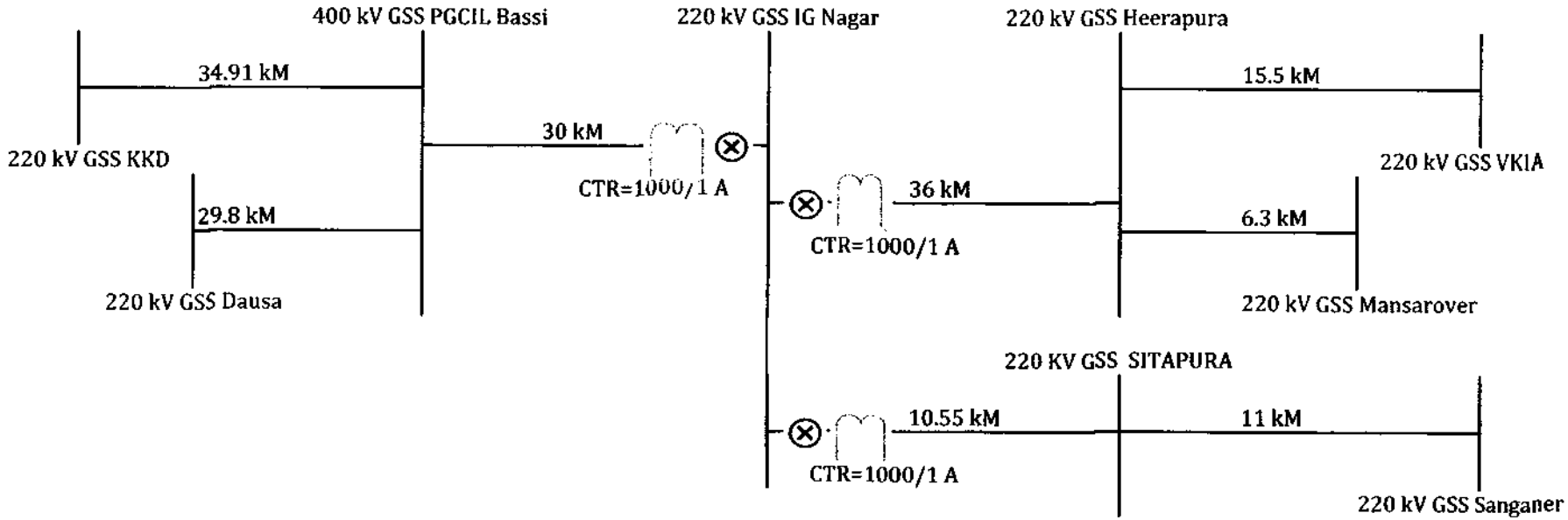
Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	100 % i.e.	1000	Amp
Plug Setting Multiplier	13.762		
Time of Operation	0.5	Seconds	
TMS	0.192		

Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	20 % i.e.	200	Amp
Plug Setting Multiplier	42.905		
Time of Operation	0.5	Seconds	
TMS	0.227		

Distance relay calculation for 220 KV IG Nagar -Sitapura Line



Principle line Length	10.55 KM.
Shortest Line Length considered on Remote Bus	11 KM.
Longest line length Considered on Remote Bus	11 KM.

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)

XE/XL=1/3((Xo/X1)-1)

kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

kZ0	**kZ0 angle**
0.734	**-1.83**

Conductor Used : **Zebra**

Conductor Parameters :	**R**	**X**	**Z**	**Angle**
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29
CTR:	1000/1 Amp= 1000			
PTR:	220000/110 V= 2000			
CTR/PTR:	0.5			

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (IG Nagar to Sitapura)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 1.722 Ohm T1= Instt.

Zone 2 forward Reach= 100% of line length (Ig Nagar to Sitpura)+50 % of the Shortest Line on remote Bus(Sitapura-Sanganer)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 3.275 Ohm T2=350 ms

Zone 3 forward Reach=100% of line length (I G Nagar to Sitapura)+110 % Longest line length on Remote Bus(Sitapura-Sanganer)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 4.622 Ohm T3=1000 ms

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.408 Ohm T4=160 ms

Directional O/C & E/F relay calculation for 220 kV IG Nagar -Sitapura Line

Fault MVA of 220 kV BUS	:	8555	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	100% i.e.	1000	Amp
Plug Setting Multiplier	13.762		
Time of Operation	0.5	Seconds	
TMS	**0.192**		

Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	20 % i.e.	200	Amp
Plug Setting Multiplier	42.905		
Time of Operation	0.5	Seconds	
TMS	**0.227**		

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Indira Gandhi Nagar
iii)	Date of Commissioning:	25.02.2011
iv)	Type of Bus Switching Scheme	Two Main Bus (One & Half scheme)
v)	Name and Organization of Audit Team	Sh. Mukul Yadav, AEN-III (MPT&S), RVPN, Jaipur
		Sh. Munesh Kumar Meena , JEN-I O/o AEN-III (MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K. Jain, SE (Prot. Engg.) RVPNL Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled /Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Transformer Protection Panel						
(i)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 100 MVA Areva make Transformer-I**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Numerical		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	Yes	Functional	Numerical	41.9 V	Complying
	Event Logger Operation	Yes	In built feature of numerical REF relay			
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Numerical	0.3/0.197	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Earth Fault Protection	Yes	Enabled	Numerical	0.1/0.254	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No (3 phase only)				Complying
	Earth Fault	No				Complying
	Event logger	Yes	In built feature of numerical LBB relay			
(i)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 100 MVA Areva make Transformer-II**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Numerical		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying

S.No.	Check		Functional/ Non-Functional/Enabled /Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	Yes	Functional	Numerical	41.8 V	Complying
	Event Logger Operation	Yes	In built feature of numerical REF relay			
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Numerical	0.3/0.197	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Earth Fault Protection	Yes	Enabled	Numerical	0.1/0.253	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No(3 phase only)				Complying
	Earth Fault	No				Complying
	Event logger	Yes	In built feature of numerical LBB relay			

Name. Signature & Contact No. of team Carrying out Protection audit:	1. Mukul Yadav, AEN-III (MPT&S), Jaipur 9413382334	
	2. Munesh Kr. Meena, JEN-I O/o AEN-III (MPT&S), Jaipur 9413383124	
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:	1. Dinesh Kumar Jain, SE (Prot.Engg.), RVPN, Jaipur, 9413393540	

Non Directional O/C & E/F relay calculation for 220/132 kV, 100 MVA Transformer-I

Fault MVA of 220 kV BUS	:	8555 MVA
P.U. Impedance of 220 kV BUS		0.0117
% Imepdance of transformer at Normal Tap		12.17 %
Transformer HV Voltage rating		220000 Volts
Transformer LV Voltage rating		132000 Volts
Transformer MVA Capacity		100 MVA
P.U. Impedance of Transformer		0.1217
Total P.U. Impedance		0.1334
Fault MVA of 132 kV BUS	:	750 MVA
3 Phase through fault Short Circuit Current		3280 Amp
Phase-Phase through fault Short Circuit Current		2840 Amp
Phase to Earth through fault Short Circuit Current		1771 Amp

Non Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	30 % i.e.	300	Amp
Plug Setting Multiplier	9.466667		
Time of Operation	0.6	Seconds	
TMS	0.197		

Non Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	10 % i.e.	100	Amp
Plug Setting Multiplier	17.71		
Time of Operation	0.6	Seconds	
TMS	0.254		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	262	Amp
Transformer Full load current LV	437	Amp
Maximum fault current on through fault (If)	3591	Amp
Bushing CT Ratio	600	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	41.9	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	419	Ohm

Non Directional O/C & E/F relay calculation for 220/132 kV, 100 MVA Transformer-II

Fault MVA of 220 kV BUS	:	8555	MVA
P.U. Impedance of 220 kV BUS		0.0117	
% Imepdance of transformer at Normal Tap		12.21	%
Transformer HV Voltage rating		220000	Volts
Transformer LV Voltage rating		132000	Volts
Transformer MVA Capacity		100	MVA
P.U. Impedance of Transformer		0.1221	
Total P.U. Impedance		0.1338	
Fault MVA of 132 kV BUS	:	747	MVA
3 Phase through fault Short Circuit Current		3267	Amp
Phase-Phase through fault Short Circuit Current		2829	Amp
Phase to Earth through fault Short Circuit Current		1764	Amp

Non Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	30 % i.e.	300	Amp
Plug Setting Multiplier	9.43		
Time of Operation	0.6	Seconds	
TMS	0.197		

Non Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	10 % i.e.	100	Amp
Plug Setting Multiplier	17.64		
Time of Operation	0.6	Seconds	
TMS	0.253		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	262	Amp
Transformer Full load current LV	437	Amp
Maximum fault current on through fault (If)	3579	Amp
Bushing CT Ratio	600	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	41.8	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	418	Ohm

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Indira Gandhi Nagar
iii)	Date of Commissioning:	25.02.2011
iv)	Type of Bus Switching Scheme	Two Main Bus (One & Half scheme)
v)	Name and Organization of Audit Team	Sh. Mukul Yadav, AEN-III (MPT&S), RVPN, Jaipur
		Sh. Munesh Kumar Meena , JEN-I O/o AEN-III (MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K. Jain, SE (Prot. Engg.) RVPNL Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled/ Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
1	**DC system**					
	No. of independent DC Sources	2 nos. 220 VDC	Functional			
	Potential between +ive & earth (Source-1)	64.3 V	-	-	-	-
	Potential between -ive & earth (Source-1)	186 V	-	-	-	-
	Potential between +ive & earth (Source-2)	118 V	-	-	-	-
	Potential between -ive & earth (Source-2)	110 V	-	-	-	-
2	Event Logger panel	No	-	-	-	-
3	Event Logger Time Synchronised	NA	-	-	-	-
	Disturbance Recorder	NA	-	-	-	-
	DR Time Synchronised	NA	-	-	-	-
4	Bus bar Protection	Yes	Functional	Numerical	120 % Pickup	Complying
	Stability Check	Yes(On Running load)	-	-	-	-
	EL output for this event	No	-	-	-	-
	DR if available	No	-	-	-	-
5	DG Set	No	-	-	-	-
	Mock testing of a sample protection associated with transmission line* **	Yes/ No	i. If Yes then observation..... ii. If no, the reason for the same.....			
6	**Local Breaker Back Up(For Line)**		-	Numerical	-	-
	Retrip	Yes	Enabled	-	-	Complying
	Current and Time Setting	Yes	-	-	PU-120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	Yes	Functional	-	-	Complying
	Earth Fault	No	Disabled	-	-	Complying
	Event logger operation	Yes	In built feature of numerical LBB relay			

Name. Signature & Contact No. of team Carrying out Protection audit:	1. Mukul Yadav, AEN-III (MPT&S), Jaipur 9413382334	
	2. Munesh Kr. Meena, JEN-I O/o AEN-III (MPT&S), Jaipur 9413383124	
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:	1. Dinesh Kumar Jain, SE (Prot.Engg.), RVPN, Jaipur, 9413393540	

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit dt 28.6.24

A. General Information

(i) Name of Utility:- 220 KV GSS Madri
(ii) Name of Voltage Level of Sub Station:- 220/132 KV
(iii) Date of Commission ng:-19.02.1977
(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus
(v) Name and Organization of Audit Team:- XEN / AEN (MPT&S) RVPNL , Udaipur
(vi)Name of representative from utility whose audit being carried out:-XEN / AEN(MPT&S) RVPNL , Madri

B. Check List for Protection Audit

S.No	Check		Functional/NonFunctional/ Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Transformer Protection Panel:					
(i)	**Name of Transformer (Rating/Capacity)**	**220/132KV , 100MVA TELK T/F**				
	Tripping by Buchholz relay (Alarm)	YES	Functional	Conventional		
	Differential Protection	YES	Functional	Numerical	As per code of configuration .	
	2nd Harmonic Block (Setting)	YES	Enable			
	Event logger Operation	NO				
	Restricted Earth Fault Protection (HV Side)	YES	Enable		20%	
	Event logger Operation	Yes/No				
	Restricted Earth Fault Protection (LV Side)	YES	Enable		20%	
	Event logger Operation	Yes/No				
	Backup Over Current	YES	Enable		65% , .16	
	Event logger Operation	NO				
	Earth Fault Protection	YES	Enable		20% , 0.16	
	Event logger Operation	NO				
	Over Flux Protection	YES	Enable		110% , 5Sec.	
	Event logger Operation	NO			120% , 1Sec.	
	Local Breaker Back Up	Yes	Disable		10%	
	Retrip	YES		[illegible] RELAY	250m	
	Current and Time Setting	Yes/No			500m	
	Separate Single and three Phase Initiation	NO				
	Earth Fault	Yes/No				
	Event logger Operation	NO				
(ii)	**Name of Transformer (Rating/Capacity)**	**220/132KV , 160MVA TELK T/F**				
	Tripping by Buchholz relay (Alarm)	YES	Functional	Conventional		
	Differential Protection	YES	Functional	Numerical	As per code of configuration .	
	2nd Harmonic Block (Setting)	YES	Enable			
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	YES	Enable			
	Event logger Operation	Yes/No				
	Restricted Earth Fault Protection (LV Side)	YES	Enable			
	Event logger Operation	Yes/No				
	Backup Over Current	YES	Enable			
	Event logger Operation	Yes/No				
	Earth Fault Protection	YES	Enable			
	Event logger Operation	Yes/No				
	Over Flux Protection	Yes	Enabled			

Executive Engineer (MPT&S)
R.R.V.P.N.L., Udaipur

Assistant Engineer (MPT&S)
RRVPNL, UDAIPUR

	Event logger Operation	No				
	Local Breaker Back Up	Yes	Disable			
	Retrip	Yes				
	Current and Time Setting					
	Separate Single and three Phase Initiation	No				
	Earth Fault	No				
	Event logger Operation	No				
(iii)	**Name of Transformer (Rating/Capacity)**	**132/33KV , 20/25 MVA T/F - 1**				
	Tripping by Buchholz relay (Alarm)	YES	Functional	Conventional		
	Differential Protection	YES/NO	Functional	EM- DTH31	30% bias	
	2nd Harmonic Block (Setting)	NO			20% P/U	
	Event logger Operation	NO				
	Restricted Earth Fault Protection (HV Side)	NO				
	Event logger Operation	Yes/No				
	Restricted Earth Fault Protection (LV Side)	NO				
	Event logger Operation	Yes/No				
	Backup Over Current	YES			2.5A , 0.18	
	Event logger Operation	NO				
	Earth Fault Protection	YES			1A , 0.2	
	Event logger Operation	NO				
	Over Flux Protection	NO				
	Event logger Operation	Yes/No				
	Local Breaker Back Up	NO				
	Retrip	NO				
	Current and Time Setting					
	Separate Single and three Phase Initiation	NO				
	Earth Fault	NO				
	Event logger Operation	NO				

(iv)	**Name of Transformer (Rating/Capacity)**	**132/33KV , 20/25 MVA T/F - 2**				
	Tripping by Buchholz relay (Alarm)	YES	Functional	Conventional		
	Differential Protection	YES		EM-DTH 32	20% , P/U	
	2nd Harmonic Block (Setting)	NO			30% , P/U	
	Event logger Operation	NO				
	Restricted Earth Fault Protection (HV Side)	NO				
	Event logger Operation	NO				
	Restricted Earth Fault Protection (LV Side)	NO				
	Event logger Operation	NO				
	Backup Over Current	YES			5A , 0.18%	
	Event logger Operation	NO				
	Earth Fault Protection	YES			1A , 0.2	
	Event logger Operation	NO				
	Over Flux Protection	YES			105%	
	Event logger Operation	NO			120%	
	Local Breaker Back Up	NO				
	Retrip	NO				
	Current and Time Setting					
	Separate Single and three Phase Initiation	NO				
	Earth Fault	NO				
	Event logger Operation	NO				

Executive Engineer (MPT&S)
R.R.V.P.N.L., Udaipur

(iv)	**Name of Transformer (Rating/Capacity)**	**132/33KV , 40/50 MVA T/F - 3**				
	Tripping by Buchholz relay (Alarm)	YES	Functional	Conventional		
	Differential Protection	YES	Functional	ABB RADSB	20% , P/U	
	2nd Harmonic Block (Setting)	NO				
	Event logger Operation	NO				
	Restricted Earth Fault Protection (HV Side)	NO				
	Event logger Operation	NO				
	Restricted Earth Fault Protection (LV Side)	NO				
	Event logger Operation	NO				
	Backup Over Current	YES			90% , 0.2	
	Event logger Operation	NO				
	Earth Fault Protection	YES			20% , 0.23	
	Event logger Operation	NO				
	Over Flux Protection	YES			110% , 0.5Sec	
	Event logger Operation	NO			115% , 1Sec	
	Local Breaker Back Up	NO				
	Retrip	NO				
	Current and Time Setting	NO				
	Separate Single and three Phase Initiation	NO				
	Earth Fault	NO				
	Event logger Operation	NO				

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. **General Information**

(i) Name of Utility:- 220 KV GSS Madri (ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-19.02.1977 (iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN / AEN (MPT&S) RVPNL , Udaipur

(vi)Name of representative from utility whose audit being carried out:-XEN / AEN(MPT&S) RVPNL , Madri

B. Check List for Protection Audit

S.No	Check		Functional/NonFunctional/ Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Distance Protection Panel:M-I/II		Functional	Numerical		
(V)	**Name of Line**		220KV Debari-M-I/M-II		As per code of configuration .	
	Pole Discrepancy Relay	Yes				
	PLCC Panel	Yes				
	Zone-1/2/3/4/5 (Settings)	Yes				
	Time Check-Z-1/2/3/4/5(Settings)	Yes				
	SOTF	Yes/No				
	Aided Scheme	Yes				
	Fault Locator	Yes				
	Power Swing (Setting R & X)					
	All Zone Block	Yes				
	DR	Yes				
	Binary Inputs					
	Breaker Contacts	Yes				
	Carrier Receive	Yes				
	Time Synchronization	NO				
(VI)	**Name of Line**		220KV Banswara-M-I/M-II		As per code of configuration .	
	Pole Discrepancy Relay	Yes	Functional	Numerical		
	PLCC Panel	Yes				
	Zone-1/2/3/4/5 (Settings)	Yes				
	Time Check-Z-1/2/3/4/5(Settings)	Yes				
	SOTF	Yes/No				
	Aided Scheme	Yes				
	Fault Locator	Yes				
	Power Swing (Setting R & X)					
	All Zone Block	Yes				
	DR	Yes				
	Binary Inputs					
	Breaker Contacts	Yes				
	Carrier Receive	Yes				
	Time Synchronization	Yes/No				

Executive Engineer (MPT&S)
R.R.V.P.N.L. Udaipur

Assistant Engineer (MPT&S)
RRVPNL, UDAIPUR

	Distance Protection Panel:M-I/II					
(VII)	Name of Line		132KV Debari			
	Pole Discrepancy Relay	NO	Functional	Numerical	As per code of configuration .	
	PLCC Panel	Yes/No				
	Zone-1/2/3/4/5 (Settings)	Yes/No				
	Time Check-Z-1/2/3/4/5(Settings)	Yes/No				
	SOTF	Yes/No				
	Aided Scheme	Yes				
	Fault Locator	Yes				
	Power Swing (Setting R & X)					
	All Zone Block	Yes				
	DR	Yes				
	Binary Inputs	Yes/No				
	Breaker Contacts	Yes				
	Carrier Receive	Yes				
	Time Synchronization	Yes/No				
(VIII)	Name of Line		132KV Balicha			
	Pole Discrepancy Relay	NO	Functional	Numerical	As per code of configuration .	
	PLCC Panel	Yes				
	Zone-1/2/3/4/5 (Settings)	Yes				
	Time Check-Z-1/2/3/4/5(Settings)	Yes				
	SOTF	No				
	Aided Scheme	Yes				
	Fault Locator	Yes				
	Power Swing (Setting R & X)					
	All Zone Block	Yes				
	DR	Yes				
	Binary Inputs					
	Breaker Contacts	Yes				
	Carrier Receive	Yes				
	Time Synchronization	Yes/No				
(V)	Name of Line		132KV Pratap nagar			
	Pole Discrepancy Relay	NO	Functional	ABB RAZOA	As per code of configuration .	
	PLCC Panel	Yes				
	Zone-1/2/3/4/5 (Settings)	Yes				
	Time Check-Z-1/2/3/4/5(Settings)	Yes				
	SOTF	Yes/No				
	Aided Scheme	NO				
	Fault Locator	NO				
	Power Swing (Setting R & X)	NO				
	All Zone Block	Yes/No				
	DR	NO				
	Binary Inputs	NO				
	Breaker Contacts	NO				
	Carrier Receive	NO				
	Time Synchronization	NO				
(VI)	Name of Line		132KV Reliance Chem-TOSHIBA			
	Pole Discrepancy Relay	NO	Non-Functional	ABB RAZOA	As per code of configuration .	
	PLCC Panel	NO				
	Zone-1/2/3/4/5 (Settings)	NO				
	Time Check-Z-1/2/3/4/5(Settings)	NO				
	SOTF	NO				
	Aided Scheme	NO				
	Fault Locator	NO				
	Power Swing (Setting R & X)	NO				
	All Zone Block	NO				
	DR	NO				
	Binary Inputs	NO				
	Breaker Contacts	NO				
	Carrier Receive	NO				
	Time Synchronization	NO				

Executive Engineer (MPT&S)
R.R.V.P.N.L., Udaipur

Assistant Engineer (MPT&S)
RRVPNL, UDAIPUR

	Distance Protection Panel:M-I/II					
(VII)	**Name of Line**		132KV RSMM			
	Pole Discrepancy Relay	NO	Functional	Numerical	As per code of configuration .	
	PLCC Panel	Yes				
	Zone-1/2/3/4/5 (Settings)	Yes				
	Time Check-Z-1/2/3/4/5(Settings)	Yes				
	SOTF	NO				
	Aided Scheme	NO				
	Fault Locator	Yes				
	Power Swing (Setting R & X)	Yes				
	All Zone Block	Yes				
	DR	Yes				
	Binary Inputs	NO				
	Breaker Contacts	NO				
	Carrier Receive	NO				
	Time Synchronization	NO				
(VIII)	**Name of Line**		132KV Dakan Kotda			
	Pole Discrepancy Relay	NO	Functional	Numerical	As per code of configuration .	
	PLCC Panel	Yes				
	Zone-1/2/3/4/5 (Settings)	Yes				
	Time Check-Z-1/2/3/4/5(Settings)	Yes				
	SOTF	Yes				
	Aided Scheme	NO				
	Fault Locator	Yes				
	Power Swing (Setting R & X)	Yes				
	All Zone Block	Yes				
	DR	Yes				
	Binary Inputs	Yes/No				
	Breaker Contacts	No				
	Carrier Receive	No				
	Time Synchronization	No				

Executive Engineer (MPT&S)
R.R.V.P.N. Udaipur

Assistant Engineer (MPT&S)
RRVPNL UDAIPUR

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Madri

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-19.02.1977

(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN / AEN (MPT&S) RVPNL , Udaipur

(vi)Name of representative from utility whose audit being carried out:-XEN / AEN(MPT&S) RVPNL , Madri

B. Check List for Protection Audit

S.No	Check		Functional/NonFunctional/ Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
1	**DC System**		Functional	117V		
	No. Of Independent DC Source	2				
	Potential Between +ve & Earth (Source-I)	115 V				
	Potential Between -ve & Earth (Source-I)	002 V				
	Potential Between +ve & Earth (Source-II)	116V	Functional	226V		
	Potential Between -ve & Earth (Source-II)	110V				
2	**Event Logger Panel**	No				
3	**Event Logger Time Synchronised**	No				
	Disturbance Recorder	No				
	DR Time Synchronised	No				
4	**Bus Bar Protection**	No				
	Stability Check					
	EL Output for this Event	No				
	DR if Available	No				
5	**DG Set**	No				
6	**Mock Testing of Sample Protection Associated with Transmission line**	No				
7	**LBB/BFR**	No				
	Retrip	No				
	Current and Time Setting	No				
	Separate Single and Three Phase initiation	No				
	Earth Fault	No				
	Event Logger Operation	No				

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Madri

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-19.02.1977

(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN / AEN (MPT&S) RVPNL , Udaipur

(vi)Name of representative from utility whose audit being carried out:-XEN / AEN(MPT&S) RVPNL , Madri

B. Check List for Protection Audit

S.No	Check		Functional/NonFunctional/ Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	NA	No Reactor Installed			
	Tripping by Buchholz relay (Alarm)	No				
	Differential Protection	No				
	2nd Harmonic Block (Setting)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (LV Side)	No				
	Event logger Operation	No				
	Backup Over Current	No				
	Event logger Operation	No				
	Earth Fault Protection	No				
	Event logger Operation	No				
	Over Flux Protection	No				
	Event logger Operation	No				

Executive Engineer (MPT&S)
R.R.V.P.N.L., Udaipur

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Niwana
iii)	Date of Commissioning:	29.03.2016
iv)	Type of Bus Switching Scheme	Two main One Auxillary Bus
v)	Name and Organization of Audit Team	Avdesh Gupta, AEN-II(MPT&S), RVPN, Jaipur
		Kamal Singh Gurjar,JEN-I(O/o AEN-II(MPT&S) RVPN,Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh.D.K.Jain,SE(PROT.ENGG.) ,RVPN, Jaipur

B. Checklist for Protection Audit

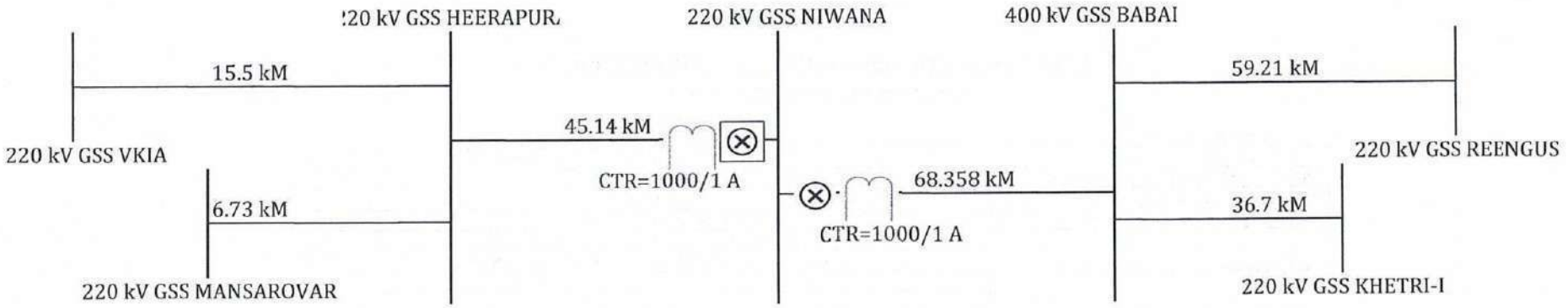
S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Distance protection Panel:M-I/II						
(i)	**Name of Line**	**220 kV HEERAPURA Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=7.369 Ohm, T1=0 ms Z2=9.898 Ohm, T2=350 ms Z3=12.690 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, Phase Z1 Z2+CR 1	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying

	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relays	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
(ii)	**Name of Line**	**220 kV BABAI Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 Sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=11.159 Ohm, T1=0 ms Z2=17.694 Ohm, T2=350 ms Z3=27.240 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying

* Complying with the Code of Configuration issued by the CE(MPT&S), RVPN, Jaipur by Letter no. RVPN/CE/MPT&S/JPR/Tech./F./ Rajkaj ref No. 5221696/D.166 Dated 21.12.2023

Name. Signature & Contact No. of team Carrying out Protection audit:	1. Avdesh Gupta AEN-II(MPT&S), RVPNL,Jaipur 94143346180	
	2. Kamal Singh Gurjar, JEN O/o AEN-II(MPT&S), RVPNL,Jaipur 9413393612	
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:	1. Dinesh Kumar Jain, SE(Prot.Engg.), RVPN, Jaipur, 9413393540	

Distance relay calculation for 220 kV NIWANA-HEERAPURA Line



Principle line Length : 45.14 KM.
Shortest Line Length considered on Remote Bus : 6.73 KM.
Longest line length Considered on Remote Bus : 15.5 KM.

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)
XE/XL=1/3((Xo/X1)-1)
kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

	kZ0	kZ0 angle
	0.734	**-1.83**

Conductor Used : **Zebra**

Conductor Parameters :

	R	X	Z	Angle
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29

CTR: 1000/1 Amp= 1000
PTR: 220000/110 V= 2000
CTR/PTR: 0.5

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (SEZ to PGCIL)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= **7.369** Ohm T1= Instt.

Zone 2 forward Reach= 100% of line length (SEZ to PGCIL)+50 % of the Shortest Line on remote Bus(PGCIL-Chaksu)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **9.898** Ohm T2=350 ms

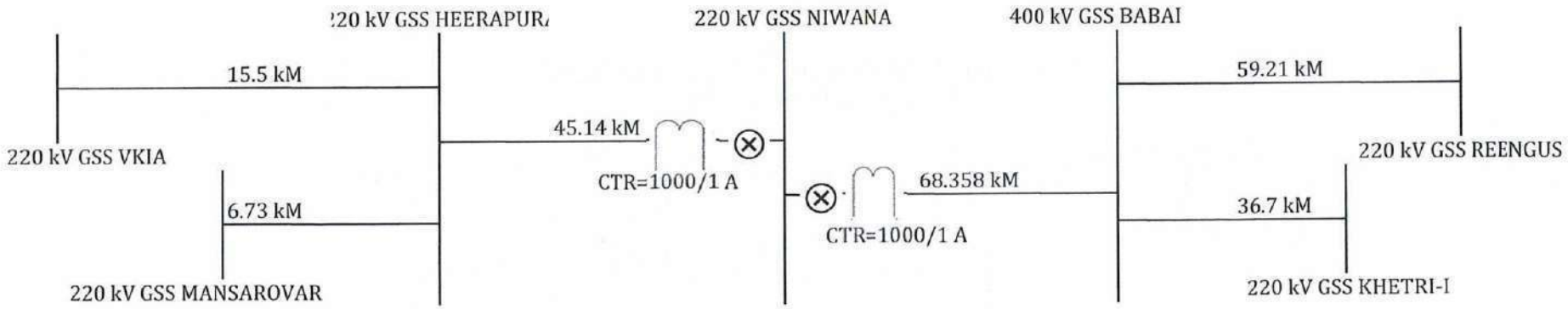
Zone 3 forward Reach=100% of line length (SEZ to PGCIL)+110 % Longest line length on Remote Bus(PGCIL-Vatika)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **12.690** Ohm T3=1000 ms

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **0.408** Ohm T4=160 ms

Distance relay calculation for 220 kV SEZ-Heerapura Line



Principle line Length	:	68.358 KM.
Shortest Line Length considered on Remote Bus	:	36.7 KM.
Longest line length Considered on Remote Bus	:	59.21 KM.

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)
XE/XL=1/3((Xo/X1)-1)
kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

kZ0	**kZ0 angle**
0.734	**-1.83**

Conductor Used : **Zebra**

Conductor Parameters :

	R	**X**	**Z**	**Angle**
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29
CTR:	1000/1 Amp= 1000			
PTR:	220000/110 V= 2000			
CTR/PTR:	0.5			

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (SEZ to Heerapura)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= **11.159** **Ohm** **T1= Instt.**

Zone 2 forward Reach= 100% of line length (SEZ to Heerapura)+50 % of the Shortest Line on remote Bus(Heerapura-NPH)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **17.694** **Ohm** **T2=350 ms**

Zone 3 forward Reach=100% of line length (SEZ to Heerapura)+110 % Longest line length on Remote Bus(Heerapura-Sanganer)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **27.240** **Ohm** **T3=1000 ms**

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **0.408** **Ohm** **T4=160 ms**

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Niwana
iii)	Date of Commissioning:	29.03.2016
iv)	Type of Bus Switching Scheme	Two main One Auxillary Bus
v)	Name and Organization of Audit Team	Avdesh Gupta, AEN-II(MPT&S), RVPN, Jaipur
		Kamal Singh Gurjar,JEN-I(O/o AEN-II(MPT&S) RVPN,Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh.D.K.Jain,SE(PROT.ENGG.) ,RVPN, Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled /Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Transformer Protection Panel						
(i)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 160 MVA BBL make Transformer**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Numerical		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	Yes	Functional	Numerical	42.3 V	Complying
	Event Logger Operation	Yes	In built feature of numerical REF relay			
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Numerical	0.42/0.200	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Earth Fault Protection	Yes	Enabled	Numerical	0.2/0.220	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No(3 phase only)				Complying

Non Directional O/C & E/F relay calculation for 220/132 kV, 160 MVA Transformer-1

Fault MVA of 220 kV BUS	:	4725	MVA
P.U. Impedance of 220 kV BUS		0.0212	
% Imepdance of transformer at Normal Tap		11.59	%
Transformer HV Voltage rating		220000	Volts
Transformer LV Voltage rating		132000	Volts
Transformer MVA Capacity		160	MVA
P.U. Impedance of Transformer		0.072438	
Total P.U. Impedance		0.0936	
Fault MVA of 132 kV BUS	:	1068	MVA
3 Phase through fault Short Circuit Current		4671	Amp
Phase-Phase through fault Short Circuit Current		4045	Amp
Phase to Earth through fault Short Circuit Current		2522	Amp

Non Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	42 % i.e.	420	Amp
Plug Setting Multiplier	9.630952		
Time of Operation	0.6	Seconds	
TMS	0.199		

Non Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	20 % i.e.	200	Amp
Plug Setting Multiplier	12.61		
Time of Operation	0.6	Seconds	
TMS	**0.223**		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	420	Amp
Transformer Full load current LV	700	Amp
Maximum fault current on through fault (If)	6040	Amp
Bushing CT Ratio	1000	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	42.3	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	423	Ohm

Non Directional O/C & E/F relay calculation for 220/132 kV, 160 MVA Transformer2

Fault MVA of 220 kV BUS	:	4725	MVA
P.U. Impedance of 220 kV BUS		0.0212	
% Imepdance of transformer at Normal Tap		11.59	%
Transformer HV Voltage rating		220000	Volts
Transformer LV Voltage rating		132000	Volts
Transformer MVA Capacity		160	MVA
P.U. Impedance of Transformer		0.072438	
Total P.U. Impedance		0.0936	
Fault MVA of 132 kV BUS	:	1068	MVA
3 Phase through fault Short Circuit Current		4671	Amp
Phase-Phase through fault Short Circuit Current		4045	Amp
Phase to Earth through fault Short Circuit Current		2522	Amp

Non Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	42 % i.e.	420	Amp
Plug Setting Multiplier	9.630952		
Time of Operation	0.6	Seconds	
TMS	0.199		

Non Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	20 % i.e.	200	Amp
Plug Setting Multiplier	12.61		
Time of Operation	0.6	Seconds	
TMS	**0.223**		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	420	Amp
Transformer Full load current LV	700	Amp
Maximum fault current on through fault (If)	6040	Amp
Bushing CT Ratio	1000	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	42.3	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	423	Ohm

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Niwana
iii)	Date of Commissioning:	29.03.2016
iv)	Type of Bus Switching Scheme	Two main One Auxillary Bus
v)	Name and Organization of Audit Team	Avdesh Gupta, AEN-II(MPT&S), RVPN, Jaipur Kamal Singh Gurjar,JEN-I(O/o AEN-II(MPT&S) RVPN,Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh.D.K.Jain,SE(PROT.ENGG.) ,RVPN, Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled/ Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
1	**DC system**					
	No. of independent DC Sources	1 nos. 220 VDC	Functional			
	Potential between +ive & earth (Source-1)	118 V	-	-	-	-
	Potential between -ive & earth (Source-1)	115 V	-	-	-	-
	Potential between +ive & earth (Source-2)	-	-	-	-	-
	Potential between -ive & earth (Source-2)	-	-	-	-	-
2	Event Logger panel	No	-	-	-	-
3	Event Logger Time Synchronised	NA	-	-	-	-
	Disturbance Recorder	NA	-	-	-	-
	DR Time Synchronised	NA	-	-	-	-
4	Bus bar Protection	NA	-	-	-	-
	Stability Check	-	-	-	-	-
	EL output for this event	-	-	-	-	-
	DR if available	-	-	-	-	-
5	DG Set	NA	-	-	-	-
	Mock testing of a sample protection associated with transmission line* **	Yes/ No	i. If Yes then observation..... ii. If no, the reason for the same.....			
6	**Local Breaker Back Up(For Line)**		-	Numerical	-	-
	Retrip	Yes	Enabled	-	-	Complying
	Current and Time Setting	Yes	-	-	PU-120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	Yes	Functional	-	-	Complying
	Earth Fault	No	Disabled	-	-	Complying
	Event logger operation	Yes	In built feature of numerical LBB relay			

Name. Signature & Contact No. of team Carrying out Protection audit:	1. Avdesh Gupta AEN-II(MPT&S), RVPNL,Jaipur 94143346180	
	2. Kamal Singh Gurjar, JEN O/o AEN-II(MPT&S), RVPNL,Jaipur 9413393612	
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:	1. Dinesh Kumar Jain, SE(Prot.Engg.), RVPN, Jaipur, 9413393540	

	Earth Fault	No				Complying
	Event logger	Yes	In built feature of numerical LBB relay			
(ii)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 160 MVA BBL make Transformer**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Numerical		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	Yes	Functional	Numerical	42.3 V	Complying
	Event Logger Operation	Yes	In built feature of numerical REF relay			
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Numerical	0.42/0.200	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Earth Fault Protection	Yes	Enabled	Numerical	0.2/0.220	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No(3 phase only)				Complying
	Earth Fault	No				Complying
	Event logger	Yes	In built feature of numerical LBB relay			

Name. Signature & Contact No. of team Carrying out Protection audit:	1. Avdesh Gupta AEN-II(MPT&S), RVPNL,Jaipur 94143346180	
	2. Kamal Singh Gurjar, JEN O/o AEN-II(MPT&S), RVPNL,Jaipur 9413393612	
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:	1. Dinesh Kumar Jain, SE(Prot.Engg.), RVPN, Jaipur, 9413393540	

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED
Corporate Identity Number (CIN):U40109RJ2000SGCO16485
Regd. Office: Vidyut Bhawan, Janpath, Jyoti Nagar, Jaipur-302005

RVPN
AN ISO: 9001:2015
Certified Company

OFFICE OF THE SUPERINTENDING ENGINEER (PROT.-ENGG),
Room No.317, Vidyut Bhawan, Jaipur Tel. No.0141-2740381(Ext.1350)
E-mail: se.prot.engg@rvpn.co.in , Website:www.http://energy.rajasthan.gov.in/rvpnl

No. RVPN/SE/JPR/ (Prot.-Engg)/Tech./F./D.- 33 Jaipur, Dated: 31.05.2024

The Chief Engineer (LD/MPT&S)
RVPN, Jaipur.

Sub:- Regarding internal Protection Audit plan.

Ref:- 1. No. 4/MTGS/SG/NPC/CEA/2023/353 dated 18.09.2023
2. NO.RVPN/SE(Prot.Engg)/JPR/Tech./F./ Raj Kaj No. 6987851 dated 07.05.2024.

Kindly find attach the Internal Protection Audit report of 220 kV GSS MIA, Alwar. The Incharge of the concern GSS was informed to rectify the observations raised during audit with Protection wing, Alwar.

Submitted for further needful action and to appraise NRPC.

Copy forwarded:

1. Superintending Engineer (MPT&S), Jaipur
2. Executive Engineer, 220 kV GSS, MIA, Alwar

RajKaj Ref
7766661

Signature valid
Digitally signed by Dinesh Kumar Jain
Designation : Superintending Engineer
Date: 2024.06.04 17:46:35 IST
Reason: Approved

Northern Regional Power Committee
Report of the Protection Audit

A. General Information:

i. Name of utility :- Rajasthan Rajya Vidyut Prasaran Nigam Ltd.
ii. Name of Voltage level of sub-station :- 220 kV GSS MIA Alwar
iii. Date of commissioning :-08.02.2011
iv. Type of bus-switching scheme :- 220 kV Main Bus
v. Name and Organization of Audit Team :- Rajasthan Rajya Vidyut Prasaran Nigam Ltd.
vi. Name of representative from utility whose audit is being carried out :- Sh. R.R Gupta & Sh. A.K. Meena

B. Check List for Protection Audit

S.No	Check		Functional/ Nonfunctional/ Enabled/Disa bled	Type of relay * (Numerical/Static/ Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
1.	DCsystem					
	No.ofindependentDCSources	1/2/3/4	1&2			01 No DC battery set Required . Purchase case under process
	Potentialbetween+ive& earth(Source-1)	-----V	Nonfunctional			
	Potentialbetween-ive&earth(Source-1)	-----V	Nonfunctional			
	Potentialbetween+ive& earth(Source-2)	-----V	Functional		125 V	Complied
	Potentialbetween-ive&earth (Source-2)	-----V	Functional		100 V	
	Potentialbetween+ive& earth(Source-3)	-----V	-			
	Potentialbetween-ive&earth (Source-3)	-----V	-			
	Potentialbetween+ive& earth(Source-4)	-----V	-			
	Potentialbetween-ive&earth (Source-4)	-----V	-			
2.	EventLogger panel	Yes/No	No			
3.	EventLoggerTime Synchronised	Yes/No	NO			
	DisturbanceRecorder	Yes/No	No			
	DRTimeSynchronised	Yes/No	NO			
4.1	TransformerProtectionPanel:		220/132 KV, 100 MVA ,BHEL TR 01			Complied
	TrippingbyBuchholz relay(Alarm)	Yes/No	Yes			
	DifferentialProtection	Yes/No	Yes	Numerical Relay	0.20 , 8.0	
	2nd HarmonicBlock(Setting)				15%	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	RestrictedEarthFaultProtection(HVside)	Yes/No	Yes	MIT	0.10 In Instt.	
	EventLoggeroperation	Yes/No	No			
	REF Protection(LVside)	Yes/No	-			
	EventLoggeroperation	Yes/No	-			
	Backupovercurrent	Yes/No	Yes	Numerical Relay	0.7 In, 0.20	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	Earth Faultprotection	Yes/No	Yes	Numerical Relay	0.20 In, 0.26	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	Over Flux Protection	Yes/No	Yes	Numerical Relay	110 % 5s ,120 %1s	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	LocalBreaker Back up	Yes/No	Yes	In Bus Bar Relay		
	Retrip	Yes/No	Yes		100 ms	
	Current and Time setting				1.2 In , 100+100ms	
	Seperatesingleandthree phaseinitiation	Yes/No	Yes		Single phase	
	Earthfault	Yes/No	No			
	EventLogger	Yes/No	Yes	In Relay		

		220/132 KV, 100 MVA ,TELK TR 02				Complied
4.2	TransformerProtectionPanel:					
	TrippingbyBuchholz relay(Alarm)	Yes/No	Yes			
	DifferentialProtection	Yes/No	Yes	Numerical Relay	0.20 , 8.0	
	2nd HarmonicBlock(Setting)				15%	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	RestrictedEarthFaultProtection(HVside)	Yes/No	Yes	Numerical	0.10 In Instt.	
	EventLoggeroperation	Yes/No	Yes	In relay		
	REF Protection(LVside)	Yes/No	-			
	EventLoggeroperation	Yes/No	-			
	Backupovercurrent	Yes/No	Yes	Numerical Relay	0.7 In, 0.20	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	Earth Faultprotection	Yes/No	Yes	Numerical Relay	0.20 In, 0.26	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	Over Flux Protection	Yes/No	Yes	Numerical Relay	110 % 5s ,120 %1s	
	EventLoggeroperation	Yes/No	Yes	In Relay		
	LocalBreaker Back up	Yes/No	Yes	In Bus Bar Relay		
	Retrip	Yes/No	Yes		100 ms	
	Current and Time setting				1.2 In , 100+100ms	
	Seperatesingleandthree phaseinitiation	Yes/No	Yes		Single phase	
	Earthfault	Yes/No	No			
	EventLogger	Yes/No	Yes			
5.	ReactorProtectionPanel:		Not available			
	TrippingbyBuchholz relay(Alarm)	Yes/No				
	DifferentialProtection	Yes/No				
	2nd HarmonicBlock(Setting)					
	EventLoggeroperation	Yes/No				
	REFProtection(HVside)	Yes/No				
	EventLoggeroperation	Yes/No				
	REF Protection(LVside)	Yes/No				
	EventLoggeroperation	Yes/No				
	Backupovercurrent	Yes/No				
	EventLoggeroperation	Yes/No				
	E/Fprotection	Yes/No				
	EventLoggeroperation	Yes/No				
	Over Flux Protection	Yes/No				
	EventLoggeroperation	Yes/No				
	LBB/BFR	Yes/No				
	Retrip	Yes/No				
	Current and Time setting					
	Seperatesingleandthree phaseinitiation	Yes/No				
	Earthfault	Yes/No				
	EventLoggeroperation	Yes/No				
			220 kV MIA – Adani (400 kV) Line			Complied
6.1	DistanceProtectionPanel: M-I/II					
	Polediscrepancyrelay	Yes/No	Yes		1.5 Sec	
	PLCCpanel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Timecheck-Z-1/2/3/4/5(Settings)	Yes/No	Yes		0,350,1000,160 s	
	SOTF	Yes/No	Disable			
	Aidedschemes	Yes/No	Yes			
	FaultLocator	Yes/No	Yes	In relay		
	Powerswing (SettingsRandX)					
	All Zone block	Yes/No	Enable			
	DR	Yes/No	Yes			
	Binary Inputs				Available	
	Breaker Contacts	Yes/No	Yes		Available	
	CarrierReceive	Yes/No	Yes			
	TimeSynchronization	Yes/No	Yes			

6.2	**DistanceProtectionPanel: M-I/II**	**220 KV MIA – BADARPUR Line**				Complied
	Polediscrepancyrelay	Yes/No	Yes		1.5 Sec	
	PLCCpanel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Timecheck-Z-1/2/3/4/5(Settings)	Yes/No	Yes		0,350,1000,160 s	
	SOTF	Yes/No	Disable			
	Aidedschemes	Yes/No	Yes			
	FaultLocator	Yes/No	Yes	In relay		
	Powerswing (SettingsRandX)					
	All Zone block	Yes/No	Enable			
	DR	Yes/No	Yes			
	Binary Inputs				Available	
	Breaker Contacts	Yes/No	Yes		Available	
	CarrierReceive	Yes/No	Yes			
	TimeSynchronization	Yes/No	Yes			
6.3	**DistanceProtectionPanel: M-I/II**	**220 kV MIA – ALWAR Line**				Complied
	Polediscrepancyrelay	Yes/No	Yes		1.5 Sec	
	PLCCpanel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Timecheck-Z-1/2/3/4/5(Settings)	Yes/No	Yes		0,350,1000,160 s	
	SOTF	Yes/No	Disable			
	Aidedschemes	Yes/No	Yes			
	FaultLocator	Yes/No	Yes	In relay		
	Powerswing (SettingsRandX)					
	All Zone block	Yes/No	Enable			
	DR	Yes/No	Yes			
	Binary Inputs				Available	
	Breaker Contacts	Yes/No	Yes		Available	
	CarrierReceive	Yes/No	Yes			
	TimeSynchronization	Yes/No	Yes			
7.	**Bus Bar Protection**	Yes/No	Yes	Numerical		
	StabilityCheck		Yes			
	EL output for this event	Yes/No	Yes			
	DR if available	Yes/No	Yes	Available		
8.	**Single Phase Auto Re-closer Scheme**	Yes/No	Yes	AR feature enable in numerical DPS relays		Complied
9.	**CT**					
	Suitable as perfaultlevel		Yes			
10.	**DG Set**	Yes/No	No			
11.	**MockTestingofasampleprotectionassociated with transmission line*****	Yes/No	i. If Yes then observation .....Yes operated properly ii. If no, the reason for the same	**Line tripped on dated 03.05.2024 on 220 KV MIA Adani Line with adopted parameters.**		

* This column is applicable for relays only

** Method and Calculation to arrive at this setting has to be submitted by the utility to NRPC secretariat within 07 days of the protection audit.

** Purpose is to check whether the operation of that protection relay energises the breaker Trip coil.

C. Observation w.r.t. compliance to NRPC protection philosophy

D. Any other Observation/Suggestion by the team of protection expert:

(Name, Signature and Contact Number of Members of team comprising for carrying out protection audit and the representative of the utility whose audit is being carried out)

7.5.2024

R. R. Gupta
AEn (Prot. Engg.) RVPN Jaipur
9413393611

A. K. Meena
AEn (Prot. Engg.) RVPN Jaipur
9413393550

Copy to: (i) Station In-charge where audit has been carried out
(ii) Representative of the utility present with the protection audit team
(iii) SE (O), NRPC

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM

Report of the Protection Audit

Date : 09/07/24

A.General Information:

I. Name of Utility:- RVPNL

II. Name of Voltage Level of sub-station: 220kV

III. Date of Commissioning 28.06.1991

IV. Type of bus-switching scheme:- Main and Aux Bus

V. Name of Organization of Audit Team :- AEN (MPT&S) RVPNL Chittorgarh

VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

S.NO.	Check		Fuctional/ Non-fuctional/ Enabeled/ Disabled	Type of Relay* (Numerical/Static/ Electo-mechanical)	Setting as Found in Field*/**	Compliance status w.r.t. regulatory provisions
	Transformer Protection Panel:					
1	**Name of Transformer(Rating/Capacity)**	220/132kV 100 MVA Tr-1 TELK Make				
	Tripping by Buchholz relay(Alarm)	YES/NO	YES			
	Diffrential Protection	YES/NO	YES	Static	Bias: 20% (CTR: 300/1) Instt: 8A	
	2nd Harmonic Block(Setting)		Internal			
	Event Logger operation	YES/NO	NO			
	Restricted Earth Fault Protection(HV side)	YES/NO	NO			
	Event Logger operation	YES/NO	NO			
	REF Protection(LV side)	YES/NO	NO			
	Event Logger operation	YES/NO	NO			
	Backup over current	YES/NO	YES	Electro-mechanical	Ps: 1A (CTR: 300/1) TMS: 0.35	
	Event Logger operation	YES/NO	NO			
	Earth Fault Protection	YES/NO	YES	Electro-mechanical	Ps: 0.2A (CTR: 300/1) TMS: 0.40	
	Event Logger operation	YES/NO	NO			
	Over flux Protection	YES/NO	YES	Electro-mechanical	K:1.2, t:12s	
	Event Logger operation	YES/NO	NO			
	Local Breaker Back up	YES/NO	NO			
	Retrip	YES/NO	NO			
	Current and Time Setting					
	Separate single and three phase initiation	YES/NO	NO			
	Earth Fault	YES/NO	NO			
	Event Logger	YES/NO	NO			

Assistant Engineer (MPT&S)
RVPNL CHITTORGARH

Date : 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM

Report of the Protection Audit

A.General Information:

I. Name of Utility:- RVPNL

II. Name of Voltage Level of sub-station: 220kV

III. Date of Commissioning 28.06.1991

IV. Type of bus-switching scheme:- Main and Aux Bus

V. Name of Organization of Audit Team :- AEN (MPT&S) RVPNL Chittorgarh

VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

2	**Name of Transformer(Rating/Capacity)**	220/132kV 100 MVA Tr-2 BHEL Make				
	Tripping by Buchholz relay(Alarm)	YES/NO	YES			
	Diffrential Protection	YES/NO	YES	Static	Bias: 35% (CTR: 600/1) Instt: 8A	
	2nd Harmonic Block(Setting)		Internal			
	Event Logger operation	YES/NO	NO			
	Restricted Earth Fault Protection(HV side)	YES/NO	NO			
	Event Logger operation	YES/NO	NO			
	REF Protection(LV side)	YES/NO	NO			
	Event Logger operation	YES/NO	NO			
	Backup over current	YES/NO	YES	Electro-mechanical	Ps: 0.5A (CTR: 600/1) TMS: 0.35	
	Event Logger operation	YES/NO	NO			
	Earth Fault Protection	YES/NO	YES	Electro-mechanical	Ps: 0.2A (CTR: 600/1) TMS: 0.40	
	Event Logger operation	YES/NO	NO			
	Over flux Protection	YES/NO	NO			
	Event Logger operation	YES/NO	NO			
	Local Breaker Back up	YES/NO	NO			
	Retrip	YES/NO	NO			
	Current and Time Setting					
	Separate single and three phase initiation	YES/NO	NO			
	Earth Fault	YES/NO	NO			
	Event Logger	YES/NO	NO			

Assistant Engineer (MPT)
RVPNL, CHITTORGARH

Date: 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM

Report of the Protection Audit

A.General Information:

I. Name of Utility:- RVPNL

II. Name of Voltage Level of sub-station: 220kV

III. Date of Commissioning 28.06.1991

IV. Type of bus-switching scheme:- Main and Aux Bus

V. Name of Organization of Audit Team :- AEN (MPT&S) RVPNL Chittorgarh

VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

3	**Name of Transformer(Rating/Capacity)**	220/132kV 100 MVA Tr-3 TELK Make				
	Tripping by Buchholz relay(Alarm)	YES/NO	YES			
	Diffrential Protection	YES/NO	YES	Numerical	CTR:400/1 Instt: 5A Per Diff. ID: 0.200 A Diff. IR1: 0.656 A Diff IR2: 3A Diff Slop S1: 0.00 Diff Slop S2: 0.200	
	2nd Harmonic Block(Setting)		Internal		Diff. 2nd HAR Ratio: 0.150 Diff. 5th HAR Ratio: 0.350	
	Event Logger operation	YES/NO	YES			
	Restricted Earth Fault Protection(HV side)	YES/NO	YES	Static	Ps: 5%, Time: 0.2s	
	Event Logger operation	YES/NO	YES			
	REF Protection(LV side)	YES/NO				
	Event Logger operation	YES/NO				
	Backup over current	YES/NO	YES	Numerical	Ps: 1A (CTR: 400/1) TMS: 0.35	
	Event Logger operation	YES/NO	YES			
	Earth Fault Protection	YES/NO	YES	Numerical	Ps: 20% (CTR: 400/1) TMS: 0.40	
	Event Logger operation	YES/NO	YES			
	Over flux Protection	YES/NO	YES	Numerical	Alarm: 110%, Time: 5s Trip: 120%, Time: 1s	
	Event Logger operation	YES/NO	YES			
	Local Breaker Back up	YES/NO	NO			
	Retrip	YES/NO	NO			
	Current and Time Setting		NO			
	Separate single and three phase initiation	YES/NO	NO			
	Earth Fault	YES/NO	NO			
	Event Logger	YES/NO	NO			

Assistant Engineer (MPT&S)
RVPNL, CHITTORGARH

Date: 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM
Report of the protection Audit

A. General Information:
I. Name of Utility:- RVPNL
II. Name of Voltage Level of sub-station: 220kV
III. Date of Commissioning 28.06.1991
IV. Type of bus-switching scheme:- 2 Main Bus and Aux. Bus
V. Name of Organization of Audit Team :- R\
VI. Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

S.NO.	Check		Fuctional/ Non-fuctional/ Enabeled/ Disabled	Type of Relay* (Numerical/ Static/ Electo-mechanical)	Setting as Found in Field*/**	Compliance status w.r.t. regulatory provisions
	Distance Protection Panel: M-I			**Numerical**		
1	**Name of Line**	220kV Chittorgarh -RAPPB-I				
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4(Setting)	YES/NO	ENABLED		Z1-16.2 Ω/ Z2-31.15Ω/ Z3-69.59 Ω/ Z4-0.326 Ω(reverse)	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				4.10/4.10	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	NO		NO	
	Distance Protection Panel: M-II			**Numerical**		
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		R1-15.92Ω,X1-16.370Ω/ R2-15.92Ω, X2-30.690Ω/ R3-15.92Ω,X3-68.550Ω/ R4-15.92Ω,X4-0.830Ω	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				4.10/4.10	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	N O		NO	

Assistant Engineer (MPT&S)
RVPNL, CHITTORGARH

Date : 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM
Report of the protection Audit

A.General Information:
I. Name of Utility:- RVPNL
II. Name of Voltage Level of sub-station: 220kV
III. Date of Commissioning 28.06.1991
IV. Type of bus-switching scheme:- 2 Main Bus and Aux. Bus
V. Name of Organization of Audit Team :- R\
VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

	Distance Protection Panel: M-I			**Numerical**		
1	**Name of Line**	220kV Chittorgarh -RAPPB-II				
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		Z1-16.2 Ω/ Z2-31.15Ω/ Z3-69.59 Ω/ Z4-0.326 Ω(reverse)	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				4.10/4.10	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	NO		NO	
	Distance Protection Panel: M-II			**Numerical**		
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		R1-15.92Ω,X1-16.370Ω/ R2-15.92Ω, X2-30.690Ω/ R3-15.92Ω,X3-68.550Ω/ R4-15.92Ω,X4-0.830Ω	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	N O		NO	

Assistant Engineer (MPT&S
RVPNL, CHITTORGARH

Date: 09/01/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM
Report of the protection Audit

A.General Information:
I. Name of Utility:- RVPNL
II. Name of Voltage Level of sub-station: 220kV
III. Date of Commissioning 28.06.1991
IV. Type of bus-switching scheme:- 2 Main Bus and Aux. Bus
V. Name of Organization of Audit Team :- R\
VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

	Distance Protection Panel: M-I			**Numerical**		
	Name of Line	220kV Chittorgarh -Hamirgarh				
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		Z1-6.149Ω/ Z2-9.213Ω/ Z3-10.74 Ω/ Z4-0 .326Ω(reverse)	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	NO		NO	
	Distance Protection Panel: M-II			**Numerical**		
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		R1-30Ω, X1-6.029 Ω/ R2-30Ω ,X2-9.213Ω/ R3-30Ω,X3-10.528Ω/ R4-30Ω, X4-0.320Ω	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	N O		NO	

Assistant Engineer (MPT&S)
RVPNL, CHITTORGARH

Date: 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM
Report of the protection Audit

A.General Information:
I. Name of Utility:- RVPNL
II. Name of Voltage Level of sub-station: 220kV
III. Date of Commissioning 28.06.1991
IV. Type of bus-switching scheme:- 2 Main Bus and Aux. Bus
V. Name of Organization of Audit Team :- R\
VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

	Distance Protection Panel: M-I			**Numerical**		
4	**Name of Line**	220kV Chittorgarh - Chittorgarh (400kV GSS)				
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		Z1-0.266mΩ/ Z2-0.762mΩ/ Z3-4.080 Ω/ Z4-0 .065Ω(reverse)	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	NO		NO	
	Distance Protection Panel: M-II			**Numerical**		
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		R1 6Ω, X1 0.260 Ω/ R2 6Ω ,X2 0.748Ω/ R3 6Ω,X3 4.0100Ω/ R4 6Ω, X4 0.650Ω(Rev.)	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	N O		NO	

Assistant Engineer (MPT&S)
RVPNL, CHITTORGARH

Date: 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM
Report of the protection Audit

A.General Information:
I. Name of Utility:- RVPNL
II. Name of Voltage Level of sub-station: 220kV
III. Date of Commissioning 28.06.1991
IV. Type of bus-switching scheme:- 2 Main Bus and Aux. Bus
V. Name of Organization of Audit Team :- R\
VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

	Distance Protection Panel: M-I			**Numerical**		
	Name of Line	220kV Chittorgarh -Sawa				
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		Z1-3.347Ω/ Z2-5.949Ω / Z3-8.480 Ω/ Z4-0 .326Ω(reverse)	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	NO		NO	
	Distance Protection Panel: M-II			**Numerical**		
	Pole discrepancy relay	YES/NO	YES		YES	
	PLCC panel	YES/NO	YES		YES	
	Zone-1/2/3/4/5(Setting)	YES/NO	ENABLED		R1-30Ω, X1- 3.280Ω/ R2- 30Ω ,X2-5.836Ω/ R3- 30Ω,X3-8.320Ω/ R4-30Ω, X4-0.320Ω	
	Time check-Z-1/2/3/4/5(Setting)	YES/NO	ENABLED		0,0.35,1,0.160 sec.	
	SOTF	YES/NO	DISABLED		DISABLED	
	Aided schemes	YES/NO	ENABLED		ENABLED	
	Fault locator	YES/NO	FUNCTIONAL		FUNCTIONAL	
	Power swing (Settings R and X)				1/ 1	
	All Zone Block	YES/NO	YES		YES	
	DR	YES/NO	YES		DR	
	Binary Inputs					
	Breaker Contacts	YES/NO	YES		YES	
	Carrier Receive	YES/NO	YES		YES	
	time Synchronization	YES/NO	N O		NO	

Assistant Engineer (MPT&S)
RVPNL, CHITTORGARH

Date: 09/07/24

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM

Report of the protection Audit

A.General Information:

I. Name of Utility:- RVPNL

II. Name of Voltage Level of sub-station: 220kV

III. Date of Commissioning 28.06.1991

IV. Type of bus-switching scheme:- Main and Aux Bus

V. Name of Organization of Audit Team :- AEN (MPT&S) RVPNL Chittorgarh

VI.Name of Representative from utility whose audit being carrier out :- XEN 220kV GSS Chittorgarh

B. Check list for Protection Audit

S.NO.	Check		Fuctional/ Non-fuctional/ Enabeled/ Disabled	Type of Yearly* (Numerical/Static/ Electo-mechanical)	Setting as Found in Field*/**	Compliance status w.r.t. regulatory provisions
1	**DC System 220V DC system**					
	No. of independent DC Sources	1/2/3/4			2	
	Potential between +ive &earth (Source-1)	V	Functional		100 V	
	Potential between -ive &earth (Source-1)	V			120 V	
	Potential between +ive &earth (Source-2)	V	Defective		Defective	
	Potential between -ive &earth (Source-2)	V			Defective	
	Potential between +ive &earth (Source-3)	V			NA	
	Potential between -ive &earth (Source-3)	V			NA	
	Potential between +ive &earth (Source-4)	V			NA	
	Potential between -ive &earth (Source-4)	V			NA	
2	**Event Logger panel**	YES/NO	NO			
3	**Event Logger Time Synchronised**	YES/NO	NO			
	Distance Recorder	YES/NO	NO			
	DR Tme Synchronised	YES/NO	NO			
4	**Bus Bar Protection**	YES/NO	NO			
	Stability Check					
	EL output for this event	YES/NO				
	DR if available	YES/NO				
5	**DG Set**	YES/NO	NO			
6	**Mock Testing for a sample protection associated with transmission line*** **	YES/NO	I. If yes than observation .... ii. If no, the reason for the same			
	LBB/BFR	YES/NO	NO			
	Retrip	YES/NO	NO			
	Current and Time Setting					
	Separate single and three phase initiation	YES/NO	NO			
	Earth Fault	YES/NO	NO			
	Event Logger operation	YES/NO	NO			

Assistant Engineer (MPT&S)
RVPNL, CHITTORGARH

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

RRVPN 220kV Sitapura S/s

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Sitapura
iii)	Date of Commissioning:	31.03.2015
iv)	Type of Bus Switching Scheme	One and Half Breaker Scheme
v)	Name and Organization of Audit Team	Kapish Sharma, AEN(MPT&S), RVPN, Jaipur
		Seema Choudhary, JEN o/o AEN(MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K.Jain, SE (Prot. Engg.), RVPN , Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled/ Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
1	**DC system**					
	No. of independent DC Sources	1 nos. 220 VDC	Functional			
	Potential between +ive & earth (Source-1)	122.2 V	-	-	-	-
	Potential between -ive & earth (Source-1)	123.0 V	-	-	-	-
2	Event Logger panel	No	-	-	-	-
3	Event Logger Time Synchronised	NA	-	-	-	-
	Disturbance Recorder	NA	-	-	-	-
	DR Time Synchronised	NA	-	-	-	-
4	Bus bar Protection	Yes	Functional	Numerical	120 % Pickup	Complying
	Stability Check	Yes(On Running load)	-	-	-	-
	EL output for this event	No	-	-	-	-
	DR if available	No	-	-	-	-
5	DG Set	No	-	-	-	-
	Mock testing of a sample protection associated with transmission line* **	Yes/ No	i. If Yes then observation..... ii. If no, the reason for the same.....			
6	**Local Breaker Back Up(For Line)**		-	Numerical	-	-
	Retrip	Yes	Enabled	-	-	Complying
	Current and Time Setting	Yes	-	-	PU-120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	Yes	Functional	-	-	Complying
	Earth Fault	No	Disabled	-	-	Complying
	Event logger operation	Yes	In built feature of numerical LBB relay			

*complying with the code of configuration issued by The CE (MPT&S) RVPN, Jaipur by letter no. RVPN/SE/MPT&S/JPR/Tech./F./ Rajkaj ref. No. 5221696/D.166 dated 21.12.2023

Name. Signature & Contact No. of team carriying out	Kapish Sharma, AEN(MPT&S), RVPN, Jaipur	
	Seema Choudhary, JEN o/o AEN(MPT&S), RVPN, Jaipur	
Name. Signature & Contact No. of representative of Utility	Sh. D.K.Jain, SE (Prot. Engg.), RVPN , Jaipur	

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Sitapura
iii)	Date of Commissioning:	31.03.2015
iv)	Type of Bus Switching Scheme	One and Half Breaker Scheme
v)	Name and Organization of Audit Team	Kapish Sharma, AEN(MPT&S), RVPN, Jaipur Seema Choudhary, JEN o/o AEN(MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K.Jain, SE (Prot. Engg.), RVPN , Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled /Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Transformer Protection Panel						
(i)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 100 MVA IMP make Transformer**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Numerical		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	Yes	Functional	Numerical	42.28	Complying
	Event Logger Operation	Yes	In built feature of numerical REF relay			
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Numerical	0.42/0.208	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Earth Fault Protection	Yes	Enabled	Numerical	0.2/0.232	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No(3 phase only)				Complying
	Earth Fault	No				Complying
	Event logger	Yes	In built feature of numerical LBB relay			

*complying with the code of configuration issued by The CE (MPT&S) RVPN, Jaipur by letter no. RVPN/SE/MPT&S/JPR/Tech./F./ Rajkaj ref. No. 5221696/D.166 dated 21.12.2023

Name. Signature & Contact No. of team carriying out	Kapish Sharma, AEN(MPT&S), RVPN, Jaipur Seema Choudhary, JEN o/o AEN(MPT&S), RVPN, Jaipur	
Name. Signature & Contact No. of representative of Utility	Sh. D.K.Jain, SE (Prot. Engg.), RVPN , Jaipur	

Non Directional O/C & E/F relay calculation for 220/132 kV, 100 MVA Transformer

Fault MVA of 220 kV BUS	:	8519	MVA
P.U. Impedance of 220 kV BUS		0.0117	
% Imepdance of transformer at Normal Tap		11.59	%
Transformer HV Voltage rating		220000	Volts
Transformer LV Voltage rating		132000	Volts
Transformer MVA Capacity		160	MVA
P.U. Impedance of Transformer		0.072438	
Total P.U. Impedance		0.0842	
Fault MVA of 132 kV BUS	:	1188	MVA
3 Phase through fault Short Circuit Current		5196	Amp
Phase-Phase through fault Short Circuit Current		4500	Amp
Phase to Earth through fault Short Circuit Current		2806	Amp

Non Directional Overcurrent Element Setting

CT Ratio	1000/1		
Plug Setting	420 % i.e.	420	Amp
Plug Setting Multiplier	10.71429		
Time of Operation	0.6	Seconds	
TMS	0.208		

Non Directional Earthfault Element Setting

CT Ratio	1000/1		
Plug Setting	20 % i.e.	200	Amp
Plug Setting Multiplier	14.03		
Time of Operation	0.6	Seconds	
TMS	0.232		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	420	Amp
Transformer Full load current LV	700	Amp
Maximum fault current on through fault (If)	6040	Amp
Bushing CT Ratio	1000	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	42.3	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	423	Ohm

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Sitapura
iii)	Date of Commissioning:	31.03.2015
iv)	Type of Bus Switching Scheme	One and Half Breaker Scheme
v)	Name and Organization of Audit Team	Kapish Sharma, AEN(MPT&S), RVPN, Jaipur Seema Choudhary, JEN o/o AEN(MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K.Jain, SE (Prot. Engg.), RVPN , Jaipur

B. Checklist for Protection Audit

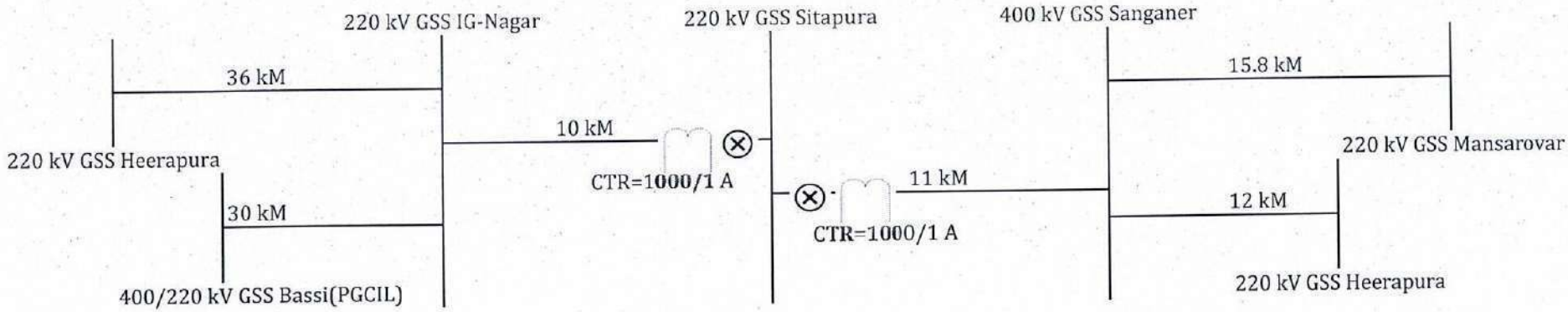
S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Distance protection Panel:M-I/II						
(i)	**Name of Line**	**220 kV IG Nagar Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=1.632 Ohm, T1=0 ms Z2=5.101 Ohm, T2=350 ms Z3=10.121 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying

S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relays	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
(ii)	**Name of Line**	**220 kV Sanganer Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 Sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=1.796 Ohm, T1=0 ms Z2=3.469 Ohm, T2=350 ms Z3=5.791 Ohm, T3=1000 ms Z4(Rev.)=408 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying

*complying with the code of configuration issued by The CE (MPT&S) RVPN, Jaipur by letter no. RVPN/SE/MPT&S/JPR/Tech./F./ Rajkaj ref. No. 5221696/D.166 dated 21.12.2023

Name. Signature & Contact No. of team carriying out	Kapish Sharma, AEN(MPT&S), RVPN, Jaipur Seema Choudhary, JEN o/o AEN(MPT&S), RVPN, Jaipur	
Name. Signature & Contact No. of representative of Utility	Sh. D.K.Jain, SE (Prot. Engg.), RVPN , Jaipur	

Distance relay calculation for 220 kV Sitapura-IG Nagar Line



Principle line Length : 10 KM.
Shortest Line Length considered on Remote Bus 30 KM.
Longest line length Considered on Remote Bus 36 KM.

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)
XE/XL=1/3((Xo/X1)-1)
kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

	kZ0	kZ0 angle
	0.734	**-1.83**

Conductor Used : **Zebra**

Conductor Parameters :

	R	X	Z	Angle
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29

CTR: 1000/1 Amp= 1000
PTR: 220000/110 V= 2000
CTR/PTR: 0.5

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (SEZ to PGCIL)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 1.632 **Ohm** **T1= Instt.**

Zone 2 forward Reach= 100% of line length (SEZ to PGCIL)+50 % of the Shortest Line on remote Bus(PGCIL-Chaksu)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 5.101 **Ohm** **T2=350 ms**

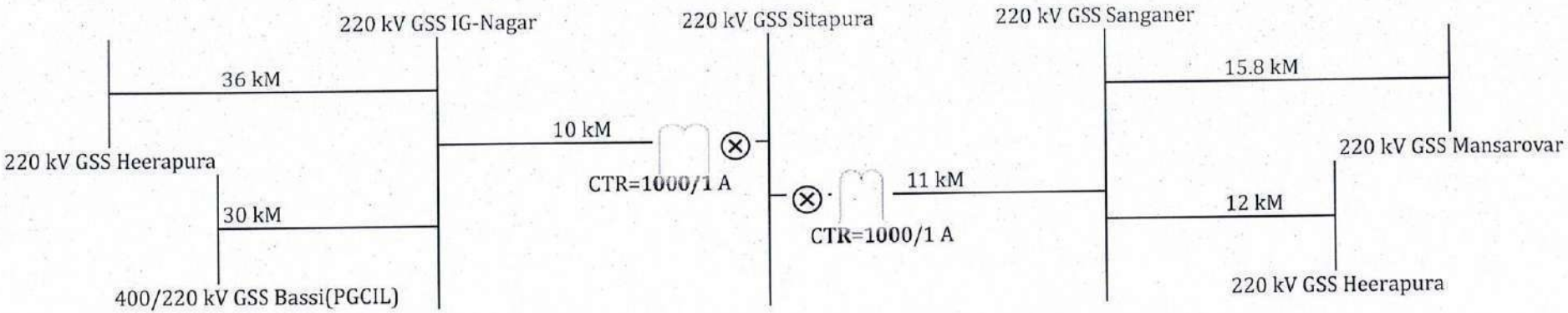
Zone 3 forward Reach=100% of line length (SEZ to PGCIL)+110 % Longest line length on Remote Bus(PGCIL-Vatika)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 10.121 **Ohm** **T3=1000 ms**

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.408 **Ohm** **T4=160 ms**

Distance relay calculation for 220 kV Sitapura-Heerapura Line



Principle line Length : 11 KM.
Shortest Line Length considered on Remote Bus 12 KM.
Longest line length Considered on Remote Bus 15.8 KM.

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)
XE/XL=1/3((Xo/X1)-1)
kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

kZ0	kZ0 angle
0.734	-1.83

Conductor Used : Zebra

Conductor Parameters :

	R	X	Z	Angle
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29

CTR: 1000/1 Amp= 1000
PTR: 220000/110 V= 2000
CTR/PTR: 0.5

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (Sitapura to Sanganer)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= **1.796** **Ohm** **T1= Instt.**

Zone 2 forward Reach= 100% of line length (Sitapura to Sanganer)+50 % of the Shortest Line on remote Bus(Sanganer to Heerapura)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **3.469** **Ohm** **T2=350 ms**

Zone 3 forward Reach=100% of line length (Sitapura to Sanganer)+110 % Longest line length on Remote Bus(Sanganer to Mansarovar)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **5.791** **Ohm** **T3=1000 ms**

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **0.408** **Ohm** **T4=160 ms**

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit on dated 14.06.2024

A. General Information

(i) Name of Utility - 400KV GSS BHILWARA
(ii) Name of Voltage Level of Sub Station - 400/220 kV
(iii) Date of Commissioning - 30 03 2010
(iv) Type of Bus Switching Scheme - 400KV Main Bus I & II
(v) Name and Organization of Audit Team - XEN (MPT&S) RVPNL BHILWARA
(vi)Name of representative from utility whose audit being carried out - XEN 400KV GSS RVPNL BHILWARA

B. Check List for Protection Audit

S No	Check		Functional/NonFunctional /Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w r t regulatory provisions
	Transformer Protection Panel:					
(i)	**Name of Transformer/ICT (Rating/Capacity)**	**400/220/33KV, 500 MVA Transformer-I (SIEMENSEMake)**				
	Tripping by Buchholz relay (Alarm)	Yes/ No	Functional	Conventional		
	Differential Protection	Yes/ No	Functional	Numerical	0.20, 8.0	
	2nd Harmonic Block (Setting)	Yes/ No	Enabled		15%	
	Event logger Operation	Yes/ No	SAS Installed			
	Restricted Earth Fault Protection (HV Side)	Yes/ No	Functional	Numerical	20% inst	
	Event logger Operation	Yes/ No	SAS Installed			
	Restricted Earth Fault Protection (LV Side)	Yes/ No	Functional	Numerical	20% inst	
	Event logger Operation	Yes/ No	SAS Installed			
	Backup Over Current	Yes/ No	Functional	Numerical	0.81, 0.230	
	Event logger Operation	Yes/ No	SAS Installed			
	Earth Fault Protection	Yes/ No	Functional	Numerical	0.2, 0.350	
	Event logger Operation	Yes/ No	SAS Installed			
	Over Flux Protection	Yes/ No	Enabled	Numerical	Alarm 110%, 5 Sec and Trip	
	Event logger Operation	Yes/ No	SAS Installed			
	Local Breaker Back Up	Yes/ No	Functional	Numerical		
	Retrip	Yes/ No	Enabled		100 mSec	
	Current and Time Setting	Yes/ No	Enabled		120%, 100+100 mSec	
	Separate Single and three Phase Initiation	Yes/ No	Enabled		Single phase initiation	
	Earth Fault	Yes/ No	Disable			
	Event logger Operation	Yes/ No	SAS Installed			
(ii)	**Name of Transformer (Rating/Capacity)**	**400/220/33 KV 315 MVA make AREVA**				
	Tripping by Buchholz relay (Alarm)	Yes/ No	Functional	Conventional		
	Differential Protection	Yes/ No	Functional	Numerical	0.2, 8.0	
	2nd Harmonic Block (Setting)	Yes/ No	Enabled		15%	
	Event logger Operation	Yes/ No	SAS Installed			
	Restricted Earth Fault Protection (HV Side)	Yes/ No	Functional	Numerical	0.2 Inst	
	Event logger Operation	Yes/ No	SAS Installed			
	Restricted Earth Fault Protection (LV Side)	Yes/ No	Functional	Numerical	0.2, Inst	
	Event logger Operation	Yes/ No	SAS Installed			
	Backup Over Current	Yes/ No	Functional	Numerical	0.51, 0.230	
	Event logger Operation	Yes/ No	SAS Installed			
	Earth Fault Protection	Yes/ No	Functional	Numerical	0.2, 0.310	
	Event logger Operation	Yes/ No	SAS Installed			
	Over Flux Protection	Yes/ No	Enabled	Numerical	Alarm 110%, 5 Sec and Trip	
	Event logger Operation	Yes/ No	SAS Installed			
	Local Breaker Back Up	Yes/ No	Functional	Numerical		
	Retrip	Yes/ No	Enabled		100 mSec	
	Current and Time Setting	Yes/ No	Enabled		120%, 100 +100 mSec	
	Separate Single and three Phase Initiation	Yes/ No	Enabled		Single phase initiation	
	Earth Fault	Yes/ No	Disable			
	Event logger Operation	Yes/ No	SAS Installed			

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility - 400KV GSS BHILWARA

(ii) Name of Voltage Level of Sub Station - 400/220 kv

(iii) Date of Commissioning - 30.03.2010

(iv) Type of Bus Switching Scheme - 400KV Main Bus I & II

(v) Name and Organization of Audit Team - XEN (MPI&S) RVPNL BHILWARA

(vi)Name of representative from utility whose audit being carried out - XEN 400KV GSS RVPNL BHILWARA

B. Check List for Protection Audit

S No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w r t regulatory provisions
	Distance Protection Panel:M-I/II					
(I)	**Name of Line**	**400KV Bhilwara Chhabra**				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		
	Distance Protection Panel:M-I/II					
(II)	**Name of Line**	**400KV Bhilwara- Chittorgarh-I**				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechenical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		
	Distance Protection Panel:M-I/II					
(I)	**Name of Line**	**400KV Bhilwara- Chittorgarh-II**				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

(I)	Name of Line	400KV Bhilwara-Ajmer -I				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

(I)	Name of Line	400KV Bhilwara-Ajmer -II				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

220 kv feeders

(I)	Name of Line	220KV Bhilwara- Inter connector -I				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

(I)	Name of Line	220KV Bhilwara- Inter connector -II				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

(I)	Name of Line	220KV Bhilwara- Baman Tukada				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

(I)	Name of Line	220KV Bhilwara- Pali				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

(I)	Name of Line	220KV Bhilwara- JSW				
	Pole Discrepancy Relay	Yes/ No	Functional	Electromechanical	1.5s	
	PLCC Panel	Yes/ No	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes/ No	Enabled	Numerical	As per Line length 0, 0.350 , 1.00 ,0.160 s	
	Time Check-Z-1/2/3/4/5(Settings)	Yes/ No	Enabled			
	SOTF	Yes/ No	Disabled			
	Aided Scheme	Yes/ No	Enabled			
	Fault Locator	Yes/ No	Enabled			
	Power Swing (Setting R & X)	Yes/ No	Enabled			
	All Zone Block	Yes/ No	Enabled			
	DR	Yes/ No	Enabled			
	Binary Inputs	Yes/ No	Enabled			
	Breaker Contacts	Yes/ No	Enabled			
	Carrier Receive	Yes/ No	Enabled			
	Time Synchronization	Yes/ No	Enabled	Through SAS		

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility - 400KV GSS BHILWARA

(ii) Name of Voltage Level of Sub Station - 400/220 kv

(iii) Date of Commissioning - 30.03.2010

(iv) Type of Bus Switching Scheme - 400KV Main Bus I & II

(v) Name and Organization of Audit Team - XEN (MPT&S) RVPNL BHILWARA

(vi)Name of representative from utility whose audit being carried out - XEN 400KV GSS RVPNL BHILWARA

B. Check List for Protection Audit

S.No	Check		Functional/NonFunctional /Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
1	**DC System**		Functional			
	No. Of Independent DC Source	2	1 & 2			
	Potential Between +ve & Earth (Source-I)	V	Fuctional		140 V	
	Potential Between -ve & Earth (Source-I)	V	Fuctional		80 V	
	Potential Between +ve & Earth (Source-II)	V	Fuctional		130 V	
	Potential Between -ve & Earth (Source-II)	V	Fuctional		100 V	
2	**Event Logger Panel**	Yes/ No	No			
3	**Event Logger Time Synchronised**	Yes/ No	No			
	Disturbance Recorder	Yes/ No	No			
	DR Time Synchronised	Yes/ No	No			
4	**Bus Bar Protection**	Yes/ No	Yes, Fuctional			
	Stability Check	Yes/ No	Yes, Fuctional			
	EL Output for this Event	Yes/ No	Yes, Fuctional			
	DR if Available	Yes/ No	Yes, Fuctional			
5	**DG Set**	Yes/ No	Manual			
6	**Mock Testing of Sample Protection Associated with Transmission line**	Yes/ No	Satisfactory			
	LBB/BFR	Yes/ No	Functional	Numerical		
	Retrip	Yes/ No	Enabled		100 mSec	
	Current and Time Setting	Yes/ No	Enabled		120%a , 100 mSec	
	Separate Single and Three Phase initiation	Yes/ No	Enabled		Three phase initiation	
	Earth Fault	Yes/ No	Disable			
	Event Logger Operation	Yes/ No	SAS Installed			

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility - 400KV GSS BHILWARA

(ii) Name of Voltage Level of Sub Station - 400/220 kV

(iii) Date of Commissioning - 30.03.2010

(iv) Type of Bus Switching Scheme - 400KV Main Bus I & II

(v) Name and Organization of Audit Team - XEN (MPT&S) RVPNL BHILWARA

(vi)Name of representative from utility whose audit being carried out - XEN 400KV GSS RVPNL BHILWARA

B. Check List for Protection Audit: Bus Reactor

S.No	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	Yes/No	Yes	Numerical		
	Tripping by Buchholz relay (Alarm)	Yes/No	Functional			
	Differential Protection	Yes/No	Yes	Numerical	0.2 & 8.0	
	2nd Harmonic Block (Setting)	Yes/No	Yes		15%	
	Event logger Operation	Yes/No	SAS Installed			
	Restricted Earth Fault Protection (HV Side)	Yes/No	Yes	Numerical	0.2 Inst	
	Event logger Operation	Yes/No	SAS Installed			
	Restricted Earth Fault Protection (LV Side)	Yes/No	No			
	Event logger Operation	Yes/No				
	Backup Over Current	Yes/No	Yes	Numerical	0.5, 0.350ms	
	Event logger Operation	Yes/No	SAS Installed			
	Earth Fault Protection	Yes/No	Yes	Numerical	0.2, 0.350ms	
	Event logger Operation	Yes/No	SAS Installed			
	Over Flux Protection	Yes/No	No			
	Event logger Operation	Yes/No	No			

A. General Information

(i) Name of Utility - 400KV GSS BHILWARA

(ii) Name of Voltage Level of Sub Station - 400/220 kV

(iii) Date of Commissioning - 30.03.2010

(iv) Type of Bus Switching Scheme - 400KV Main Bus I & II

(v) Name and Organization of Audit Team - XEN (MPT&S) RVPNL BHILWARA

(vi)Name of representative from utility whose audit being carried out:- XEN 400KV GSS RVPNL BHILWARA

B. Check List for Protection Audit: - Line Reactor

S.No	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	Yes/No	Yes	Numerical		
	Tripping by Buchholz relay (Alarm)	Yes/No	Functional			
	Differential Protection	Yes/No	Yes	Numerical	0.2 & 8.0	
	2nd Harmonic Block (Setting)	Yes/No	Yes		15%	
	Event logger Operation	Yes/No	SAS Installed			
	Restricted Earth Fault Protection (HV Side)	Yes/No	Yes	Numerical	0.2, Inst	
	Event logger Operation	Yes/No	SAS Installed			
	Restricted Earth Fault Protection (LV Side)	Yes/No	No			
	Event logger Operation	Yes/No				
	Backup Over Current	Yes/No	No			
	Event logger Operation	Yes/No				
	Earth Fault Protection	Yes/No	No			
	Event logger Operation	Yes/No				
	Over Flux Protection	Yes/No	No			
	Event logger Operation	Yes/No	No			

Executive Engineer (MPT&S)
RVPNL, Bhilwara

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit dt 23.08.24

A. General Information

(i) Name of Utility:- 220 KV GSS Amberi

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 08.09.2017

(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL , Udaipur

(vi)Name of representative from utility whose audit being carried out:-XEN 220KV GSS Amberi

B. Check List for Protection Audit

S.No	Check		Functional NonFunctional Enabled Disabled	Type of Relay (Numerical Static Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Transformer Protection Panel:					
(i)	**Name of Transformer (Rating/Capacity)**	**220/132KV , 160MVA BHEL**				
	Tripping by Buchholz relay (Alarm)	YES	Enable			
	Differential Protection	YES	Enable	Numerical	As per code of configuration20 %	
	2nd Harmonic Block (Setting)	YES	Enable			
	Event logger Operation	NO				
	Restricted Earth Fault Protection (HV Side)	YES	Enable		20%	
	Event logger Operation	Yes No				
	Restricted Earth Fault Protection (LV Side)	YES	Enable		20%	
	Event logger Operation	Yes No				
	Backup Over Current	YES	Enable		.42% 0.25%	
	Event logger Operation	NO				
	Earth Fault Protection	YES	Enable		20% , 0.30	
	Event logger Operation	NO				
	Over Flux Protection	YES	Enable		110% , 5Sec.120% , 1Sec.	
	Event logger Operation	NO				
	Local Breaker Back Up in bus bar	YES	Enable			
	Retrip	YES	Enable			
	Current and Time Setting	Yes No			1200A	
	Separate Single and three Phase Initiation	NO				
	Earth Fault	Yes No				
	Event logger Operation	NO				
(ii)	**Name of Transformer (Rating/Capacity)**	**132/33KV ,20/25MVA TR**				
	Tripping by Buchholz relay (Alarm)	YES	Enable			
	Differential Protection	YES	Enable	Numerical	As per code of configuration .15%	
	2nd Harmonic Block (Setting)	YES	Enable			
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	YES	Enable		20%	
	Event logger Operation	Yes No				
	Restricted Earth Fault Protection (LV Side)	YES	Enable		20%	
	Event logger Operation	Yes No				
	Backup Over Current	YES	Enable		.42% 0.18%	
	Event logger Operation	Yes No				
	Earth Fault Protection	YES	Enable		20% , 0.25	
	Event logger Operation	Yes No				
	Over Flux Protection	Yes	Enabled		110% , 5Sec.120% , 1Sec.	
	Event logger Operation	No				
	Local Breaker Back Up	YES				
	Retrip	Yes				
	Current and Time Setting					
	Separate Single and three Phase Initiation	No				
	Earth Fault	No				
	Event logger Operation	No				
	Earth Fault	NO				
	Event logger Operation	NO				

XEN (MPT & S)
RRVPNL, Udaipur

Assistant Engineer (MPT&S)
RRVPNL, UDAIPUR

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Amberi

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-08.09.2017

(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN , 220KV GSS RVPNL Amberi

B. Check List for Protection Audit

S.No	Check		Functional NonFunctional Enabled Disabled	Type of Relay (Numerical Static El ectromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Distance Protection Panel:M-I/II					
III	**Name of Line : 220KV Debari-M-I/M-II**		Functional	Numerical	As per code of configuration .	
	Pole Discrepancy Relay	Yes	Enabled			
	PLCC Panel	Yes	Enabled			
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled			
	Time Check-Z-1 2 3 4 5(Settings)	Yes	Enabled			
	SOTF	NO				
	Aided Scheme	Yes	Enabled			
	Fault Locator	Yes	Enabled			
	Power Swing (Setting R & X)					
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs					
	Breaker Contacts	Yes	Enabled			
	Carrier Receive	Yes	Enabled			
	Time Synchronization	NO	Enabled			
	Distance Protection Panel:M-I/II					
IV	**Name of Line : 220KV PGCIL-M-I/M-II**		Functional	Numerical	As per code of configuration .	
	Pole Discrepancy Relay	Yes	Enabled			
	PLCC Panel	Yes	Enabled			
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled			
	Time Check-Z-1 2 3 4 5(Settings)	Yes	Enabled			
	SOTF	NO				
	Aided Scheme	Yes	Enabled			
	Fault Locator	Yes	Enabled			
	Power Swing (Setting R & X)					
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs					
	Breaker Contacts	Yes	Enabled			
	Carrier Receive	Yes	Enabled			
	Time Synchronization	Yes No	Enabled			
V	**Name of Line : 132KV Sukher -I**		Functional	Numerical	As per code of configuration .	
	Pole Discrepancy Relay	NO				
	PLCC Panel	NO				
	Zone-1 2 3 4 5 (Settings)	Yes No	Enabled			
	Time Check-Z-1 2 3 4 5(Settings)	Yes No	Enabled			
	SOTF	NO				
	Aided Scheme	NO				
	Fault Locator	Yes	Enabled			
	Power Swing (Setting R & X)					
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs					
	Breaker Contacts	Yes	Enabled			
	Carrier Receive	NO				
	Time Synchronization	Yes No	Enabled			

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VI	**Name of Line : 132KV Sukher -II**		Functional	Numerical	As per code of configuration .	
	Pole Discrepancy Relay	NO				
	PLCC Panel	NO				
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled			
	Time Check-Z-1 2 3 4 5(Settings)	Yes	Enabled			
	SOTF	No				
	Aided Scheme	NO				
	Fault Locator	Yes	Enabled			
	Power Swing (Setting R & X)					
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs					
	Breaker Contacts	Yes	Enabled			
	Carrier Receive	NO				
	Time Synchronization	Yes No	Enabled			
VII	**Name of Line : 132KV Sisarama**		Functional	Numerical	As per code of configuration .	
	Pole Discrepancy Relay	NO				
	PLCC Panel	NO				
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled			
	Time Check-Z-1 2 3 4 5(Settings)	Yes	Enabled			
	SOTF	No				
	Aided Scheme	NO				
	Fault Locator	Yes	Enabled			
	Power Swing (Setting R & X)					
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs					
	Breaker Contacts	Yes	Enabled			
	Carrier Receive	NO				
	Time Synchronization	Yes No	Enabled			
VIII	**Name of Line : 132KV Debari**		Functional	Numerical	As per code of configuration .	
	Pole Discrepancy Relay	NO				
	PLCC Panel	NO				
	Zone-1 2 3 4 5 (Settings)	Yes	Enabled			
	Time Check-Z-1 2 3 4 5(Settings)	Yes	Enabled			
	SOTF	No				
	Aided Scheme	NO				
	Fault Locator	Yes	Enabled			
	Power Swing (Setting R & X)					
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs					
	Breaker Contacts	Yes	Enabled			
	Carrier Receive	NO				
	Time Synchronization	Yes No	Enabled			

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Assistant Engineer (MPT&S)
RRVPNL, UDAIPUR

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Amberi

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 08.9.2017

(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN , 220KV GSS RVPNL,Amberi

B. Check List for Protection Audit

S.No	Check		Functional NonFunctional Enabled Disabled	Type of Relay (Numerical Static El ectromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
1	**DC System**		Functional			
	No. Of Independent DC Source	1				
	Potential Between +ve & Earth (Source-I)	117 V				
	Potential Between -ve & Earth (Source-I)	116V				
	Potential Between +ve & Earth (Source-II)					
	Potential Between -ve & Earth (Source-II)					
2	**Event Logger Panel**	No				
3	**Event Logger Time Synchronised**	No				
	Disturbance Recorder	No				
	DR Time Synchronised	No				
4	**Bus Bar Protection**	Yes	Functional			
	Stability Check					
	FL Output for this Event	No				
	DR if Available	Yes	Enable			
5	**DG Set**	No				
6	**Mock Testing of Sample Protection Associated with Transmission line**	No				
7	**LBB/BFR**	Yes	Enable			
	Retrip	Yes	Enable			
	Current and Time Setting	Yes	Enable		1200A	
	Separate Single and Three Phase initiation	Yes	Enable			
	Earth Fault	No				
	Event Logger Operation	No				

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Madri

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-

(iv) Type of Bus Switching Scheme:- Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN , 220KV GSS RVPNL Madri

B. Check List for Protection Audit

S.No	Check		Functional NonFunctional Enabled Disabled	Type of Relay (Numerical Static El ectromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	NA	No Reactor Installed			
	Tripping by Buchholz relay (Alarm)	No				
	Differential Protection	No				
	2nd Harmonic Block (Setting)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (LV Side)	No				
	Event logger Operation	No				
	Backup Over Current	No				
	Event logger Operation	No				
	Earth Fault Protection	No				
	Event logger Operation	No				
	Over Flux Protection	No				
	Event logger Operation	No				

XEN (MPT & S)
RVPNL, Udaipur

Assistant Engineer (MPT&S)
RRVPNL, UDAIPUR

RRVPN 220kV Kota (Sakatpura) S/s

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED
Corporate Identity Number (CIN):U40109RJ2000SGC016485
Regd. Office: Vidyut Bhawan, Janpath, Jyoti Nagar, Jaipur-302005

RVPN
AN ISO: 9001:2015
Certified Company

OFFICE OF THE SUPERINTENDING ENGINEER (PROT.-ENGG),
Room No.317, Vidyut Bhawan, Jaipur Tel. No.0141-2740381(Ext.1350)
E-mail: se.prot.engg@rvpn.co.in , Website:www.http://energy.rajasthan.gov.in/rvpnl

No. RVPN/SE/JPR/ (Prot.-Engg)/Tech./F./D.- 42 Jaipur, Dated: 12.06.2024

The Chief Engineer (LD/MPT&S)
RVPN, Jaipur.

Sub:- Regarding internal Protection Audit plan.

Ref:- 1. No. 4/MTGS/SG/NPC/CEA/2023/353 dated 18.09.2023
2. NO.RVPN/SE(Prot.Engg)/JPR/Tech./F./ Raj Kaj No. 6987851 dated 07.05.2024.

Kindly find attach the Internal Protection Audit report of 220 kV GSS Sakatpura, Kota. The Incharge of the concern GSS was informed to rectify the observations raised during audit with Protection wing, Kota.

Submitted for further needful action and to appraise NRPC.

Copy forwarded:

1. Superintending Engineer (MPT&S), Kota
2. Executive Engineer, 220 kV GSS, Sakatpura, Kota

RajKaj Ref
7999582

Signature valid
Digitally signed by Dinesh Kumar Jain
Designation : Superintending Engineer
Date: 2024.06.12 15:02:55 IST
Reason: Approved

Report of the Protection Audit

A. General Information:

i. Name of utility :- Rajasthan Rajya Vidyut Prasaran Nigam Ltd.
ii. Name of Voltage level of sub-station :- 220 kV GSS RVPN, Sakatpura, Kota
iii. Date of commissioning :-11.07.1971
iv. Type of bus-switching scheme :- A to B, A to D, B to C
v. Name and Organization of Audit Team :- Rajasthan Rajya Vidyut Prasaran Nigam Ltd.
vi. Name of representative from utility whose audit is being carried out :- Sh. R.R Gupta & Sh. A.K. Meena

B. Check List for Protection Audit

S.No	Check		Functional/ Nonfunctional/ Enabled/ Disabled	Type of relay * (Numerical/ Static/ Electro mechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
1.	**DC system**					complied
	No. of independent DC Sources	1/2/3/4	2			
	Potential between +ive & earth (Source-1)	---- V	Functional		148.9	To be replaced
	Potential between -ive & earth (Source-1)	---- V	Functional		85.2	
	Potential between +ive & earth (Source-2)	---- V	Functional		123.7	
	Potential between -ive & earth (Source-2)	---- V	Functional		118.2	
	Potential between +ive & earth (Source-3)	---- V	-			
	Potential between -ive & earth (Source-3)	---- V	-			
	Potential between +ive & earth (Source-4)	---- V	-			
	Potential between -ive & earth (Source-4)	---- V	-			
2.	**Event Logger panel**	Yes/No	Nonfunctional			
3.	**Event Logger Time Synchronised**	Yes/No	-			
	Disturbance Recorder	Yes/No	Nonfunctional			
	DR Time Synchronised	Yes/No	Nonfunctional			
4.1	**Transformer Protection Panel:**		220/132 kV 160 MVA BHEL TR-01			complied
	Tripping by Buchholz relay(Alarm)	Yes/No	Yes			
	Differential Protection	Yes/No	Yes	Numerical Relay	0.20 , 8.0	
	2nd Harmonic Block(Setting)		Enabled		15%	
	Event Logger operation	Yes/No	Yes	In Relay		
	Restricted Earth Fault Protection (HV side)	Yes/No	No			
	Event Logger operation	Yes/No	-			
	REF Protection (LV side)	Yes/No	-			
	Event Logger operation	Yes/No	-			
	Backup over current	Yes/No	Yes	Numerical Relay	0.9 In, 0.20	
	Event Logger operation	Yes/No	Yes	In Relay		
	Earth Fault protection	Yes/No	-	Numerical Relay	0.20 In, 0.26	
	Event Logger operation	Yes/No	Yes	In Relay		
	Over Flux Protection	Yes/No	Yes	Numerical Relay	110 % 5s , 120 %1s	
	Event Logger operation	Yes/No	Yes	In Relay		

	Local Breaker Back up	Yes/No	No			
	Retrip	Yes/No	-			
	Current and Time setting		-			
	Seperate single and three phase initiation	Yes/No	-			
	Earth fault	Yes/No	-			
	Event Logger	Yes/No	-	In Relay		
42	Transformer Protection Panel:		220/132 kV 100 MVA CGL TR-02			complied
	Tripping by Buchholz relay(Alarm)	Yes/No	Yes			
	Differential Protection	Yes/No	Yes	Numerical Relay	0.20 , 8.0	
	2ND Harmonic Block(Setting)		Enabled		15%	
	Event Logger operation	Yes/No	Yes	In Relay		
	Restricted Earth Fault Protection (HV side)	Yes/No	Yes	JVS	0.10 In Instt.	
	Event Logger operation	Yes/No	NO			
	REF Protection (LV side)	Yes/No	-			
	Event Logger operation	Yes/No	-			
	Backup over current	Yes/No	Yes	Numerical Relay	0.7 In, 0.20	
	Event Logger operation	Yes/No	Yes	In Relay		
	Earth Fault protection	Yes/No	-	Numerical Relay	0.20 In, 0.26	
	Event Logger operation	Yes/No	Yes	In Relay		
	Over Flux Protection	Yes/No	Yes	Numerical Relay	110 % 5s , 120 %1s	
	Event Logger operation	Yes/No	Yes	In Relay		
	Local Breaker Back up	Yes/No	No			
	Retrip	Yes/No	-			
	Current and Time setting		-			
	Seperate single and three phase initiation	Yes/No	-			
	Earth fault	Yes/No	-			
	Event Logger	Yes/No	-	In Relay		
43	Transformer Protection Panel:		220/132 kV 100 MVA BHEL TR-03			complied
	Tripping by Buchholz relay(Alarm)	Yes/No	Yes			
	Differential Protection	Yes/No	Yes	Static Relay	0.20 , 8.0	
	2ND Harmonic Block(Setting)		Enabled		15%	
	Event Logger operation	Yes/No	No			
	Restricted Earth Fault Protection (HV side)	Yes/No	No			
	Event Logger operation	Yes/No	-			
	REF Protection (LV side)	Yes/No	-			
	Event Logger operation	Yes/No	-			
	Backup over current	Yes/No	Yes	Electro mechanical	0.7 In, 0.20	
	Event Logger operation	Yes/No	Yes			
	Earth Fault protection	Yes/No	-	Electro mechanical	0.20 In, 0.26	
	Event Logger operation	Yes/No	Yes			
	Over Flux Protection	Yes/No	No			
	Event Logger operation	Yes/No	No			
	Local Breaker Back up	Yes/No	No			
	Retrip	Yes/No	-			
	Current and Time setting		-			
	Seperate single and three phase initiation	Yes/No	-			
	Earth fault	Yes/No	-			
	Event Logger	Yes/No	-	In Relay		
44	Transformer Protection Panel:		220/132 kV 100 MVA BHEL TR-04			complied

	Tripping by Buchholz relay(Alarm)	Yes/No	Yes			
	Differential Protection	Yes/No	Yes	Numerical Relay	0.20 , 8.0	
	2nd Harmonic Block(Setting)		Enabled		15%	
	Event Logger operation	Yes/No	Yes	In Relay		
	Restricted Earth Fault Protection (HV side)	Yes/No	No	MIT	0.10 In Instt.	
	Event Logger operation	Yes/No	-			
	REF Protection (LV side)	Yes/No	-			
	Event Logger operation	Yes/No	-			
	Backup over current	Yes/No	Yes	Numerical Relay	0.7 In, 0.20	
	Event Logger operation	Yes/No	Yes	In Relay		
	Earth Fault protection	Yes/No	-	Numerical Relay	0.20 In, 0.26	
	Event Logger operation	Yes/No	Yes	In Relay		
	Over Flux Protection	Yes/No	Yes	Electro mechanical	110 % 5s ,120%1s	
	Event Logger operation	Yes/No	No			
	Local Breaker Back up	Yes/No	No			
	Retrip	Yes/No	-			
	Current and Time setting		-			
	Seperate single and three phase initiation	Yes/No	-			
	Earth fault	Yes/No	-			
	Event Logger	Yes/No	-	In Relay		
5.	Reactor Protection Panel:		No			
	Tripping by Buchholz relay(Alarm)	Yes/No				
	Differential Protection	Yes/No				
	2nd Harmonic Block (Setting)					
	Event Logger operation	Yes/No				
	REF Protection (HV side)	Yes/No				
	Event Logger operation	Yes/No				
	REF Protection (LV side)	Yes/No				
	Event Logger operation	Yes/No				
	Backup over current	Yes/No				
	Event Logger operation	Yes/No				
	E/F protection	Yes/No				
	Event Logger operation	Yes/No				
	Over Flux Protection	Yes/No				
	Event Logger operation	Yes/No				
	LBB/BFR	Yes/No				
	Retrip	Yes/No				
	Current and Time setting					
	Seperate single and three phase initiation	Yes/No				
	Earth fault	Yes/No				
	Event Logger operation	Yes/No				
6.1	Distance Protection Panel: M-I/II		220 kV Sakatpura-Dahra			complied
	Pole discrepancy relay	Yes/No	Yes		1.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					

	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.2	**Distance Protection Panel: M-I/II**		220 kV SAKATPURA-RAPP A CKT-1			complied
	Pole discrepancy relay	Yes/No	Yes		0.6 Sec	Revised 1.0 to 0.6s
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.3	**Distance Protection Panel: M-I/II**		220 kV SAKATPURA-RAPP A CKT-2			complied
	Pole discrepancy relay	Yes/No	Yes		0.6 Sec	Revised 1.0 to 0.6s
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.4	**Distance Protection Panel: M-I/II**		220 kV SAKATPURA-RAPP A CKT-3			complied
	Pole discrepancy relay	Yes/No	Yes		0.6 Sec	Revised 1.0 to 0.6s
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	

	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.5	**Distance Protection Panel: M-I/II**		**220 kV Sakatpura-Mandalgarh**			**complied**
	Pole discrepancy relay	Yes/No	Yes		1.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.6	**Distance Protection Panel: M-I/II**		**220 kV Sakatpura-Ranpur**			**complied**
	Pole discrepancy relay	Yes/No	Yes		1.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.7	**Distance Protection Panel: M-I/II**		**220 kV Sakatpura- Anta**			**complied**
	Pole discrepancy relay	Yes/No	Yes		1.5 Sec	
	PLCC panel	Yes/No	Yes			

	Zone-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable	Numerical Relay	As per Line Length	
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,2,3,4 Enable		0,350,1000,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.8	Distance Protection Panel: M-I/II		220 kV SAKATPURA-KTPS-1			complied
	Pole discrepancy relay	Yes/No	Yes		0.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable	Numerical Relay	As per Line Length	Line differential relay in used
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable		0,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.9	Distance Protection Panel: M-I/II		220 kV SAKATPURA- KTPS-II			complied
	Pole discrepancy relay	Yes/No	Yes		0.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable	Numerical Relay	As per Line Length	Line differential relay in used
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable		0,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.10	Distance Protection Panel: M-I/II		220 kV SAKATPURA- KTPS- II			complied

	Pole discrepancy relay	Yes/No	Yes		0.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable	Numerical Relay	As per Line Length	Line differential relay in used
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable		0,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
6.11	**Distance Protection Panel: M-I/II**		**220 kV SAKATPURA-KTPS -III**			**complied**
	Pole discrepancy relay	Yes/No	Yes		0.5 Sec	
	PLCC panel	Yes/No	Yes			
	Zone-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable	Numerical Relay	As per Line Length	Line differential relay in used
	Time check-Z-1/2/3/4/5 (Settings)	Yes/No	1,4 Enable		0,160 s	
	SOTF	Yes/No	No			
	Aided schemes	Yes/No	Yes			
	Fault Locator	Yes/No	Yes	In relay		
	Power swing (Settings R and X)					
	All Zone block	Yes/No	Yes			
	DR	Yes/No	Yes			
	Binary Inputs		Yes		Available	
	Breaker Contacts	Yes/No	Yes		Available	
	Carrier Receive	Yes/No	Yes			
	Time Synchronization	Yes/No	No		GPS not available	
7.	**Bus Bar Protection**	Yes/No	No			To be installed
	Stability Check					
	EL output for this event	Yes/No				
	DR if available	Yes/No				
8.	**Single Phase Auto Recloser Scheme**	Yes/No	No			
9.	**CT**		Yes			
	Suitable as per fault level		No			
10.	**DG Set**	Yes/No	No			
11.	**Mock Testing of a sample protection associated with transmission line*** **	Yes/No	i. If Yes then observation ..... ii. If no, the reason for the same	**220 kV Sakatpura RAPP-B Ckt-I AR lockout C-G trip time 59 ms Distance 36.1 km**		

* This column is applicable for relays only

** Method and Calculation to arrive at this setting has to be submitted by the utility to NRPC secretariat within 07 days of the protection audit.

** Purpose is to check whether the operation of that protection relay energises the breaker Trip coil.

C. Observation w.r.t. compliance to NRPC protection philosophy

D. Any other Observation/Suggestion by the team of protection expert:

(Name, Signature and Contact Number of Members of team comprising for carrying out protection audit and the representative of the utility whose audit is being carried out)

R. R. Gupta
AEn (Prot. Engg.) RVPN Jaipur
9413393611

A. K. Meena
AEn (Prot. Engg.) RVPN Jaipur
9413393550

Copy to: (i) Station In-charge where audit has been carried out
(ii) Representative of the utility present with the protection audit team
(iii) SE (O), NRPC

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

Protection Audit for the Month July 2024 (Date of audit 09.07.2024)

A. General Information

(i) Name of Utility:- 220 KV GSS BANSWARA **(ii) Name of Voltage Level of Sub Station:- 220/132 KV**

(iii) Date of Commissioning:-24.03.2004 **(iv) Type of Bus Switching Scheme:- Two Main Bus and Aux. Bus**

(v) Name and Organization of Audit Team:- AEN (MPT&S) RVPNL BANSWARA

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL BANSWARA

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Transformer Protection Panel:					
(1)	**Name of Transformer (Rating/Capacity)**	**220/132, 100MVA Transformer-I (BHEL Make)**				
	Tripping by Buchholz relay (Alarm)	Yes	Functional	Conventional		
	Differential Protection	Yes	Functional	Numerical	Pickup- 0.2 pu, Slope 1 - 0.3, Slope 2- 0.7	
	2nd Harmonic Block (Setting)	Yes	Enabled		15%	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (HV Side)	Yes	Functional	Numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (LV Side)	Yes	Functional	Numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Backup Over Current	Yes	Functional	Numerical	88%, CTR-300/1	
	Event logger Operation	No	(No Event logger Installed)			
	Earth Fault Protection	Yes	Functional	Numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Over Flux Protection	Yes	Enabled	Numerical	Alarm -110%, 5 sec , Trip- As per inverse curve characteristics	
	Event logger Operation	No	(No Event logger Installed)			
	Local Breaker Back Up	YES	Functional	**Static**		
	Retrip		Enabled		100 msec	
	Current and Time Setting	yes			120% Inormal,100 msec	
	Separate Single and three Phase Initiation	no			three phase initiation	
	Earth Fault	no	DISABLED			
	Event logger Operation	no				

Assistant Engineer (MPT&S)
RVPNL, Banswara

(ii)	**Name of Transformer (Rating/Capacity)**	**220/132, 100MVA Transformer-I (TELK Make)**				
	Tripping by Buchholz relay (Alarm)	Yes	Functional	Conventional		
	Differential Protection	Yes	Functional		Pickup- 0.2 pu, Slope 1- 0.2, Slope 2- 0.7	
	2nd Harmonic Block (Setting)	Yes		Static	15% (Inbuilt)	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (HV Side)	No			20%	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (LV Side)	No			20%	
	Event logger Operation	No	(No Event logger Installed)			
	Backup Over Current	Yes	Functional	numerical	66% CTR-400, 1 A	
	Event logger Operation	No	(No Event logger Installed)			
	Earth Fault Protection	Yes	Functional	numerical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Over Flux Protection	Yes	Enabled	numerical	Alarm -110%,5 sec Trip- As per inverse curve characteristics	
	Event logger Operation	No	(No Event logger Installed)			
	Local Breaker Back Up	YES	Functional	**Numerical**		
	Retrip	No	Enabled		100 msec	
	Current and Time Setting	No			120% Inormal,100 msec	
	Separate Single and three Phase Initiation	No			three phase initiation	
	Earth Fault	No	DISABLED			
	Event logger Operation	No	(No Event logger Installed)			

Assistant Engineer (MPT&S)
RVPNL, Banswara

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS BANSWARA

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 24.03.2004

(iv) Type of Bus Switching Scheme:- Two Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- AEN (MPT&S) RVPNL BANSWARA

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL BANSWARA

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Distance Protection Panel:M-I/II					
(I)	**Name of Line**	**220KV BANSWARA-ASPUR LINE**				
	Pole Discrepancy Relay	YES	Functional	ELECTROMECHANICAL	1.5 sec	
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical	As per latest Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	YES	Disabled			
	Aided Scheme	YES	Enabled			
	Fault Locator	YES	Enabled			
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes	ENABLED			
	Breaker Contacts	Yes	ENABLED			
	Carrier Receive	YES	ENABLED			
	Time Synchronization	YES				

Assistant Engineer (MPT&S)
RVPNL, Banswara

(II)	**Name of Line**	**220KV BANSWARA-MADRI LINE**				
	Pole Discrepancy Relay	YES	Functional	ELECTROMECHANICAL	1.5 sec	
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical	As per latest Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	YES	Disabled			
	Aided Scheme	YES	Enabled			
	Fault Locator	YES	Enabled			
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes	ENABLED			
	Breaker Contacts	Yes	ENABLED			
	Carrier Receive	YES	ENABLED			
	Time Synchronization	YES				

Assistant Engineer (MPT&S)
RVPNL, Banswara

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS BANSWARA

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-24.03.2004

(iv) Type of Bus Switching Scheme:- Two Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- AEN (MPT&S) RVPNL BANSWARA

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL BANSWARA

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
1	**DC System (220V DC)**		Functional	Static	20%	
	No. Of Independent DC Source	1				
	Potential Between +ve & Earth (Source-I)	190 V				
	Potential Between -ve & Earth (Source-I)	50 V				
2	**Event Logger Panel**	No				
3	**Event Logger Time Synchronised**	No				
	Disturbance Recorder	No				
	DR Time Synchronised	No				
4	**Bus Bar Protection**	yes				
	Stability Check	yes				
	EL Output for this Event	yes				
	DR if Available	yes				
5	**DG Set**	No				
6	**Mock Testing of Sample Protection Associated with Transmission line**	yes				
7	**LBB/BFR**	No				
	Retrip	No				
	Current and Time Setting	No				
	Separate Single and Three Phase initiation	No				
	Earth Fault	No				
	Event Logger Operation	No				

Assistant Engineer (MPT&S)
RVPNL, Banswara

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility :- 220 KV GSS BANSWARA

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:-24.03.2004

(iv) Type of Bus Switching Scheme:- Two Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- AEN (MPT&S) RVPNL BANSWARA

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL BANSWARA

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	NA	No reactor Installed			
	Tripping by Buchholz relay (Alarm)	No				
	Differential Protection	No				
	2nd Harmonic Block (Setting)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (LV Side)	No				
	Event logger Operation	No				
	Backup Over Current	No				
	Event logger Operation	No				
	Earth Fault Protection	No				
	Event logger Operation	No				
	Over Flux Protection	No				
	Event logger Operation	No				

Assistant Engineer (MPT&S)
RVPNL, Banswara

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit dt 01.08.2024

A. General Information

(i) Name of Utility:- 220 KV GSS Reengus

(ii) Name of Voltage Level of Sub Station:- 220 KV

(iii) Date of Commissioning:-12.01.1984

(iv) Type of Bus Switching Scheme:- 02 NO's Main Bus and Aux. Bus

(v) Name and Organization of Audit Team:- AEN O/O SE (Prot. Engg.) RVPNL ,Jaipur

(vi)Name of representative from utility whose audit being carried out:-SE (Prot. Engg.) RVPNL ,Jaipur

B. Check List for Protection Audit

S.No.	Check		Functional/ NonFunctional/Enabled/ Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Transformer Protection Panel:					
(i)	**Name of Transformer (Rating/Capacity)**	**220/132KV , 160MVA BBL Make T/F-1**				
	Tripping by Buchholz relay (Alarm)	YES	Enable	Conventional		Complying
	Differential Protection	YES	Enable	Numerical	As per code of configuration	Complying
	2nd Harmonic Block (Setting)	YES	Enable	In built feature in Diff. Relay	15.00%	Complying
	Event logger Operation	YES	Enable			
	Restricted Earth Fault Protection (HV Side)	YES	Functional	STATIC	20%	Complying
	Event logger Operation	YES				
	Restricted Earth Fault Protection (LV Side)	NA				
	Event logger Operation	NA				
	Backup Over Current	YES	Enable	Numerical	2.5/ 0.21	Complying
	Event logger Operation	YES				
	Earth Fault Protection	YES	Enable	Numerical	2.5/ 0.23	Complying
	Event logger Operation	YES				
	Over Flux Protection	YES	Enable	In built feature in Diff. Relay		Complying
	Event logger Operation	YES				
	Local Breaker Back Up	YES	Functional	Numerical		Complying
	Retrip	YES	Enable			
	Current and Time Setting	YES	Functional	Numerical	120% for 100 ms+External timer 100 ms	Complying
	Separate Single and three Phase Initiation	No (3 Phase only)				
	Earth Fault	No				
	Event logger Operation	No				
(ii)	**Name of Transformer (Rating/Capacity)**	**220/132KV , 160MVA , IMP Make T/F-2**				
	Tripping by Buchholz relay (Alarm)	YES	Enable	Conventional		Complying
	Differential Protection	YES	Enable	Numerical	As per code of configuration	Complying
	2nd Harmonic Block (Setting)	YES	Enable	In built feature in Diff. Relay	15.00%	Complying
	Event logger Operation	YES	Enable			
	Restricted Earth Fault Protection (HV Side)	YES	Functional	Numerical	20%	Complying
	Event logger Operation	YES				
	Restricted Earth Fault Protection (LV Side)	NA				

	Event logger Operation	NA				
	Backup Over Current	YES	Enable	Numerical	1.0/ 0.22	Complying
	Event logger Operation	YES				
	Earth Fault Protection	YES	Enable	Numerical	1.0/ 0.26	Complying
	Event logger Operation	YES				
	Over Flux Protection	YES	Enable	In built feature in Diff. Relay		Complying
	Event logger Operation	YES				
	Local Breaker Back Up	YES	Functional	Numerical		Complying
	Retrip	YES	Enable			
	Current and Time Setting	YES	Functional	Numerical	120% for 100 ms+External timer 100 ms	Complying
	Separate Single and three Phase Initiation	No (3 Phase only)				
	Earth Fault	No				
	Event logger Operation	No				

* Complying with the code of configuration issued by the CE(MPT&S) ,RVPN. Jaipur by letter No. RVPN/CE/MPT&S/JPR/Tech./F./Rajkaj ref No.5221696/D.166 Dated 21.12.2023

Name: Signature & Contact no. Team carrying out Protection audit:	Sh. R.R.Gupta, AEN O/O SE (Prot. Engg.) RVPNL ,Jaipur	
	A .K. Lamoria ,AEN(MPT&S) ,RVPN , Jhunjhunu	
	Pragya Pandey ,AEN(MPT&S) ,RVPN , Sikar	
	Ramawatar Dhaka ,JEN(MPT&S) RVPN ,Sikar	
Name: Signature & Contact no. Representative of utility whose protection audit is being carried out:Team carrying out Protection audit:	Sh. D.K. Jain ,SE(Prot. Engg.) RVPN , Jaipur	

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Reengus
(ii) Name of Voltage Level of Sub Station:- 220 KV
(iii) Date of Commissioning:-12.01.1984
(iv) Type of Bus Switching Scheme:- 02 NO's Main Bus and Aux. Bus
(v) Name and Organization of Audit Team:- AEN O/O SE (Prot. Engg.) RVPNL ,Jaipur
(vi)Name of representative from utility whose audit being carried out:-SE (Prot. Engg.) RVPNL ,Jaipur

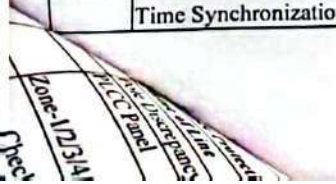
B. Check List for Protection Audit

S.No.	Check		Functional/ NonFunctional/Enabled/ Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Distance Protection Panel:M-I			DIST. M-I SIEMENS		
(V)	**Name of Line**			**220 KV REENGUS-SIKAR 1**		
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=1.48 Ω T1=0.00 ms , X2=2.03 Ω T2=350 ms, X3=2.26 Ω T3=1000 ms, X4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-II			DIST M II- MICOM P442		
(VI)	**Name of Line**			**220 KV REENGUS-SIKAR 1**		
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=1.514 Ω T1=0.00 ms Z2=2.07 Ω T2=350 ms Z3=2.30 Ω T3=1000 ms Z4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			

	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST M I – MICOM P442			
(VII)	**Name of Line**	**220 KV REENGUS-SIKAR II**				
	Pole Discrepancy Relay	YES	Functional			
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=7.57 Ω T1=0.00 ms Z2=10.36 Ω T2=350 ms Z3=11.53 Ω T3=1000 ms Z4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST M II – GE D 60			
(VIII)	**Name of Line**	**220 KV REENGUS-SIKAR II**				
	Pole Discrepancy Relay	YES	Functional			
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=7.57 Ω T1=0.00 ms Z2=10.36 Ω T2=350 ms Z3=11.53 Ω T3=1000 ms Z4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	

	All Zone Block	YES	Enable	In built feature in Dist. Relay		
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST. M-I SIEMENS			
(V)	**Name of Line**		**220 KV REENGUS-LAXMANGARH**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=8.88 Ω T1=0.00 ms X2=18.08 Ω T2=350 ms X3=23.45 Ω T3=1000 ms X4(rev.) = 326 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST. M-II Q-MHO			
(VI)	**Name of Line**		**220 KV REENGUS-LAXMANGARH**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	STATIC	Z1=4.32 Ω T1=0.00 ms Z2=9.56 Ω T2=350 ms Z3=15.21 Ω T3=1000 ms Z4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	NO	NA			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	NO	NA			
	Power Swing (Setting R & X)	YES	Enable	In built feature in Dist. Relay	R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
	DR	NO	NA			
	Binary Inputs	YES	Enable	In built feature in Dist. Relay		Complying
	Breaker Contacts	NO	NA			
	Carrier Receive	YES	Enable	In built feature in Dist. Relay		Complying

	Time Synchronization	NO	NA			
	Distance Protection Panel:M-I		DIST. M-I SIEMENS			
(VII)	**Name of Line**		**220 KV REENGUS-RENWAL**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=1.48 Ω T1=0.00 ms X2=2.03 Ω T2=350 ms X3=4.01 Ω T3=1000 ms X4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
(VIII)	**Distance Protection Panel:M-II**		DIST M II- MICOM P442			
	Name of Line		**220 KV REENGUS-RENWAL**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=1.35 Ω T1=0.00 ms Z2=2.22 Ω T2=350 ms Z3=4.09 Ω T3=1000 ms Z4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			



	Distance Protection Panel:M-I		DIST. M-I SIEMENS			
	Name of Line		**220 KV REENGUS-CHOMU**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=0.97 Ω T1=0.00 ms X2=1.6 Ω T2=350 ms X3=2.06 Ω T3=1000 ms X4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
(X)	**Distance Protection Panel:M-II**		DIST M II- MICOM P442			
	Name of Line		**220 KV REENGUS-CHOMU**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=0.99 Ω T1=0.00 ms Z2=1.63 Ω T2=350 ms Z3=2.10 Ω T3=1000 ms Z4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST. M-I SIEMENS			
(XI)	**Name of Line**		**220 KV REENGUS-BABAI**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=1.48 Ω T1=0.00 ms X2=2.0 Ω T2=350 ms X3=3.14 Ω T3=1000 ms X4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			

	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-II		DIST M II- MICOM P442			
(XII)	**Name of Line**		**220 KV REENGUS-BABAI**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=1.51 Ω T1=0.00 ms Z2=2.04 Ω T2=350 ms Z3=3.21 Ω T3=1000 ms Z4(rev.) = 65 mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=1 Ω and X=1 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST. M-I SIEMENS			
(XIII)	**Name of Line**		**220 KV REENGUS-DFCC-I**			
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=1.48 Ω T1=0.00 ms X2=2.03 Ω T2=350 ms X3=2.26 Ω T3=1000 ms X4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
		YES	Enable			

(XIV) Name of Lin... Distance Pro... Pole Discrep... PLCC Pane... Time Synchron... Carrier Receive ...ker Contacts ...puts

	Inputs	YES	Enable	In built feature in Dist. Relay		
	aker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-II		DIST M II- MICOM P442			
(XIV)	**Name of Line**	**220 KV REENGUS-DFCC-I**				
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=4.32 Ω T1=0.00 ms Z2=9.56 Ω T2=350 ms Z3=15.21 Ω T3=1000 ms Z4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-I		DIST. M-I SIEMENS			
(XV)	**Name of Line**	**220 KV REENGUS-DFCC-II**				
	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	X1=1.48 Ω T1=0.00 ms X2=2.03 Ω T2=350 ms X3=2.26 Ω T3=1000 ms X4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			
	Distance Protection Panel:M-II		DIST M II- MICOM P442			
(XVI)	**Name of Line**	**220 KV REENGUS-DFCC II**				

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	Pole Discrepancy Relay	YES	Functional			Complying
	PLCC Panel	YES	Functional			
	Zone-1/2/3/4/5 (Settings)	YES	Functional	Numerical	Z1=4.32 Ω T1=0.00 ms Z2=9.56 Ω T2=350 ms Z3=15.21 Ω T3=1000 ms Z4(rev.) = 326mΩ T4=160 ms	
	Time Check-Z-1/2/3/4/5(Settings)	YES	Functional			
	SOTF	YES	Disable			
	Aided Scheme	YES	Functional	In built feature in Dist. Relay	permissive under reach phase, Z1 Z2+CR	Complying
	Fault Locator	YES	Enable			
	Power Swing (Setting R & X)	YES	Enable		R=5 Ω and X=5 Ω	
	All Zone Block	YES	Enable			
	DR	YES	Enable			
	Binary Inputs	YES	Enable			
	Breaker Contacts	YES	Enable			
	Carrier Receive	YES	Enable			
	Time Synchronization	YES	Enable			

* Complying with the code of configuration issued by the CE(MPT&S) ,RVPN. Jaipur by letter No. RVPN/CE/MPT&S/JPR/Tech./F./Rajkaj ref No.5221696/D.166 Dated 21.12.2023

Name: Signature & Contact no. Team carrying out Protection audit:	Sh. R.R.Gupta, AEN O/O SE (Prot. Engg.) RVPNL ,Jaipur	
	A .K. Lamoria ,AEN(MPT&S) ,RVPN , Jhunjhunu	
	Pragya Pandey ,AEN(MPT&S) ,RVPN , Sikar	
	Ramawatar Dhaka ,JEN(MPT&S) RVPN ,Sikar	
Name: Signature & Contact no. Representative of utility whose protection audit is being carried out:Team carrying out Protection audit:	Sh. D.K. Jain ,SE(Prot. Engg.) RVPN , Jaipur	

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

General Information

(i) Name of Utility:- 220 KV GSS Reengus
(ii) Name of Voltage Level of Sub Station:- 220 KV
(iii) Date of Commissioning:-12.01.1984
(iv) Type of Bus Switching Scheme:- 02 NO's Main Bus and Aux. Bus
(v) Name and Organization of Audit Team:- AEN O/O SE (Prot. Engg.) RVPNL ,Jaipur
(vi)Name of representative from utility whose audit being carried out:-SE (Prot. Engg.) RVPNL ,Jaipur

B. Check List for Protection Audit						
S.No.	Check		Functional/ NonFunctional/Enabled/ Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
1	**DC System**	2 nos (220 V DC)	Functional			Complying
	No. Of Independent DC Source	119 V				
	Potential Between +ve & Earth (Source-I)	112 V				
	Potential Between -ve & Earth (Source-I)	114 V				
	Potential Between +ve & Earth (Source-II)	110V				
	Potential Between -ve & Earth (Source-II)					
2	**Event Logger Panel**	No				
3	**Event Logger Time Synchronised**	No				
	Disturbance Recorder	No				
	DR Time Synchronised	No				
4	**Bus Bar Protection**	yes	Functional	Numerical		Complying
	Stability Check					
	EL Output for this Event					
	DR if Available					
5	**DG Set**	No				
6	**Mock Testing of Sample Protection Associated with Transmission line**	No				
7	**LBB/BFR**	YES	Functional	Numerical		Complying
	Retrip	YES	Enable			Complying
	Current and Time Setting	YES	Enable		PU =120%/100ms +100ms External timer	Complying
	Separate Single and Three Phase initiation	YES	Enable			Complying
	Earth Fault	YES	Disable			
	Event Logger Operation	YES	Enable			Complying

* Complying with the code of configuration issued by the CE(MPT&S) ,RVPN. Jaipur by letter No. RVPN/CE/MPT&S/JPR/Tech./F./Rajkaj ref No.5221696/D.166 Dated 21.12.2023

Name: Signature & Contact no. Team carrying out Protection audit:	Sh. R.R.Gupta, AEN O/O SE (Prot. Engg.) RVPNL ,Jaipur	
	A .K. Lamoria ,AEN(MPT&S) ,RVPN , Jhunjhunu	
	Pragya Pandey ,AEN(MPT&S) ,RVPN , Sikar	
	Ramawatar Dhaka ,JEN(MPT&S) RVPN ,Sikar	
Name: Signature & Contact no. Representative of utility whose protection audit is being carried out:Team carrying out Protection audit:	Sh. D.K. Jain ,SE(Prot. Engg.) RVPN , Jaipur	

Assistant Engineer (MPT&S)
R.R.V.P.N.L., SIKAR

Assistant Engineer (MPT &
RVPNL, Jhunjhunu

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit carried out 3.09.2024

A. General Information

(i) Name of Utility:- 220 KV GSS Kankroli (ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 31.03.1997 (iv) Type of Bus Switching Scheme:- Double Main Bus and Single Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN 220K.V GSS RVPNL Kankroli

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Transformer Protection Panel:					
(i)	**Name of Transformer (Rating/Capacity)**	**220/132,100MVA Transformer-I (BHEL Make)**				
	Tripping by Buchholz relay (Alarm)	Yes	Functional	Conventional		
	Differential Protection	Yes	Functional	Static	PickUp 20%	
	2nd Harmonic Block (Setting)	No	Feature Not Available			
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (HV Side)	Yes	Functional	Electromechanical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Restricted Earth Fault Protection (LV Side)	No	Not Required			
	Event logger Operation	No	(No Event logger Installed)			
	Backup Over Current	Yes	Functional	Electromechanical	75%	
	Event logger Operation	No	(No Event logger Installed)			
	Earth Fault Protection	Yes	Functional	Electromechanical	20%	
	Event logger Operation	No	(No Event logger Installed)			
	Over Flux Protection	Yes	Enabled	Electromechanical	As per Code of Configuration	
	Event logger Operation	No	(No Event logger Installed)			
	Local Breaker Back Up					
	Retrip					

Executive Engineer (MPT&S)
RVPNL Udaipur

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	Current and Time Setting					
	Separate Single and three Phase Initiation					
	Earth Fault					
	Event logger Operation					
(ii)	**Name of Transformer (Rating/Capacity)**	**220/132,100MVA Transformer-II (TELK Make)**				
	Tripping by Buchholz relay (Alarm)	Yes	Functional	Conventional		
	Differential Protection	Yes	Functional	Numerical	As per Code of Configuration	
	2nd Harmonic Block (Setting)	Yes				
	Event logger Operation	NA	(No Event logger Installed)			
	Restricted Earth Fault Protection (HV Side	Yes		Numerical	20%	
	Event logger Operation	NA	(No Event logger Installed)			
	Restricted Earth Fault Protection (LV Side)	No	Not required			
	Event logger Operation	NA	(No Event logger Installed)			
	Backup Over Current	Yes	Functional	Numerical	65.6%	
	Event logger Operation	NA	(No Event logger Installed)			
	Earth Fault Protection	Yes	Functional	Numerical	20%	
	Event logger Operation	NA	(No Event logger Installed)			
	Over Flux Protection	Yes	Enabled	Numerical	As per Code of Configuration	
	Event logger Operation	NA	(No Event logger Installed)			
	Local Breaker Back Up					
	Retrip					
	Current and Time Setting					
	Separate Single and three Phase Initiation					
	Earth Fault					
	Event logger Operation					

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Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit carried out on 03.09.2024

A. General Information

(i) Name of Utility:- 220 KV GSS Kankroli

(ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 31.03.1997

(iv) Type of Bus Switching Scheme:- Double Main Bus and Single Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL Kankroli

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Distance Protection Panel:M-I/II					
(I)	**Name of Line**	**220KV PGCIL-I**				
	Pole Discrepancy Relay	Yes	Functional			
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical(M-I) Static (M-II)	As per Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	No	Disabled			
	Aided Scheme	Yes	Enabled			
	Fault Locator	No				
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes				
	Breaker Contacts	Yes				
	Carrier Receive	Yes	Enabled			
	Time Synchronization	No				

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(2)	**Name of Line**	**220KV PGCIL-II**				
	Pole Discrepancy Relay	Yes	Functional			
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical	As per Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	No	Disabled			
	Aided Scheme	Yes	Enabled			
	Fault Locator	No				
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes				
	Breaker Contacts	Yes				
	Carrier Receive	Yes	Enabled			
	Time Synchronization	No				

(3)	**Name of Line**	**220KV HZL-I**				
	Pole Discrepancy Relay	Yes	Functional			
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical	As per Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	No	Disabled			
	Aided Scheme	Yes	Enabled			
	Fault Locator	No				
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes				
	Breaker Contacts	Yes				
	Carrier Receive	Yes	Enabled			
	Time Synchronization	No				

Executive Engineer (MPT&S)
R.R.V.P.N.L., Udaipur

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(4)	**Name of Line**	**220KV HZL-II**				
	Pole Discrepancy Relay	Yes	Functional			
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical	As per Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	No	Disabled			
	Aided Scheme	Yes	Enabled			
	Fault Locator	No				
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes				
	Breaker Contacts	Yes				
	Carrier Receive	Yes	Enabled			
	Time Synchronization	No				
(5)	**Name of Line**	**220KV Bamantukda**				
	Pole Discrepancy Relay	Yes	Functional			
	PLCC Panel	Yes	Functional			
	Zone-1/2/3/4/5 (Settings)	Yes	Enabled	Numerical	As per Code of Configuration	
	Time Check-Z-1/2/3/4/5(Settings)	Yes	Enabled			
	SOTF	No	Disabled			
	Aided Scheme	Yes	Enabled			
	Fault Locator	No				
	Power Swing (Setting R & X)	Yes	Enabled			
	All Zone Block	Yes	Enabled			
	DR	Yes	Enabled			
	Binary Inputs	Yes				
	Breaker Contacts	Yes				
	Carrier Receive	Yes	Enabled			
	Time Synchronization	No				

Executive Engineer (MPT&S)
R.R.V.P.N.L. Udaipur

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Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit

A. General Information

(i) Name of Utility:- 220 KV GSS Kankroli (ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 31.03.1997 (iv) Type of Bus Switching Scheme:- Double Main Bus and Single Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL Kankroli

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
1	**DC System**		Functional	Electromechanical	20%	
	No. Of Independent DC Source	1				
	Potential Between +ve & Earth (Source-I)	118 V				
	Potential Between -ve & Earth (Source-I)	118 V				
2	**Event Logger Panel**	No				
3	**Event Logger Time Synchronised**	No				
	Disturbance Recorder	No				
	DR Time Synchronised	No				
4	**Bus Bar Protection**	Yes	Functional	Numerical	As per Code of Configuration	
	Stability Check					
	EL Output for this Event	No				
	DR if Available	No				
5	**DG Set**	No				

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6	**Mock Testing of Sample Protection Associated with Transmission line**	No				
	LBB/BFR					
	Retrip					
	Current and Time Setting					
	Separate Single and Three Phase initiation					
	Earth Fault					
	Event Logger Operation					

Rajasthan Rajya Vidhyut Prasaran Nigam

Report of the Protection Audit carried out on 3.09.2024

A. General Information

(i) Name of Utility:- 220 KV GSS Kankroli (ii) Name of Voltage Level of Sub Station:- 220/132 KV

(iii) Date of Commissioning:- 31.03.1997 (iv) Type of Bus Switching Scheme:- Double Main Bus and Single Aux. Bus

(v) Name and Organization of Audit Team:- XEN (MPT&S) RVPNL Udaipur

(vi)Name of representative from utility whose audit being carried out:- XEN 220KV GSS RVPNL Kankroli

B. Check List for Protection Audit

S.No.	Check		Functional/NonFunctional/Enabled/Disabled	Type of Relay (Numerical/Static/Electromechanical)	Setting as found in field	Compliance Status w.r.t regulatory provisions
	Reactor Protection Panel:	NA	No reactor Installed			
	Tripping by Buchholz relay (Alarm)	No				
	Differential Protection	No				
	2nd Harmonic Block (Setting)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (HV Side)	No				
	Event logger Operation	No				
	Restricted Earth Fault Protection (LV Side)	No				
	Event logger Operation	No				

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	Backup Over Current	No				
	Event logger Operation	No				
	Earth Fault Protection	No				
	Event logger Operation	No				
	Over Flux Protection	No				
	Event logger Operation	No				

Executive Engineer (MPT&S)
R.R.V.P.N.L., Udaipur

AEN (MPT&S)
R.R.V.P.N.L., KANKROLI

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Kukas
iii)	Date of Commissioning:	13.10.1999
iv)	Type of Bus Switching Scheme	Two Main Bus
v)	Name and Organization of Audit Team	Sh. Mukul Yadav, AEN-III (MPT&S), RVPN, Jaipur Sh. Munesh Kumar Meena , JEN-I O/o AEN-III (MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K. Jain, SE (Prot. Engg.) RVPNL Jaipur

B. Checklist for Protection Audit

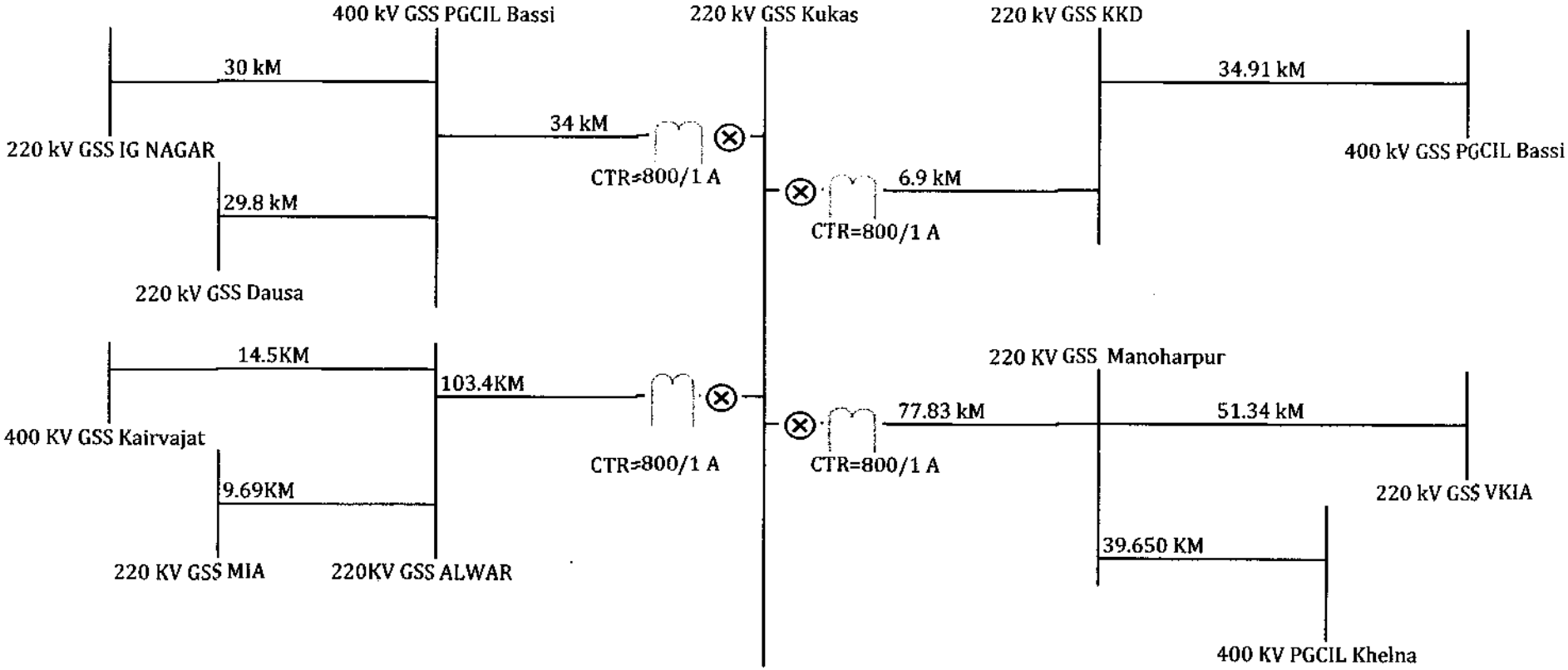
S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Distance protection Panel:M-I/II						
(i)	**Name of Line**	**220 kV PGCIL Bassi Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=4.44 Ohm, T1=0 ms Z2=7.983 Ohm, T2=350 ms Z3=10.938 Ohm, T3=1000 ms Z4(Rev.)=326 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying

S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relays	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
(ii)	**Name of Line**	**220 kV KKD Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 Sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=901 mOhm, T1=0 ms Z2= 3.976 Ohm, T2=350 ms Z3=7.395 Ohm, T3=1000 ms Z4(Rev.)=326 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relays	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
Distance protection Panel:M-I/II						
(iii)	**Name of Line**	**220 KV Manoharpur Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	M1-Numerical Distance	Z1=10.164 Ohm, T1=0 ms	

S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional	Protection Relay M2-Electrostatic Distance Protection Relay	Z2=15.942 Ohm, T2=350 ms Z3=21.925 Ohm, T3=1000 ms Z4(Rev.)=326 mOhm, T4=160 ms	Complying
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relay	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relay	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relay	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
Distance protection Panel:M-I/II						
(iv)	**Name of Line**	**220 KV Alwar Line**				
	Pole discrepancy relay	Yes	Functional(On CB)	Electromechanical	2 sec.	
	PLCC panel	Yes	Functional			
	Zone-1/2/3/4/5(settings)	Yes	Functional	Numerical Distance Protection Relays	Z1=13.504 Ohm, T1=0 ms Z2=17.671 Ohm, T2=350 ms Z3=19.484 Ohm, T3=1000 ms Z4(Rev.)=326 mOhm, T4=160 ms	Complying
	Time check-Zone-1/2/3/4/5(settings)	Yes	Functional			
	SOTF	No	Disabled	-	-	Complying
	Aided schemes	Yes	Functional	In built feature of Numerical Distance Protection Relays	Permissive Under Reach, 1 Phase Z1 Z2+CR	Complying
	Fault locator	Yes	Functional	In built feature of Numerical Distance Protection Relays	-	Complying
	Power swing(S(settings R and X)				R=5 Ohm, X=5 Ohm	Complying
	All Zone block	Yes	Enabled	In built feature of Numerical Distance Protection Relays	-	Complying
	DR	Yes	Enabled		-	Complying
	Binary Input					

S.No.	Check		Functional / Non-Functional /Enabled/ Disabled	Type of Relay*(Numerical/Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Breaker Contacts	Yes	Functional	-	-	Complying
	Carrier Receive	Yes	Functional	-	-	Complying
	Time Synchronization	Yes	Functional	-	-	Complying
Name. Signature & Contact No. of team Carrying out Protection audit:			1. Mukul Yadav, AEN-III (MPT&S), Jaipur 9413382334			
			2. Munesh Kr. Meena, JEN-I O/o AEN-III (MPT&S), Jaipur 9413383124			
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:			1. Dinesh Kumar Jain, SE (Prot.Engg.), RVPN, Jaipur, 9413393540			

Distance relay calculation for 220 KV Kukas-PGCIL Bassi Line



EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)

XE/XL=1/3((Xo/X1)-1)

kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1

Principle line Length	:	34 KM.
Shortest Line Length considered on Remote Bus		29.8 KM.
Longest line length Considered on Remote Bus		30 KM.

kZ0	**kZ0 angle**
0.734	**-1.83**

Conductor Used : **Zebra**

Conductor Parameters :	**R**	**X**	**Z**	**Angle**
Positive Sequence(Z1):	0.081	0.4	0.408	78.55

Zero Sequence(Z0):	0.2875	1.275	1.307	77.29
CTR:	800/1 Amp=	800		
PTR:	220000/110 V=	2000		
CTR/PTR:	0.4			

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (Kukas to PGCIL Bassi)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 4.440 Ohm T1= Instt.

Zone 2 forward Reach= 100% of line length (Kukas to PGCIL Bassi)+50 % of the Shortest Line on remote Bus(PGCIL-Dausa)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 7.983 Ohm T2=350 ms

Zone 3 forward Reach=100% of line length (Kukas to PGCIL Bassi)+110 % Longest line length on Remote Bus(PGCIL-IG NAGAR)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 10.938 Ohm T3=1000 ms

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.326 Ohm T4=160 ms

Directional O/C & E/F relay calculation for 220 kV Kukas-PGCIL Bassi Line

Fault MVA of 220 kV BUS	:	6885	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

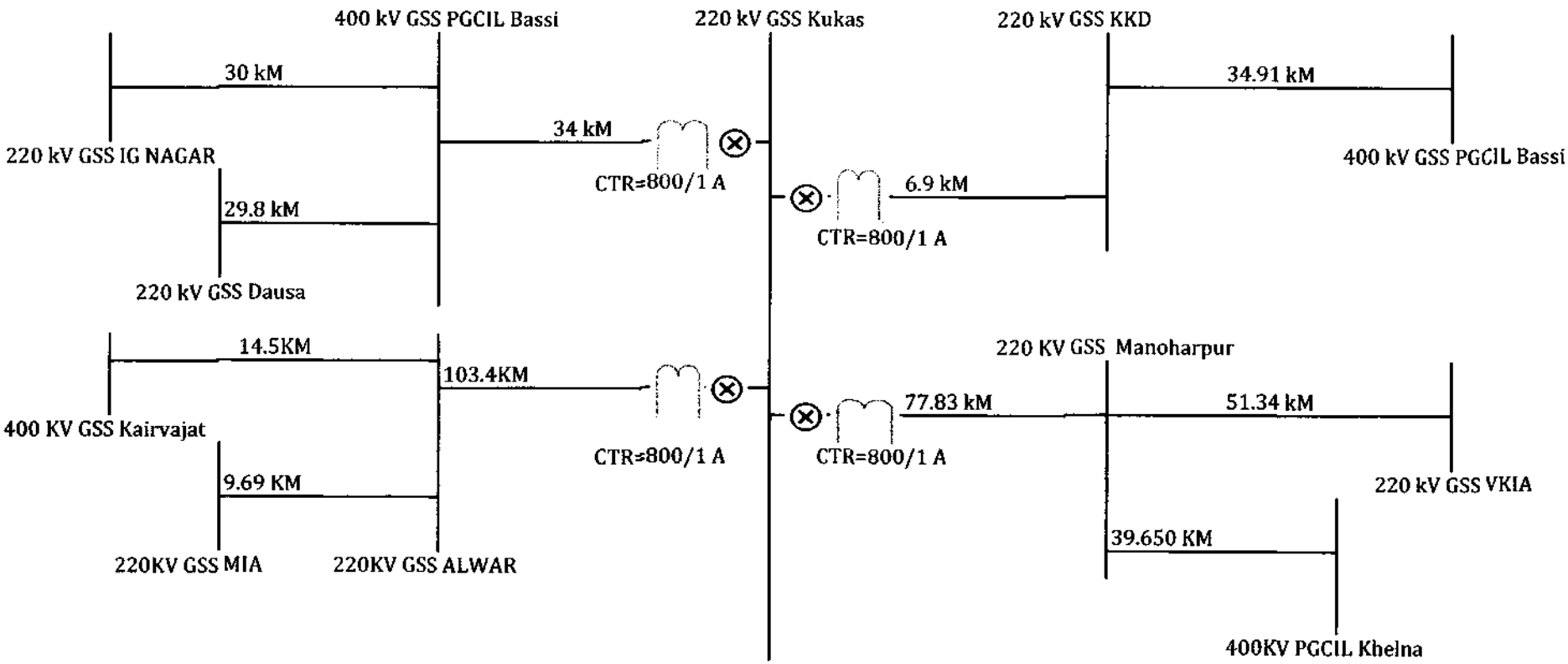
Directional Overcurrent Element Setting

CT Ratio	800/1		
Plug Setting	100% i.e.	800	Amp
Plug Setting Multiplier	17.2025		
Time of Operation	0.5	Seconds	
TMS	**0.209**		

Directional Earthfault Element Setting

CT Ratio	800/1		
Plug Setting	20 % i.e.	160	Amp
Plug Setting Multiplier	53.6313		
Time of Operation	0.5	Seconds	
TMS	**0.227**		

Distance relay calculation for 220KV Kukas - KKD Line



Principle line Length	:	6.9 KM.
Shortest Line Length considered on Remote Bus		34.91 KM.
Longest line length Considered on Remote Bus		34.91 KM.

Conductor Used	:	**Zebra**			
Conductor Parameters	:	**R**	**X**	**Z**	**Angle**
Positive Sequence(Z1):		0.081	0.4	0.408	78.55
Zero Sequence(Z0):		0.2875	1.275	1.307	77.29
CTR:		800/1 Amp= 800			
PTR:		220000/110 V= 2000			
CTR/PTR:		0.4			

EARTH FAULT COMPENSATION

	kZ0	**kZ0 angle**
RE/RL=1/3((Ro/R1)-1)		
XE/XL=1/3((Xo/X1)-1)		
kZ0 Res. Comp.= kZ0 = (Z0 – Z1) / 3Z1	**0.734**	**-1.83**

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (Kukas to KKD)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.901 Ohm T1= Instt.

Zone 2 forward Reach= 100% of line length (Kukas to KKD)+50 % of the Shortest Line on remote Bus (KKD to PGCIL Bassi)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 3.976 Ohm T2=350 ms

Zone 3 forward Reach=100% of line length (Kukas to KKD)+110 % Longest line length on Remote Bus(KKD to PGCIL Bassi)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 7.395 Ohm T3=1000 ms

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.326 Ohm T4=160 ms

Directional O/C & E/F relay calculation for 220 kV Kukas-KKD Line

Fault MVA of 220 kV BUS	:	6885	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

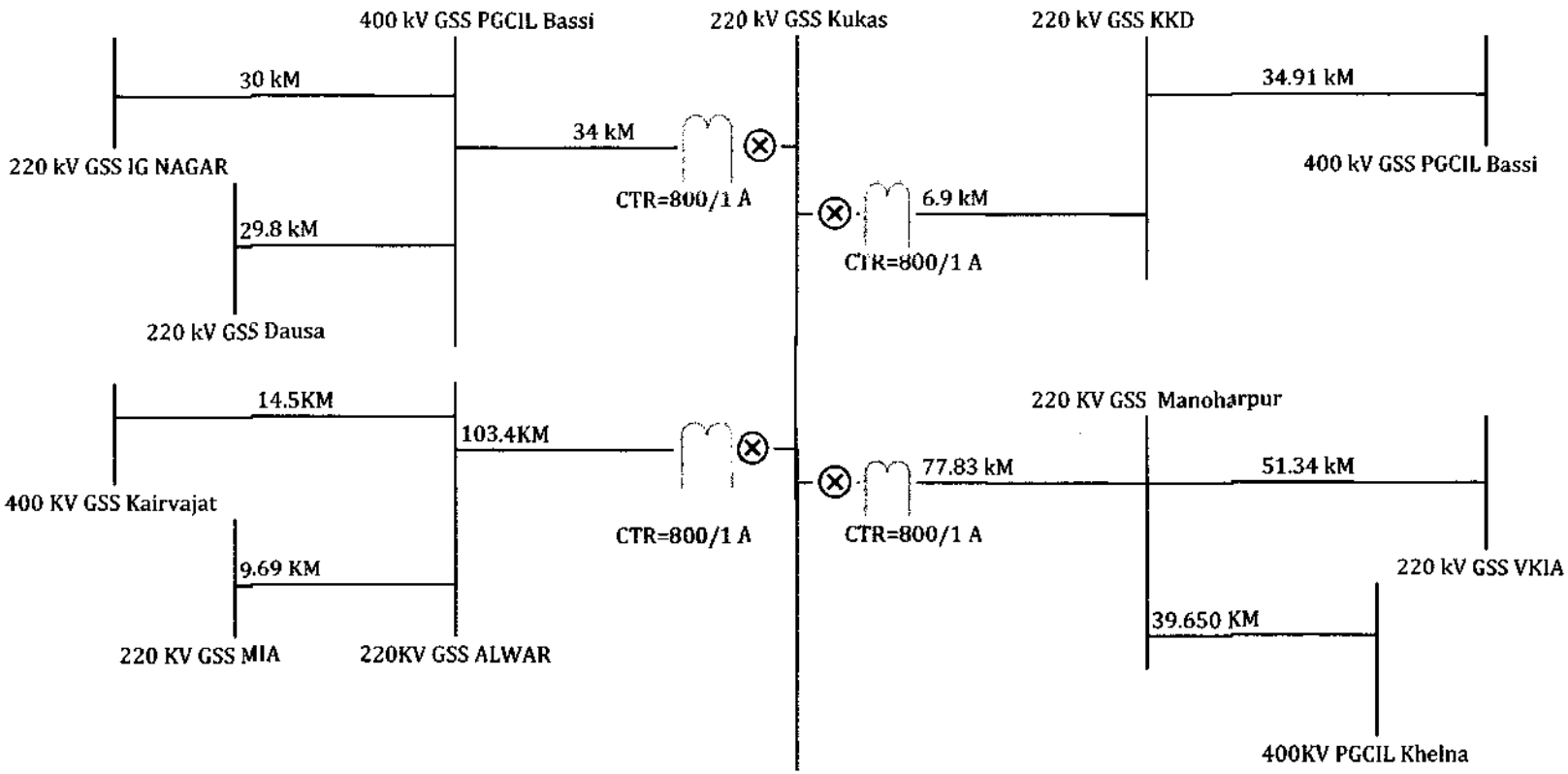
Directional Overcurrent Element Setting

CT Ratio	800/1		
Plug Setting	100 % i.e.	800	Amp
Plug Setting Multiplier	17.2025		
Time of Operation	0.5	Seconds	
TMS	**0.209**		

Directional Earthfault Element Setting

CT Ratio	800/1		
Plug Setting	20 % i.e.	160	Amp
Plug Setting Multiplier	53.6313		
Time of Operation	0.5	Seconds	
TMS	**0.227**		

Distance relay calculation for 220 KV Kukas -Manoharpur Line



Principle line Length	77.83 KM.
Shortest Line Length considered on Remote Bus	39.65 KM.
Longest line length Considered on Remote Bus	51.34 KM.

Conductor Used : Zebra

Conductor Parameters :

	R	X	Z	Angle
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29

CTR: 800/1 Amp= 800

PTR: 220000/110 V= 2000

CTR/PTR: 0.4

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)

XE/XL=1/3((Xo/X1)-1)

	kZ0	kZ0 angle
kZ0 Res. Comp.= kZ0 = (Z0 - Z1) / 3Z1	**0.734**	**-1.83**

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (Kukas to Manoharpur)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= **10.164** **Ohm** **T1= Instt.**

Zone 2 forward Reach= 100% of line length (Kukas to Manoharpur)+50 % of the Shortest Line on remote Bus(Manoharpur-PGCIL Khelna)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **15.942** **Ohm** **T2=350 ms**

Zone 3 forward Reach=100% of line length(Kukas to Manoharpur)+110 % Longest line length on Remote Bus(Manoharpur-VKIA)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **21.925** **Ohm** **T3=1000 ms**

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= **0.326** **Ohm** **T4=160 ms**

Directional O/C & E/F relay calculation for 220 kV Kukas-Manoharpur Line

Fault MVA of 220 kV BUS	:	6885	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

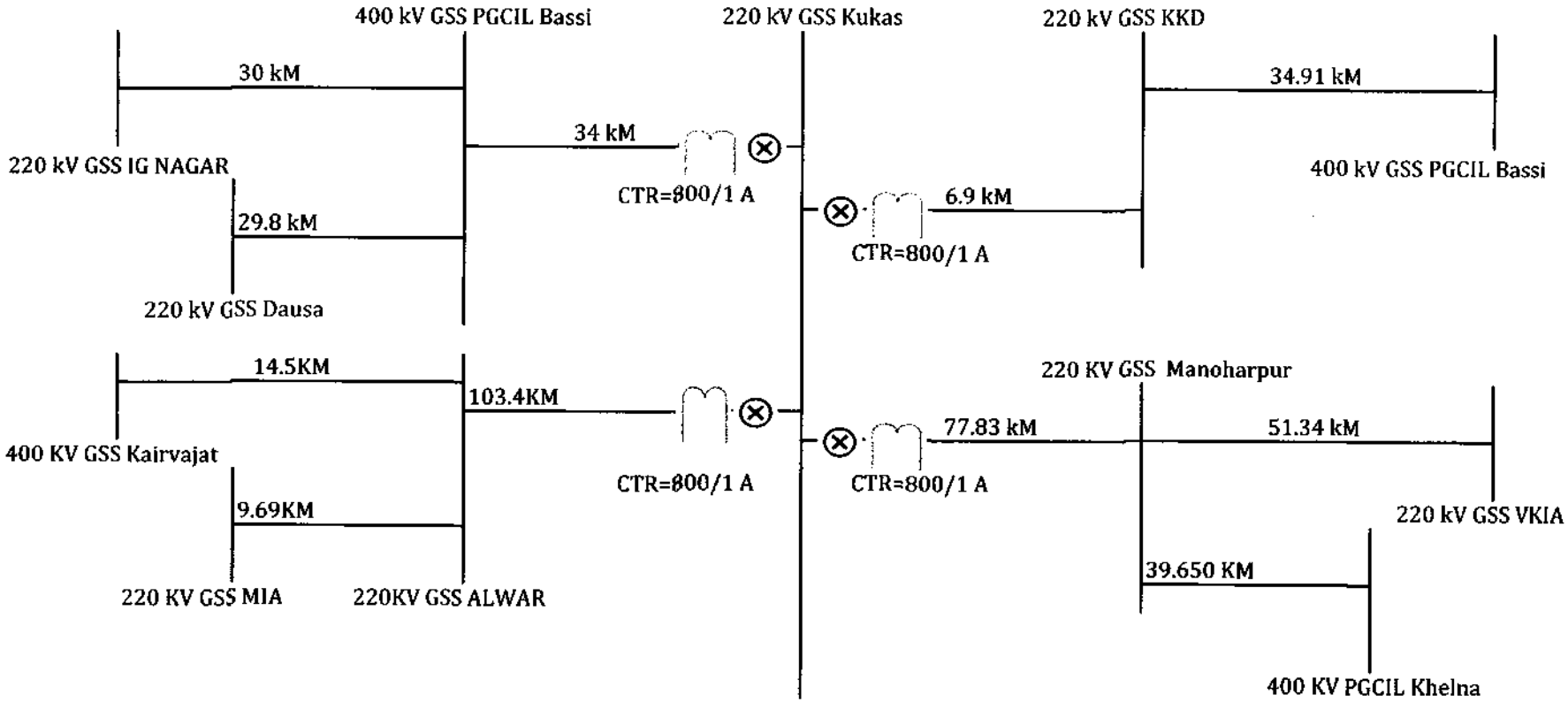
Directional Overcurrent Element Setting

CT Ratio	800/1		
Plug Setting	100% i.e.	800	Amp
Plug Setting Multiplier	17.2025		
Time of Operation	0.5	Seconds	
TMS	0.209		

Directional Earthfault Element Setting

CT Ratio	800/1		
Plug Setting	20 % i.e.	160	Amp
Plug Setting Multiplier	53.6313		
Time of Operation	0.5	Seconds	
TMS	0.227		

Distance relay calculation for 220 KV Kukas -Alwar Line



Principle line Length	:	103.4 KM.
Shortest Line Length considered on Remote Bus		9.69 KM.
Longest line length Considered on Remote Bus		14.5 KM.

Conductor Used : **Zebra**

Conductor Parameters :	**R**	**X**	**Z**	**Angle**
Positive Sequence(Z1):	0.081	0.4	0.408	78.55
Zero Sequence(Z0):	0.2875	1.275	1.307	77.29
CTR:	800/1 Amp= 800			
PTR:	220000/110 V= 2000			
CTR/PTR:	0.4			

EARTH FAULT COMPENSATION

RE/RL=1/3((Ro/R1)-1)

XE/XL=1/3((Xo/X1)-1)

kZ0 Res. Comp.= kZ0 = (Z0 - Z1) / 3Z1

kZ0	**kZ0 angle**
0.734	**-1.83**

Zone 1(Forward) Reach:	80	% of the Line to be Protected
Zone 2(Forward) Reach:	50	% of the Shortest Line on remote Bus+100 % of the Protected Line
Zone 3(Forward) Reach:	110	% Longest line length on Remote Bus+100 % of the Protected Line
Zone 4(Reverse) Reach:	2	Km

Zone 1 forward Reach= 80% of line length (Kukas to Alwar)* +ve Sequence impedance of conductor/km*(CTR/PTR)

= 13.504 Ohm T1= Instt.

Zone 2 forward Reach= 100% of line length (Kukas to Alwar)+50 % of the Shortest Line on remote Bus(Alwar-MIA)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 17.671 Ohm T2=350 ms

Zone 3 forward Reach=100% of line length (Kukas to Alwar)+110 % Longest line length on Remote Bus(Alwar-Kairvajat)*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 19.484 Ohm T3=1000 ms

Zone 4 reverse Reach=2 km*+ve Sequence impedance of conductor/km*(CTR/PTR)

= 0.326 Ohm T4=160 ms

Directional O/C & E/F relay calculation for 220 kV Kukas-Alwar Line

Fault MVA of 220 kV BUS	:	6885	MVA
3 Phase Short Circuit Current	:	15891	Amp
Phase-Phase Short Circuit Current	:	13762	Amp
Phase to Earth Short Circuit Current	:	8581	Amp

Directional Overcurrent Element Setting

CT Ratio	800/1		
Plug Setting	100% i.e.	800	Amp
Plug Setting Multiplier	17.2025		
Time of Operation	0.5	Seconds	
TMS	**0.209**		

Directional Earthfault Element Setting

CT Ratio	800/1		
Plug Setting	20 % i.e.	160	Amp
Plug Setting Multiplier	53.6313	.	
Time of Operation	0.5	Seconds	
TMS	**0.227**		

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Kukas
iii)	Date of Commissioning:	13.10.1999
iv)	Type of Bus Switching Scheme	Two Main Bus
v)	Name and Organization of Audit Team	Sh. Mukul Yadav, AEN-III (MPT&S), RVPN, Jaipur
		Sh. Munesh Kumar Meena , JEN-I O/o AEN-III (MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K. Jain, SE (Prot. Engg.) RVPNL Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled /Disabled	Type of Relay*(Numerical/ Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
Transformer Protection Panel						
(i)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 100 MVA CGL make Transformer-I**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Electrostatic		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying
	Event Logger Operation	No				
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	No				
	Event Logger Operation	No				
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Electromechanical	1/0.215	Complying
	Event Logger Operation	No				
	Earth Fault Protection	Yes	Enabled	Electromechanical	0.2/0.273	Complying
	Event Logger Operation	No				
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	No				
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No(3 phase only)				Complying
	Earth Fault	No				Complying
	Event logger	No				
(i)	**Name of Transformer (Rating/Capacity)**	**220/132 kV, 100 MVA CGL make Transformer-III**				
	Tripping by Buchholz Relay (Alarm)	Yes	Enabled	Electromechanical		Complying
	Differential Protection	Yes	Enabled	Numerical		Complying
	2nd Harmonic Block (Setting)		Enabled		15%	Complying

S.No.	Check		Functional/ Non-Functional/Enabled /Disabled	Type of Relay*(Numerical/ Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Restricted Earth Fault Protection (HV Side)(Auto X-mer)	Yes	Functional	Numerical	40.1 V	Complying
	Event Logger Operation	Yes	In built feature of numerical REF relay			
	REF Protection (LV Side)	NA				
	Event Logger Operation	NA				
	Backup Over Current	Yes	Enabled	Numerical	0.66/0.203	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Earth Fault Protection	Yes	Enabled	Numerical	0.2/0.273	Complying
	Event Logger Operation	Yes	In built feature of numerical O/C & E/F relay			
	Over Flux Protection	Yes	Enabled			Complying
	Event Logger Operation	Yes	In built feature of numerical differential relay			
	Local Breaker Back Up	Yes				
	Retrip	Yes	Enabled			Complying
	Current and Time Setting				120%/100 ms+100 ms External timer	Complying
	Separate Single and three phase initiation	No(3 phase only)				Complying
	Earth Fault	No				Complying
	Event logger	Yes	In built feature of numerical LBB relay			
Name. Signature & Contact No. of team Carrying out Protection audit:			1. Mukul Yadav, AEN-III (MPT&S), Jaipur 9413382334			
			2. Munesh Kr. Meena, JEN-I O/o AEN-III (MPT&S), Jaipur 9413383124			
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:			1. Dinesh Kumar Jain, SE (Prot.Engg.), RVPN, Jaipur, 9413393540			

Non Directional O/C & E/F relay calculation for 220/132 kV, 100 MVA Transformer-I

Fault MVA of 220 kV BUS	:	6885	MVA
P.U. Impedance of 220 kV BUS		0.0145	
% Imepdance of transformer at Normal Tap		9.47	%
Transformer HV Voltage rating		220000	Volts
Transformer LV Voltage rating		132000	Volts
Transformer MVA Capacity		100	MVA
P.U. Impedance of Transformer		0.0947	
Total P.U. Impedance		0.1092	
Fault MVA of 132 kV BUS	:	916	MVA
3 Phase through fault Short Circuit Current		4007	Amp
Phase-Phase through fault Short Circuit Current		3470	Amp
Phase to Earth through fault Short Circuit Current		2164	Amp

Non Directional Overcurrent Element Setting

CT Ratio	300/1		
Plug Setting	100 % i.e.	300	Amp
Plug Setting Multiplier	11.56667		
Time of Operation	0.6	Seconds	
TMS	0.215		

Non Directional Earthfault Element Setting

CT Ratio	300/1		
Plug Setting	20 % i.e.	60	Amp
Plug Setting Multiplier	36.06667		
Time of Operation	0.6	Seconds	
TMS	0.273		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	262	Amp
Transformer Full load current LV	437	Amp
Maximum fault current on through fault (If)	4615	Amp
Bushing CT Ratio	600	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	53.8	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	538	Ohm

Non Directional O/C & E/F relay calculation for 220/132 kV, 100 MVA Transformer-III

Fault MVA of 220 kV BUS	:	6885	MVA
P.U. Impedance of 220 kV BUS		0.0145	
% Imepdance of transformer at Normal Tap		12.71	%
Transformer HV Voltage rating		220000	Volts
Transformer LV Voltage rating		132000	Volts
Transformer MVA Capacity		100	MVA
P.U. Impedance of Transformer		0.1271	
Total P.U. Impedance		0.1416	
Fault MVA of 132 kV BUS	:	706	MVA
3 Phase through fault Short Circuit Current		3088	Amp
Phase-Phase through fault Short Circuit Current		2674	Amp
Phase to Earth through fault Short Circuit Current		1668	Amp

Non Directional Overcurrent Element Setting

CT Ratio	400/1		
Plug Setting	66 % i.e.	264	Amp
Plug Setting Multiplier	10.12879		
Time of Operation	0.6	Seconds	
TMS	0.203		

Non Directional Earthfault Element Setting

CT Ratio	400/1		
Plug Setting	20 % i.e.	80	Amp
Plug Setting Multiplier	20.85		
Time of Operation	0.6	Seconds	
TMS	0.273		

Stablizing Resistor calculation for Restricted Earth fault relay

Transformer Full load current HV	262	Amp
Transformer Full load current LV	437	Amp
Maximum fault current on through fault (If)	3438	Amp
Bushing CT Ratio	600	
Lead resistance	1	Ohm
Rct	5	Ohm
Vk=	If*(Rct+2Rl)	
Vk=	40.1	Volts
REF Operating Current	0.1	Amp
Stablizing Resistor	401	Ohm

Rajasthan Rajya Vidhyut Prasaran Nigam Limited

Report of the Protection Audit

A. General Information

i)	Name of utility:	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
ii)	Name of Voltage level of Substation:	220 kV GSS Kukas
iii)	Date of Commissioning:	13.10.1999
iv)	Type of Bus Switching Scheme	Two Main Bus
v)	Name and Organization of Audit Team	Sh. Mukul Yadav, AEN-III (MPT&S), RVPN, Jaipur Sh. Munesh Kumar Meena , JEN-I O/o AEN-III (MPT&S), RVPN, Jaipur
vi)	Name of representative from utility whose audit being carried out	Sh. D.K. Jain, SE (Prot. Engg.) RVPNL Jaipur

B. Checklist for Protection Audit

S.No.	Check		Functional/ Non-Functional/Enabled/Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
1	**DC system**					
	No. of independent DC Sources	2 nos. 220 VDC	01 Nos. Functional & 01 Nos. Non-functional			
	Potential between +ive & earth (Source-1)	114.2 V	-	-	-	-
	Potential between -ive & earth (Source-1)	115.7 V	-	-	-	-
	Potential between +ive & earth (Source-2)	-	-	-	-	-
	Potential between -ive & earth (Source-2)	-	-	-	-	-
2	Event Logger panel	No	-	-	-	-
3	Event Logger Time Synchronised	NA	-	-	-	-
	Disturbance Recorder	NA	-	-	-	-
	DR Time Synchronised	NA	-	-	-	-
4	Bus bar Protection	Yes	Functional	Numerical	120 % Pickup	Complying
	Stability Check	Yes(On Running load)	-	-	-	-
	EL output for this event	No	-	-	-	-
	DR if available	No	-	-	-	-
5	DG Set	No	-	-	-	-
	Mock testing of a sample protection associated with transmission line* **	Yes/ No	i. If Yes then observation..... ii. If no, the reason for the same.....			
6	**Local Breaker Back Up(For Line)**		-	Electrostatic	-	-
	Retrip	Yes	Enabled	-	-	Complying
	Current and Time Setting	Yes	-	-	PU-120%/100 ms+100 ms External timer	Complying

S.No.	Check		Functional/ Non-Functional/Enabled/Disabled	Type of Relay*(Numerical /Static/Electromechanical)	Setting as found in field*/**	Compliance status w.r.t. regulatory provisions
	Separate Single and three phase initiation	Yes	Functional	-	-	Complying
	Earth Fault	No	Disabled	-	-	Complying
	Event logger operation	No				
Name. Signature & Contact No. of team Carrying out Protection audit:			1. Mukul Yadav, AEN-III (MPT&S), Jaipur 9413382334			
			2. Munesh Kr. Meena, JEN-I O/o AEN-III (MPT&S), Jaipur 9413383124			
Name. Signature & Contact No. of representative of utility whose Protection audit is being carried out:			1. Dinesh Kumar Jain, SE (Prot.Engg.), RVPN, Jaipur, 9413393540			

Internal Protection Audit Report

Jaypee Vishnuprayag Hydro Electric Plant, Vishnuprayag

Date : 27.07.2024

(a)	General Information	
(i)	Name of the project	Jaypee Vishnuprayag Hydro-Electric Project (4x100 MW)
(ii)	Name of Owner Utility	Jaiprakash Power Ventures Ltd.
(iii)	Voltage Level (s) or highest voltage level	400 KV
(iv)	Short circuit current rating of all equipment (for all voltage level)	40 KA(rms) for 1 second (Value of AC component)
(v)	Date of commissioning of the substation	2006
(vi)	Checking and validation date	24-Jul-24
(vii)	Record of previous tripping"s (in last one year) and details of protection operation	Annexure-V
(viii)	Previous Relay Test Reports	Annexure-VI
(ix)	Overall single line diagram (SLD)	Annexure-I
(x)	AC aux SLD	Annexure-II (415V & 11 KV)
(xi)	DC aux SLD	Annexure-III
(xii)	SAS architecture diagram	Annexure-IV
(xiii)	SPS scheme implemented (if any)	NA

(b)	Plant details			
	Date of commissioning	Unit 1	13.09.2006	
		Unit 2	22.09.2006	
		Unit 3	01.10.2006	
		Unit 4	01.11.2006	
	Type of bus-switching scheme:	Double Bus Bar Scheme		
	Wheather SLD connected or Not:	Connected		
	Name and Organization of Audit Team	Mr. Rakesh Malviya		Internal Audit
		Mr. Ajay Parashar		Internal Audit
		Mr. Manish Rana		Internal Audit

(c)	The relay configuration checklist for available power system elements at station:	
(i)	Transmission Line	Refer (c - i)
(ii)	Bus Reactor/Line Reactor	Refer (c - ii)
(iii)	Inter-connecting Transformer	NA
(iv)	Busbar Protection Relay	Refer (c - iv)
(v)	AC auxiliary system	Refer (c - v)
(vi)	DC auxiliary system	Refer (c - vi)
(vii)	Communication system	Refer (c - vii)
(viii)	Circuit Breaker Details	Refer (c - viii)
(ix)	Current Transformer Details	Refer (c - ix)

(x)	Capacitive Voltage Transformers Details	Refer (c - x)		
(xi)	Any other equipment/system relevant for protection system operation			

(c - i)	**Transmission Line Distance Protection/Differential Protection**			
a.	Name and Length of Line	Line-1:- 283.1 KM (Vishnuprayag - Muzzaffarnagar 400 KV Line) Line-2:- 106 KM (Vishnuprayag - Alaknanda 400 KV Line)		
b.	Whether series compensated or not	Not Applicable		
c.	Mode of communication used (PLCC/OPGW)	PLCC		
d.	Relay Make and Model for Main-I and Main-II	Main-I:- ABB (REL 670) Main-II Siemens (Siprotec 7SA522)		
e.	List of all active protections & settings	Refer B Check List for Protection Audit		
f.	Carrier aided scheme if any	Yes		
g.	Status of Power Swing/Out of Step/SOTF/Breaker Failure/Broken Conductor/STUB/Fault Locator/DR/VT fuse fail/Overvoltage Protection/Trip Circuit supervision/Auto reclose/Load encroachment etc.	Refer B Check List for Protection Audit		
h.	Relay connected to Trip Coil-1 or 2 or both	Both		
i.	CT ratio and PT ratio	Line-1 & 2:- 1000/1A	400 kV / √3 / 110 V / √3	
j.	Feed from DC supply-1 or 2	Both		
k.	Connected to dedicated CT core (mention name)	CT L101 & CT L201	CORE-1	PS
			CORE-2	PS
			CORE-3	0.1
			CORE-4	0.2
			CORE-5	PS
			CORE-6	PS
		CT R101 (for Shunt Reactors)	CORE-1	PS
			CORE-2	PS
			CORE-3	5P20
			CORE-4	PS
		CT R102 (for Shunt Reactors)	CORE-1	PS
		CT R103 (for Shunt Reactors)	CORE-1	PS
l.	Other requirements for protection checking and validation	Nil		

(c - ii)	**Shunt Reactor Protection**			
a.	Relay Make and Model	ABB & RET 670		
b.	List of all active protections along with settings	Attached		
c.	Status of Oil Temperature Indicator/Winding Temperature Indicator/Bucholz/Pressure Release Device etc.	All OK		
d.	Relay connected to Trip Coil-1 or 2 or both	Both		
e.	CT ratio and PT ratio	250/1A	400 kV / √3 / 110 V / √3	
f.	Feed from DC supply-1 or 2	Both		
g.	Connected to dedicated CT core (mention name) *CTs mounted on Reactors	Line Bushing	Neutral End	WTI CT
		Core-1 - PS	Core-1 - PS	5 (7.5 VA)
		Core-2 - PS		

	CTs mounted on Reactors	Core-3 - PS		
		Core-4 - 5P20 (10VA)		
h.	Other requirements for protection checking and validation	Nil		

(c - iii)	**NA**	
(c - iv)	**Busbar Protection Relay**	
a.	Busbar and redundant relay make and model	ABB & REB 670
b.	Type of Busbar arrangement	Double Bus Bar
c.	Zones	Zone 1 to 4
d.	Dedicated CT core for each busbar protection (Yes/No)	Bus-I:- B101-1(spare), B101-2(Protection) Bus-II;- B102-1(BB prot.), B102-2(Metering)
e.	Breaker Failure relay included (Yes/No), if additional then furnish make and model	Yes
f.	Trip issued to both Busbar protection in case of enabling	Yes
g.	Isolator indication and check relays	Yes
h.	Other requirements for protection checking and validation	Nil

(c - v)	**AC Auxiliary system**	
a.	Source of AC auxiliary system	SSB & UAB
b.	Supply changeover between sources (Auto/Manual)	Auto & Manual both
c.	Diesel generator (DG) details	2*1010 KVA
d.	Maintenance plan and supply changeover periodicity in DG	Annually & Quaterly
e.	Single Line Diagram	Attached
f.	Other requirements for protection checking and validation	Nil

(c - vi)	**DC Auxiliary system**	
a.	Type of Batteries (Make, vintage, model)	Lead acid, Make: Exide, Vintage: TH1000H
b.	Status of battery Charger	Working
c.	Measured voltage (positive to earth and negative to earth)	Positive to earth Source -1/Source-2: Unearthed system Negative to earthSource -1/Source-2: Unearthed system
d.	Availability of ground fault detectors	Available
e.	Protection relays and trip circuits with independent DC sources	Yes
f.	Other requirements for protection checking and validation	Nil

(c - vii)	**Communication system**	
(i)	Mode of communication for Main-1 and Main-2 protection	PLCC
(ii)	Mode of communication for data and speech communication	PLCC
(iii)	Status of PLCC channels	Working
(iv)	Time synchronization equipment details	GPS Receiver, interconnecting cable with matching connector.

(v)	OPGW on geographically diversified paths for Main-1 and main-2 relay	Not available
(vi)	Other requirements for protection checking and validation	Nil

(c - viii)	**Circuit Breaker Details**	
a.	Details and Status	Make: GE T&D Type: T155-2&3 compact CB, Single break Rated voltage: 420 KV
b.	Healthiness of Tripping Coil and Trip circuit supervision relay	Healthy
c.	Single Pole/Multi pole operation	Multi-pole
d.	Pole Discrepancy Relay available(Y/N)	Yes
e.	Monitoring Devices for checking the dielectric medium	Density monitor for SF6 Pressure
f.	Other requirements for protection checking and validation	Nil

(c - ix)	**Current Transformer (CT) Details**								
a.	CT core connection details								
	Core	CT U101 (1000-500-250/1A)	CT G101 (6000/5A)	CT G102 (6000/5A)	CT G103 (6000/5A)	CT G104 (6000/5A)	CT G105 (500-250/1A)	CT G106 (1500/1A)	CT G107 (1500/1A)
	1	PS	PS	0.5 cl, 30 VA	PS	PS	PS	PS	PS
	2	PS	PS	0.5 cl, 30 VA	5P20, 10VA (200/5A)	5P20, 10VA (100/1A)	5P20, 10 VA	0.1, 15 VA (Metering)	-
	3	5P20, 30 VA	PS (Spare)	PS	-	-	-	5P20, 5 VA	-
	4	PS	Metering, 30VA	-	-	-	-	-	-
	5	PS	PS	-	-	-	-	-	-
	Adoted Ratio	1000/1A	6000/5A	6000/5A	6000/5A	6000/5A	500/1A	1500/1A	1500/1A
	Make	GE T&D (Earlier Areva)	Prayog Electricals	Prayog Electricals	Prayog Electricals	Prayog Electricals	Prayog Electricals	Prayog Electricals	Prayog Electricals
	Type	T155-CT	Cast Resin Ring Type	Cast Resin Ring Type	Cast Resin Ring Type	Cast Resin Ring Type	Cast Resin Ring Type	Cast Resin Ring Type	Cast Resin Ring Type
	Voltage level	420 KV	13.8 Kv	13.8 Kv	13.8 Kv	13.8 Kv	13.8 Kv	13.8 Kv	415 V
	Location	GIS	Generator Neutral side	Generator Phase side	Excitatin transformer CT	GT primary CT	GT Neutral CT	UAT CT	UAT LT side CT

(c - x)	**Capacitive Voltage Transformer (CVT) Details**	
	CVT name and voltage level	Line CVT - 400 KV
	CVT core connection details	Core 1/2/3
	Wdg-I	100 VA
	Wdg-II	0.2 Cl./300 VA

	Wdg-III	3P	
c.	Accuracy Class	CT - 0.5 cl	CVT - 0.2 cl
d.	Whether Protection/Metering	Both	
e.	CVT ratio available and ratio adopted	400 kV / √3 / 110 V / √3	
f.	Details of last checking and validation of CVT healthiness	Feb-24	
g.	Other requirements for protection checking and validation	Nil	

B. Check List for Protection Audit

S.No	Check		Functional / Non-functional / Enabled / Disabled	Type of relay * (Numerical / Static / Electro mechanical)	Setting as found in field*/**	Remarks
1.	**DC system**					
	No. of independent DC Sources	2	NA	NA	NA	220 V DC System
	Potential between +ive & earth (Source-1)	-	NA	NA	NA	Unearthed system (220 V DC System)
	Potential between -ive & earth (Source-1)	-	NA	NA	NA	Unearthed system (220 V DC System)
	Potential between +ive & earth (Source-2)	-	NA	NA	NA	Unearthed system (220 V DC System)
	Potential between -ive & earth (Source-2)	-	NA	NA	NA	Unearthed system (220 V DC System)
	Earth Fault / Over voltage Protection relay	-	Functional	Static	IE>0.7IN OV-110%Un	
2.	**Event Logger panel**	Yes	Functional	NA	NA	Inbuilt function of SCADA / protection system
3.	**Event Logger Time Synchronised**	Yes	Functional	NA	NA	Inbuilt function of SCADA / protection system
	Disturbance Recorder	Yes	Functional	NA	NA	Inbuilt function of SCADA / protection system
	DR Time Synchronised	Yes	Functional	NA	NA	Inbuilt function of SCADA / protection system
4.	**Transformer Protection Panel:**					
	Tripping by Buchholz relay (Alarm)	Yes	Functional	Numerical	NA	
	Differential Protection	Yes	Functional			
	2nd Harmonic Block(Setting)		Functional	Numerical	Attached	
	Event Logger operation	Yes	Functional	Numerical	Attached	

	Restricted Earth Fault Protection (LV side)	No				Primary winding is in Delta Connection
	Event Logger operation	No		NA	NA	
	REF Protection (HV side)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
	Over current	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
	Earth Fault protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
	Over Flux Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
5.	**Reactor Protection Panel:**					
	Tripping by Buchholz relay(Alarm)	**Yes**	Functional	Numerical	NA	
	Differential Protection	**Yes**	Functional	Numerical	Attached	
	2^{nd} Harmonic Block (Setting)	**Yes**	Functional	Numerical	Attached	
	5^{th} Harmonic Block (Setting)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
	REF Protection (LV side)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
	Backup Impedance	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
6.	**Line Protection Panel: M-I/II**					
	Pole discrepancy relay	**Yes**	Functional	Through Schematic	1 seconds	
	PLCC panel	**Yes**	Functional	NA	NA	
	Distanace Protection	**Yes**	Functional	Numerical	Attached	
	Zone-1/2/3/4/5 (Settings)	**Yes**	Functional	Numerical	Attached	
	Time check-Z-1/2/3/4/5 (Settings)	**Yes**	Functional	Numerical	Attached	
	SOTF	**Yes**	Functional	Numerical	Attached	
	Fault Locator	**Yes**	Functional	Numerical	Attached	
	Power swing(Settings R and X)	**Yes**	Functional	Numerical	Attached	
	All Zone block	**Yes**	Functional	NA	NA	
	DR	**Yes**	Functional	in built in numerical relay also	NA	
	Breaker Contacts	**Yes**	Functional	NA	NA	
	Carrier Receive	**Yes**	Functional	NA	NA	
	Time Synchronization	**Yes**	Functional	NA	NA	

7.	**Single Phase Auto Recloser Scheme**	**Yes**	Functional	Numerical	Attached	
8.	**Bus Bar Protection**	**Yes**	Functional	Numerical		
	Stability Check	**Yes**	Functional	Numerical		
	Slope check	**Yes**	Functional	Numerical	Attached	
	EL output for this event	**Yes**	Functional	Numerical		
	DR if available	**Yes**	Functional	Numerical		
	Local Breaker Back up	**Yes**	Functional	Numerical	Attached	
	Retrip	**Yes**	Functional			
	Current and Time setting	**Yes**	Functional		Attached	
	Seperate single and three phase initiation	**Yes**	Functional	Numerical	Attached	
	Earth fault	**Yes**	Functional	Numerical	Attached	
	Event Logger	**Yes**	Functional	Numerical	Attached	
9.	**Bus Coupler Protection**	**Yes**	Functional	Numerical		
	Over Current	**Yes**	Functional	Numerical		
	Earth Fault protection	**Yes**	Functional	Numerical	Attached	
	EL output for this event	**Yes**	Functional	Numerical		
	DR if available	**Yes**	Functional	Numerical		
10.	**Generator & Generator Transformer Protection Panel:**					
	Main 1 Protection					
10-A1	Generator Differential Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A2	Generator Backup Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A3	Gen. Loss of Excitation (U/V)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A4	Gen AC Inst Over Current	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A5	Gen AC Time delayed Over	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A6	Gen O/V protection Stage 1	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A7	Gen O/V protection Stage 2	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A8	Gen Reverse Power Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A9	Gen Neg Phase Seq Protection	**Yes**	Functional	Numerical	Attached	

	Event Logger operation	**Yes**	Functional	NA	NA	
10-A10	Generator Thermal Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A11	Gen Volt Balance Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A12	GT Restricted Earth Fault	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A13	UAT O/c & E/F Protection	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-A14	Gen Stator 100% Earth Fault	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
	Main 2 Protection					
10-B1	Over Voltage Stage-1 (59)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B2	Over Voltage Stage-2 (59)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B3	Under Voltage Stage-1 (27)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B4	Under Voltage Stage-2 (27)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B5	Over Frequency Stage-1 (81)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B6	Over Frequency Stage-2 (81)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B7	Under Frequency Stage-1 (81)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B8	Under Frequency Stage-2 (81)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B9	Over Fluxing Stage-1 (24)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B10	Over Fluxing Stage-2 (24)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B11	UAT Restricted E/F Protn. (64R)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B12	GT/F Time Delayed O/C (51GT)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B13	Gen. Trans. Neu. O/C (51NGT)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B14	95% Stator E/F(59/27)	**Yes**	Functional	Numerical	Attached	
	Event Logger operation	**Yes**	Functional	NA	NA	
10-B15	Overall Differential (87T)	**Yes**	Functional	Numerical	Attached	

	Event Logger operation	**Yes**	Functional	NA	NA	
11.	**DG Set**	**Yes**	Functional	Auto/Manual		In built in DG sets function of DG set controller

	System	Time Synchronising	Availablity (In service or
i)	400 kV System	Masibus	In service

A) Transmission Line Protection-I

	Name of Line	Main-I Protection (Make & Model)	Availablity (In service or
i)	400 kV Vishnuprayag-Muzaffarnagar Line-1	ABB; REL-670	In service
ii)	400 kV Vishnuprayag-Alaknanda Line-2	ABB; REL-670	In service

Transmission Line Protection-II

	Name of Line	PLCC/Protection coupler (Make and Model)
i)	400 kV Vishnuprayag-Muzaffarnagar Line-1	ABB; ETI41/NSD41
ii)	400 kV Vishnuprayag-Muzaffarnagar Line-2	ABB; ETI41/NSD41

B) Reactor Protection

	Name of Reactor	Differential Protection (Make and Model)	REF Protection (Make and Model)
i)	Line-1 Reactor	Hitachi; RET-670	Hitachi; RET-670
ii)	Line-2 Reactor	Hitachi; RET-670	Hitachi; RET-670
iii)	Bus Reactor-1		
iv)	Bus Reactor-2		

C) Geneator & Generator Transformer Protection

	Name of Reactor	Main 1
i)	Unit 1 (100 MW)	Hitachi - REG 670
i)	Unit 2 (100 MW)	Hitachi - REG 670
i)	Unit 3 (100 MW)	Hitachi - REG 670

i)	Unit 4 (100 MW)	Hitachi - REG 670

Summary of Protection system
uprayag Hydro Electric Plant, Vishnuprayag

Date of Installation	Event Logger (Make)	Availablity (In service or not)	Synchronising Facility Available or
Jan. 2024	Hitachi and ABB	In service	Available

Date of Testing	Main-II Protection (Make & Model)	Availablity (In service or not)	Date of Testing	LBB (Mak
Feb. 2024	Siemens, 7SA522	In service	Feb. 2024	ABI
Feb. 2024	Siemens, 7SA522	In service	Feb. 2024	ABI

Availablity (In service or not)	Disturbance Recorder(DR)	Details of O/V Protection
In service	Provided in line Main-1&2 Protections	Provided in line Main-1&2 Protections
In service		

Back-up Impedance Protection (Make and Model)	OTI/WTI Indication working or not	Buchholz/ PRD	Any other Protection	Date of Testing
Hitachi; RET-670	working	working	--	Feb-24
Hitachi; RET-670	working	working	--	Feb-24

Bus Reactors Not Installed

Main 2	OTI/WTI Indication working or not	Buchholz/ PRD	Any other Protection	Date of Testing
Hitachi - REG 670	working	working	--	Feb-24
Hitachi - REG 670	working	working	--	Feb-24
Hitachi - REG 670	working	working	--	Feb-24

Hitachi - REG 670	working	working	--	Feb-24

Synchro Check Relay	Remarks
SKD 11	

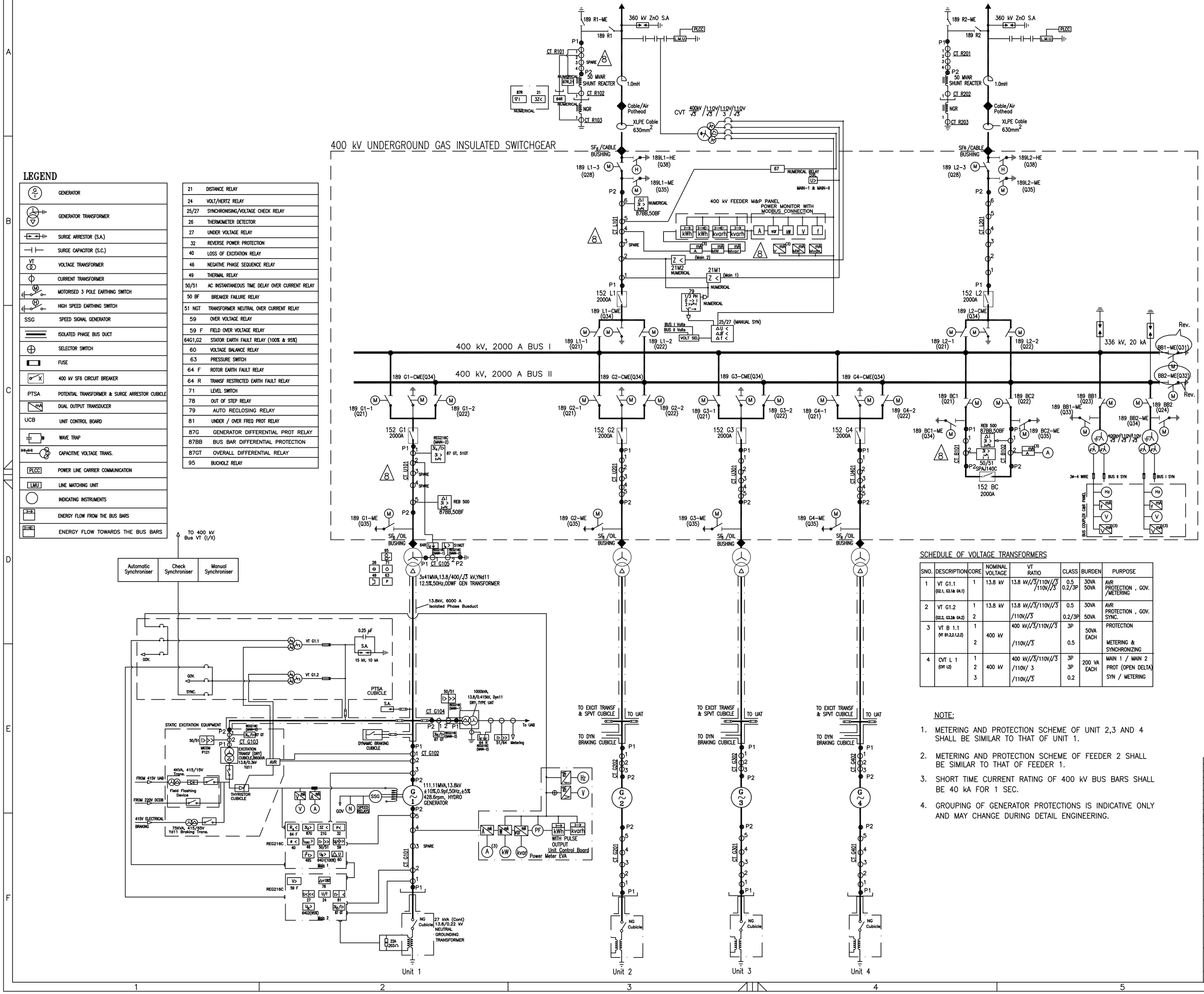
; Protection ‹e & Model)	Availablity (In service	Date of Testing
B; REB-670	In service	Jan. 2024
B; REB-670	In service	Jan. 2024

Availablity (In service or not)
In service
In service

LA Rating HV side
360kV,20kA, Class IV
360kV,20kA, Class IV

Remarks

Annexure-I



LEGEND

G	GENERATOR
	GENERATOR TRANSFORMER
	SURGE ARRESTOR (S.A.)
	SURGE CAPACITOR (S.C.)
VT	VOLTAGE TRANSFORMER
	CURRENT TRANSFORMER
M	MOTORISED 3 POLE EARTHING SWITCH
H	HIGH SPEED EARTHING SWITCH
SSG	SPEED SIGNAL GENERATOR
	ISOLATED PHASE BUS DUCT
	SELECTOR SWITCH
	FUSE
X	400 kV SF6 CIRCUIT BREAKER
PTSA	POTENTIAL TRANSFORMER & SURGE ARRESTOR CUBICLE
mA	DUAL OUTPUT TRANSDUCER
UCB	UNIT CONTROL BOARD
	WAVE TRAP
	CAPACITIVE VOLTAGE TRANS.
PLCC	POWER LINE CARRIER COMMUNICATION
LMU	LINE MATCHING UNIT
	INDICATING INSTRUMENTS
	ENERGY FLOW FROM THE BUS BARS
	ENERGY FLOW TOWARDS THE BUS BARS

21	DISTANCE RELAY
24	VOLT/HERTZ RELAY
25/27	SYNCHRONISING/VOLTAGE CHECK RELAY
26	THERMOMETER DETECTOR
27	UNDER VOLTAGE RELAY
32	REVERSE POWER PROTECTION
40	LOSS OF EXCITATION RELAY
46	NEGATIVE PHASE SEQUENCE RELAY
49	THERMAL RELAY
50/51	AC INSTANTANEOUS TIME DELAY OVER CURRENT RELAY
50 BF	BREAKER FAILURE RELAY
51 NGT	TRANSFORMER NEUTRAL OVER CURRENT RELAY
59	OVER VOLTAGE RELAY
59 F	FIELD OVER VOLTAGE RELAY
64G1,G2	STATOR EARTH FAULT RELAY (100% & 95%)
60	VOLTAGE BALANCE RELAY
63	PRESSURE SWITCH
64 F	ROTOR EARTH FAULT RELAY
64 R	TRANSF RESTRICTED EARTH FAULT RELAY
71	LEVEL SWITCH
78	OUT OF STEP RELAY
79	AUTO RECLOSING RELAY
81	UNDER / OVER FREQ PROT RELAY
87G	GENERATOR DIFFERENTIAL PROT RELAY
87BB	BUS BAR DIFFERENTIAL PROTECTION
87GT	OVERALL DIFFERENTIAL RELAY
95	BUCHOLZ RELAY

SCHEDULE OF CURRENT TRANSFORMERS

sno	Description	Core	Nominal Voltage	CT Ratio	Class	App Sec. Res (Ohm)	Knee Point Voltage, volt	Burden VA	Purpose
1	CT G101 (CT G201,G301, G401)	1	13.8 kV	6000/5A	PS	≤1.5	>415	–	OVERALL DIFF PROT
		2			PS	≤1.5	>477	–	PROT MAIN 2
		3			PS	≤1.5	>477	–	SPARE
		4			0.5	–	–	30	METERING
		5			PS	≤1.5	>477	–	PROT MAIN 1
2	CT G102 (CT G202,G302, G402)	1	13.8 kV	6000/5A	0.5	–	–	30	AVR 1
		2			0.5	–	–	30	AVR 2
		3			PS	≤1.5	>477	–	GEN DIFF PROT
3	CT G103 (CT G203,G303, G403)	1	13.8 kV	6000/5A 100/1A	PS 5P20	≤1.5 –	>415	– 10	OVERALL DIFF PROT PROT
4	CT G104 (CT G204,G304, G404)	1	13.8 kV	6000/5A 100/1A	PS 5P20	≤1.5	>415	– 10	OVERALL DIFF PROT PROT
5	CT G105 (CT G205,G305, G405)	1	400 kV	500–250 /1A	PS 5P20	≤1.5 –	>250	– 10	REF NEUTRAL O/C PROT
6	CT U101 (CT U201,U301, U401)	1	400kV	1000–500/ 250/1A	X	≤5.0	>1000	–	OVERALL DIFF PROT
		2			X	≤5.0	>1000	–	PROTECTION
		3			5P20	–	–	30	SPARE
		4			X	≤5.0	>1000	–	SPARE
		5			X	≤5.0	>1000	–	BUS BAR PROT
7	CT B101	1	400kV	1000–500/ 250/1A	X	≤5.0	>1000	–	SPARE
		2			5P20	–		30	PROT
8	CT B102	1	400kV	1000–500/ 250/1A	X	≤5.0	>1000	–	BUS BAR PROT
		2			0.5		–	30	METERING
9	CT L101 (CT L201)	1	400kV	1000–500 / 1A	X	≤5.0	>1000	–	LINE PROT MAIN 1
		2			X	≤5.0	>1000	–	LINE PROT MAIN 2
		3			0.1/0.2*	–	–	50	SPARE
		4			0.1/0.2*	–	–	50	METERING & SYN
		5			X	≤5.0	>1000	–	OVERCURRENT PROT
		6			X	≤5.0	>1000	–	BUS BAR PROT
10	CT R101 (CT R201)	1	400kV	250/1A	X	≤4.0	>400	–	REACTOR DIFF PROT
		2			X	≤4.0	>400	–	PROTECTION (REF)
		3			5P20	–		30	SPARE
		4			X	≤4.0	–	–	SPARE
11	CT R102 (CT R202)	1	400kV	250/1A	X	≤4.0	>400	–	REACTOR DIFF PROT.
12	CT R103 (CT R203)	1	400kV	250/1A	X	≤4.0	>400	–	PROTECTION (REF)

(* The CT cores for line metering and spare shall have accuracy of 0.1 at 1000/1A and 0.2 at 500/1A tap)

SCHEDULE OF VOLTAGE TRANSFORMERS

SNO.	DESCRIPTION	CORE	NOMINAL VOLTAGE	VT RATIO	CLASS	BURDEN	PURPOSE
1	VT G1.1 (G2.1, G3.1& G4.1)	1	13.8 kV	13.8 kV/√3/110V/√3 /110V/√3	0.5 0.2/3P	30VA 50VA	AVR PROTECTION , GOV. /METERING
2	VT G1.2 (G2.2, G3.2& G4.2)	1	13.8 kV	13.8 kV/√3/110V/√3 /110V/√3	0.5 0.2/3P	30VA 50VA	AVR PROTECTION , GOV. SYNC.
3	VT B 1.1 (VT B1.2,2.1,2.2)	1	400 kV	400 kV/√3/110V/√3 /110V/√3	3P 0.5	50VA EACH	PROTECTION & METERING & SYNCHRONIZING
4	CVT L 1 (CVT L2)	1	400 kV	400 kV/√3/110V/√3 /110V/ 3 /110V/√3	3P 3P 0.2	200 VA EACH	MAIN 1 / MAIN 2 PROT (OPEN DELTA) SYN / METERING

NOTE:

1. METERING AND PROTECTION SCHEME OF UNIT 2,3 AND 4 SHALL BE SIMILAR TO THAT OF UNIT 1.
2. METERING AND PROTECTION SCHEME OF FEEDER 2 SHALL BE SIMILAR TO THAT OF FEEDER 1.
3. SHORT TIME CURRENT RATING OF 400 kV BUS BARS SHALL BE 40 kA FOR 1 SEC.
4. GROUPING OF GENERATOR PROTECTIONS IS INDICATIVE ONLY AND MAY CHANGE DURING DETAIL ENGINEERING.

Rev.	Description	Grid Ref.	BY	Approved By:	Date
10	Drawing Updated	–	Amit Juahair		24/07/24
9	Drawing Updated	–	Tapan Singh	AKS/SC	02/08/05
8	Modif. in line CT for Prot. & Spare, Addition of identification code for Relays, CB, Disconnectors, Earthing Switches	–	Tapan Singh	AKS/SC	05/08/04
7	Location of CT U101, U201, U301, U401 400kV CT parameter Unit Aux.Transformer Rating, Earth switch, Reactor CT Detail modified	–	Tapan Singh	AKS/SC	15/07/04
6	Protection Module added, 13.8kV VT Config. Revised	–	Tapan Singh	AKS/SC	04/04/04
5	Knee point voltage and CT resistance for CTs added	–	S.Mathur	AKS/SC	12/12/03
4	Cable Diff Prot removed, Reactor rating & CT details changed	–	S.Mathur	AKS/SC	08/10/03
3	VT Details revised, line & neutral grounding Reactors added	–	S.Mathur	AKS/SC	25/07/03
2			AC	SC	9/10/02

Print Issue Date 27/07/2003

		DATE	25/07/03
Drawn	AMIT CHAUDHRY	Drawing Checked	A.K SINHA (V.P.)
Designed	A.K SINHA	Recommended/App.	SURESH CHANDRA (Jt. P.)

Drawing issued for information only unless signed as approved

CLIENT

JAIPRAKASH POWER VENTURES LIMITED

PROJECT

VISHNUPRAYAG HYDROELECTRIC PROJECT (400 MW)

TITLE

SINGLE LINE PROTECTION AND METERING DIAGRAM

JAYPEE VENTURES LIMITED
PLOT 64/4, SITE-IV, INDUSTRIAL AREA, SAHIBABAD – 201 010, U.P.

SCALE : NTS	DRAWING NO: 1100 – 2132 – 0011	REV. 10

Annexure – II

LEGEND

- 11kV withdrawable type V.C.B/SF6 CB
- 415V MCCB with O/L & S/C release
- Withdrawable-Type, 415V Electrically Operated, 3P, ACB
- Fuse Disconnect switch
- Direction overcurrent / Earth fault relay
- Restricted earth fault
- Over Voltage
- Under Voltage Relay
- Data Acquisition And Control System
- Reverse Power Relay
- Ammeter
- Voltmeter
- Powerfactormeter
- Kilowattmeter
- Kilowatthourmeter
- 13.8kV Isolated Phase Bus Duct
- Ammeter Transducer
- Line Trap
- VoltageTransducer
- Kilowatt Transducer
- Frequency Transducer
- Pulse Output
- Ammeter Selector Switch
- Voltmeter Selector Switch
- Potential Transformer
- Curent Transformer
- Lightning Arrester
- Isolator with Earth Switch
- Diesel Generator
- 415V Bus Trunking
- Syn. Arrangement
- Coupling Device
- Line Matching Unit

111.1MVA 13.8kV GEN. — 01LKA001TA — 1000 kVA, 13.8/0.415 kV, Dyn11 **UAT-1** [Dry-type] — 12LKA001TB — UAB-1

111.1MVA 13.8kV GEN. — 02LKA001TA — 1000 kVA, 13.8/0.415 kV, Dyn11 **UAT-2** [Dry-type] — UAB-2

111.1MVA 13.8kV GEN. — 03LKA001TA — 1000 kVA, 13.8/0.415 kV, Dyn11 **UAT-3** [Dry-type] — UAB-3

111.1MVA 13.8kV GEN. — 04LKA001TA — 1000 kVA, 13.8/0.415 kV, Dyn11 **UAT-4** [Dry-type] — 34LKA001TB — UAB-4

Ratio : 1500/1A; 5VA : 5P10; 15VA : Cl.1; 1500/1A ; PS; 415/110 V; Power Monitor with Modbus Connection; 0–1500 A.; 0–500 V; Ref Drg No. 1100–2132–0013

52–1 1500A — 52–5 1500A — 52–2 1500A — 415V, 3–Phase 4Wire,2000A,50kA for 1 Sec — 52–3 1500A — 52–6 1500A — 52–4 1500A

20LKA001TB — 1500A Isolator 89–1 — SSB–A — 1500A Isolator 89–2 — 1500A 52–11 — SSB–B — 1500A Isolator 89–3 — 1500A Isolator 89–4

1500A 52–12 — Ref Drg No. 1100–2132–0014 — 1500A 52–13

NOT FOUND IN EQUIPMENT LIST

415V, 3–Phase 4Wire,2000A,50kA for 1 Sec

40LKA001TB — 40LKA001TA — 250kVA 11/0.415kV — 152–B2 400A — 40LGA001TB — Butterfly Valve Chamber — 415V Aux. Board (For detail refer Drg. No. 1100–2132–0042) — 4 Pole Structure — Isolator with Earth Switch — LA — 11KV O.H Line

20LKA001TB — 1500/1A ; PS — Ratio : 1500/1A — 15VA : Cl.1 — 5VA : 5P10 — 64R

20LKA001TA — 1500/1A PS — 1500/1A 5P10 — 51N — 1000 kVA, 11/0.415 kV, Dyn11 **SST-1** [Dry-type] — 11KV CABLE

20LKA002TB — 001 — 1500/1A ; PS — Ratio : 1500/1A — 15VA : Cl.1 — 5VA : 5P10 — 64R

20LKA002TA — 1500/1A PS — 1500/1A 5P10 — 51N — 1000 kVA, 11/0.415 kV, Dyn11 **SST-2** [Dry-type] — 11KV CABLE

415V Potyard Aux. Board (For detail refer Drg. No. 1100–2132–0044)

90LKA001TB — Bus PT 415/110V; 0–500 V — 90LKA001TA — 250kVA 11/0.415 kV, Dyn11 Station Transformer for Potyard

PLCC SYSTEM — 4 Pole Structure — Isolator with Earth Switch — LA — Marwari — Existing 33kV line to be used — 11KV O.H Line

50LKA001TA — 500kVA 11/0.415kV Dyn11 Near DG Room — 50LGA001TB — 0–30 A; 0–75kV; 11/0.11kV; 30/1A; 30/1A 5P10 Cl.1 — 152–B1 400A

50LKP001GE — 320kVA 415V DG — 1/2 LOGIC — 50LKP002GE — 320kVA 415V DG

5VA : 5P10; Power Monitor with Modbus Connection; 0–500A; Ratio–500/1A 15VA, Cl.1; 0–500V; 415/110 V; Bus PT; 630A; 52–B3; 52–B4; 630A

415V DG BOARD — 415V, 3 Phase, 4 Wire, 1000A, Al. Bus Bar

IN THE SCOPE OF D.G. SET SUPPLIER

1000A 4 Pole Isolator 89–B1 — DG Room — 50LKA001TB

Ratio–800/1A; 5VA ; 5P10; 15VA, Cl.1; Power Monitor with Modbus Connection; 0–800 A.; 0–500V; 415/110 V; 800A; 52–B1; 52–B2; 415V, 3–Phase 800A,20kA; Barrage Control Room

415V AC Barrage Power Dist. Board (For detail refer Drg. No. 1100–2132–0043) — 50LKA002TB

(Local synch. for DG sets) Synch. Check Relay — Bus PT 11000/110 V

Ratio : 40/5A; 5VA : 5P10; 15VA : Cl.1; 0–15 A.; 630A 152–8

Ratio : 100/5A; 5VA : 5P10; 15VA : Cl.1; 0–100 A.; 630A 152–5; 630A 152–6; 630A 152–9; 630A 152–7

11KV BUS — 11KV, 3–Phase 3Wire,400A,10kA for 1 Sec

33KV O.H Line — For Colony Supply — 4 Pole Structure — L.A. — Isolator with Earth Switch — 400A — 11KV BUS — 400A — Ratio–150/1A 5VA ; 5P10 15VA, Cl.0.5 — 0–150 A.; 0–15 KV; PT 11000/110 V; 2000kVA 33/11kV — 33kV Breaker — 33kV BUS — Exixsting 66/33kV PPCL Sub–station — Marwary Colony (Near Diesel Sets)

152–1 630A — Power Monitor with Modbus Connection; 0–150 A.; 0–15 KV; Ratio–150/5A 5VA ; 5P10 15VA, Cl.0.5; PT 11000/110 V; 11KV O.H Line — 4 Pole Structure — Isolator with Earth Switch — LA — Incoming–1

152–3 630A — Power Monitor with Modbus Connection; 0–100 A.; 0–15 KV; Ratio–100/5A 15VA, Cl.0.5; PT 11000/110 V; Ratio–100/5A 5VA ; 5P10; 2000 kVA 0.415/11 kV Ynd 11 TRANSFORMER

152–4 630A — Power Monitor with Modbus Connection; Ratio–100/5A 15VA, Cl.0.5; PT 11000/110 V; Ratio–100/5A 5VA ; 5P10; SPARE

152–2 630A — Power Monitor with Modbus Connection; 0–150 A.; 0–15 KV; Ratio–150/5A 5VA ; 5P10 15VA, Cl.0.5; PT 11000/110 V; 4 Pole Structure — Isolator with Earth Switch — LA — 11KV O.H Line — Incoming–2 / Spare

D.G. COMPOSITE CONTROL PANEL — 415V, 3 Phase, 4 Wire, 3200A, Al. Bus Bar — 52–C3 3200A T.P. ACB — 52–C1 1600A T.P. ACB — 52–C2 1600A T.P. ACB — 90LKP001GE — 1010kVA 415 V D.G. SET–1 — 1/2 LOGIC — 90LKP002GE — 1010kVA 415 V D.G. SET–2 — IN THE SCOPE OF D.G. SET SUPPLIER

R4:– Capacity of UAT,SST DG Set revised to 1000 kVA.

NOTE

1. Synchronising arrangement between DG Sets to be provided
2. Short circuit rating of Circuit Breakers :
   415 V Circuit Breakers – 50 kA, 1 Sec for Power House &
   20 kA, 1 Sec for Barrage Site
   11 kV Circuit Breakers – 10 kA, 1 Sec
3. All the transducers shall have 4–20 mA dual output.Power Monitor will have modbus connection.
4. The energy meters shall have provision of pulse output if facility does not exist in Power Monitor
5. The connection of UATs to respective UABs, SSTs to respective SSBs and interconnection between UABs & SSBs as shown in the SLD shall be through sandwich type LT bus trunking system
6. OFC Cables will be laid on 11kV line from Power House to BFV Chamber & 11kV line from Power House to Barrage Site
7. For details of PLCC System refer Drawing 1100–2163–0001

Rev.	Description	Grid Ref.	By	Approved By:	Date
R8	1010kVA D.G. Scheme Modified, 2MVA Trf. Added		AJ		24/07/24
R7	1010kVA D.G. Scheme Modified, 2MVA Trf. Added		GS/LDP	S. Chandra	22/08/05
R6	Protection of 415V D.G. Set Added		GS/LDP	S. Chandra	12/04/05
R5	11kV CTs ratio & Breaker rating revised		Rohit Gupta	S. Chandra	20/10/04
R4	Capacity of UAT, SST, DG Set revised to 1000kVA		T S / SM	S. Chandra	20/04/04
R3	PT, Power Monitor & equipment marking added		T S / SM	S. Chandra	16/03/04
R2	PLCC Sys & Alstom equipment marking added		S. Maiti	S. Chandra	02/02/04
R1	Ammeter Transducers added & CT rating modified		S. Maiti	S. Chandra	20/11/03

Z:\Vishnuprayag\Schematic\ACAD\1100–2132–0025_R6.dwg

DATE	16/09/03	Drawing Checked		A. K. Sinha	Vice Pres.
Designed	S. MAITI	Design Engr.	Recommended/App.	S. CHANDRA	Joint Pres.

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CLIENT

JAIPRAKASH POWER VENTURES LIMITED

PROJECT: VISHNUPRAYAG HYDROELECTRIC PROJECT (400 MW)

TITLE: 11kV/415V AC POWER DISTRIBUTION SYSTEM – SINGLE LINE DIAGRAM

JAYPEE VENTURES LIMITED
PLOT 64/4, SITE–IV, INDUSTRIAL AREA, SAHIBABAD – 201 010, U.P.

SCALE NTS | DRAWING NO: 1100–2132–0025 | REV. R8

Annexure-III
(DC System)

LEGEND

FUSE

MCCB

VOLTAGE TRANSDUCER

REFERENCE DRAWINGS

	TITLE	DRG. NO.
1.	SINGLE LINE DIAGRAM FOR BATTERY & CHARGER FOR 220 V DC SYSTEM	1100-2147-0002
2.	UPS DISTRIBUTION BOARD	1100-2147-0005

NOTES :-

1. CONNECTION FOR SDB-2A, FOR UNIT 2 IS SIMILAR TO SDB-1A. SIMILARLY, CONNECTION FOR SDB-2B, FOR UNIT 2 IS SIMILAR TO SDB-1B.
2. CONNECTION FOR SDB-4A, FOR UNIT 4 IS SIMILAR TO SDB-3A. SIMILARLY, CONNECTION FOR SDB-3B, FOR UNIT 4 IS SIMILAR TO SDB-3B.
3. DCDB-I & DCDB-II ARE PROTECTED WITH D.C. UNDERVOLTAGE, OVERTAGE RELAY AND EARTH FAULT RELAYS.
4. ALL THE MCCBs ARE PROVIDED WITH POTENTIAL FREE CONTACTS FOR 'ON' AND 'TRIP' STATES. SIMILARLY, ALL THE MCBs ARE PROVIDED WITH POTENTIAL FREE CONTACT FOR 'ON' STATE.

R7	MCCB ratings updated		Amit Jauhari	Suresh Chandra	13/09/05
R6	Revised as per present details		Amit Jauhari	Suresh Chandra	05/02/05
R5	MCBs changed to MCCBs		Gopal Sharma	Suresh Chandra	30/10/04
R4	100 A MCBs changed to 100 A MCCBs		Amit Jauhari	Suresh Chandra	10/09/04
R3	LTBoard supply from DCDB-II included		Amit Jauhari	Suresh Chandra	12/05/04
R2	SDB-5 A&B, DC HP pump supply modified.		Amit Jauhari	Suresh Chandra	16/03/04
R1	Feeders revised,equipment codes by Alstom added		S. Maiti	S. Chandra	30/01/04
Rev.	Description	Grid Ref.	BY	Approved By:	Date
		D:\AMIT\Acad-2\VISHNU\DC SYSTEM\1100-2147-0004_R0			
DATE	13/10/2003	Drawing Checked	AK Sinha	V.P.	
Designed	Amit Jauhari Sr. Engr.	Recommended/App.	S. CHANDRA	Jt. President	

Drawing Issued for Information only unless signed as approved

CLIENT

JAIPRAKASH POWER VENTURES LIMITED

PROJECT

VISHNUPRAYAG HYDROELECTRIC PROJECT (400 MW)

TITLE

DC SYSTEM – SINGLE LINE DIAGRAM

JAYPEE VENTURES LIMITED
PLOT 64/4, SITE-IV, INDUSTRIAL AREA, SAHIBABAD – 201 010, U.P.

SCALE N.T.S. | DRAWING NO: 1100-2147-0004 | REV. R7

COMMUNICATION CONNECTIVITY DIAGRAM
Refurbishment of Main Protection Relays at 400MW
Vishnuprayag Hydroelectric project

Annexure-IV

LEGEND :

ARMOURED FO CABLE	
DUPLEX FO PTCH CABLE	
LAN CABLE CAT-6	

FX = MULTI MODE FIBER OPTIC PORT
TX = COPPER PORT (RJ45)
LIU = MULTI MODE LIGHT INTERFACE UNIT

Based on: SALE ORDER No:3100137415		Title	VISHNUPRAYAG HYDROELECTRIC PROJECT (400 MW) COMMINICATION CONNECTIVITY DIAGRAM
Prepared: SMB			
Approved: PSK			
Project	Vishnuprayag Hydroelectric project Jaiprakash Power Ventures Limited	Doc. des.: COMMUNICATION CONNECTIVITY DIAGRAM	Ref. des.:
		Resp. dept.: PG-GAS	Rev. ind.: 02 / Lang.: English
HITACHI		Doc. No.: 1MNS801835-ZSA	Sheet: 01 / No. of sh.: 01

SHUT DOWN LOG (June 2023 - June 2024)						Annexure-V
Sl. No.	Unit/ Feeder	Date / Time		Duration during month	Type of Fault	Purpose / Reason
		From	To	(Hrs : Mts)		
1	400 kV VP – MZN Line	30.06.2023 02:28	30.06.2023 04:11	01 Hrs 43 Mts	Transmission line fault	400 kV VP-MZN line CB at VP end was tripped at 02:28 Hrs on 30.06.2023 on receipt of Direct trip command from MZN end. After receiving line charging codes, 400 kV VP-MZN line was charged from MZN end at 04:10 Hrs and CB at VP end was closed at 04:11 Hrs on 30.06.2023 respectively. (400 kV VP-ALK Line remained in service)
2	400 kV VP – MZN Line	05.07.2023 12:38	05.07.2023 15:07	02 Hrs 29 Mts	Transmission line fault	400 kV VP-MZN Line tripped on R-Y Fault (Dist. 92.0 km), from both ends at 1238 Hrs on 05.07.2023. 400 kV VP-MZN Line was charged from MZN end at 1506 Hrs and CB at VP end was tried to close at 1507 Hrs, but again tripped on Y-N Fault (Dist. 97.81 km) on 05.07.2023. 400 kV VP - MZN line shutdown availed by UPPTCL from 0905 Hrs on 06.07.2023. After attending the fault 400 kV VP-MZN Line was charged from MZN end at 15:12 Hrs and at VP end CB was Closed at 15:13 Hrs on 12.07.2023. (400 kV VP-ALK Line remained in service)
	400 kV VP – MZN Line	05.07.2023 15:07	12.07.2023 15:13	168 Hrs 06 Mts	Transmission line fault	
3	Unit - 2	14.07.2023 17:16	14.07.2023 21:48	04 Hrs 32 Mts	Governor	Unit-2 Tripped on Quick shutdown (QSD) due to Governor oil level too low at 17:16 Hrs on 14.07.2023. After attending the fault Unit-2 Synchronized with grid at 21:48 Hrs on 14.07.2023.
4	400 kV VP – ALK Line	04.08.2023 03:09	04.08.2023 04:42	01 Hrs 33 Mts	Transmission line fault	400 kV ALK-MZN line tripped, simultaneously CB of 400 kV VP - MZN line at VP end also tripped. As power evacuation system was not available; running unit 1, 2, 3 & 4 also tripped at 03:09 hrs on 04.08.2023. 400 kV VP – ALK line was charged at 04:42 hrs with restoration of 400kV ALK – MZN line. After receiving line charging codes VP-MZN line CB at VP end was closed at 05:03 hrs on 04.08.2023. Unit 1, 2, 3 & 4 were synchronized with grid at 05:54 hrs, 05:48 hrs, 05:22
	400 kV VP – MZN Line	04.08.2023 03:09	04.08.2023 05:03	01 Hrs 54 Mts	Transmission line fault	
	Unit - 1	04.08.2023 03:09	04.08.2023 05:54	02 Hrs 45 Mts	Transmission line fault	
	Unit - 2	04.08.2023 03:09	04.08.2023 05:48	02 Hrs 39 Mts	Transmission line fault	

	Unit - 3	04.08.2023 03:09	04.08.2023 05:22	02 Hrs 13 Mts	Transmission line fault	hrs & 05:40 hrs respectively.
	Unit - 4	04.08.2023 03:09	04.08.2023 05:40	02 Hrs 31 Mts	Transmission line fault	
5	400 kV VP – MZN Line	10.08.2023 03:50	10.08.2023 05:23	01 Hrs 33 Mts	Transmission line fault	400 kV VP - MZN line CB at VP End tripped on over current at 03:50 Hrs on 10.08.2023, due to tripping of 400 kV ALK - MZN line and excess power flow, resulting in tripping of running units 1, 2, 3 & 4 at 03:50 Hrs After receiving line charging codes, 400 kV VP-MZN line CB closed at VP end at 05:23 hrs on 10.08.2023. Units 1, 2, 3 & 4 were synchronized with grid at 06:06 hrs, 05:52 hrs, 05:40 hrs & 05:48 hrs respectively on 10.08.2023. After receiving opening codes, 400 kV VP-ALK Line was opened at 05:28 Hrs and on receipt of charging codes, 400 kV VP-ALK Line was charged from ALK End at 06:22 Hrs & CB at VP End was closed at 06:23 Hrs on 10.08.2023
	400 kV VP – ALK Line	10.08.2023 05:28	10.08.2023 06:23	00 Hrs 55 Mts	Transmission line fault	
	Unit - 1	10.08.2023 03:50	10.08.2023 06:06	02 Hrs 16 Mts	Transmission line fault	
	Unit - 2	10.08.2023 03:50	10.08.2023 05:52	02 Hrs 02 Mts	Transmission line fault	
	Unit - 3	10.08.2023 03:50	10.08.2023 05:40	01 Hrs 50 Mts	Transmission line fault	
	Unit - 4	10.08.2023 03:50	10.08.2023 05:48	01 Hrs 58 Mts	Transmission line fault	
6	400 kV VP – ALK Line	18.08.2023 16:37	19.08.2023 15:15	22 Hrs 38 Mts	Transmission line fault	400 kV VP-ALK Line tripped on Y-B Fault (Dist. 56.60 km) at 1637 Hrs on 18.08.2023, resulting in tripping of all running Units 1, 2, 3 & 4 at 1637 Hrs, due to non-availability of Power Evacuation. After Charging 400 kV VP-MZN Line at 1748 Hrs, Units 1, 2, 3 & 4 were synchronised with grid at 1820 Hrs,1804 Hrs, 1808 Hrs & 1753 Hrs respectively on 18.08.2023. also after receiving line charging codes of 400 kV VP - ALK line, 400 kV VP-ALK line was charged from ALK end at 15:14 hrs and CB of VP end was closed at 15:15 hrs on 19.08.2023. 400 kV VP-MZN Line Shutdown was availed by UPPTCL from 1612 Hrs to 1748 Hrs on 18.08.2023.
	Unit - 1	18.08.2023 16:37	18.08.2023 18:20	01 Hrs 43 Mts	Transmission line fault	
	Unit - 2	18.08.2023 16:37	18.08.2023 18:04	01 Hrs 27 Mts	Transmission line fault	
	Unit - 3	18.08.2023 16:37	18.08.2023 18:08	01 Hrs 31 Mts	Transmission line fault	
	Unit - 4	18.08.2023 16:37	18.08.2023 17:53	01 Hrs 16 Mts	Transmission line fault	
7	Unit - 3	20.08.2023 23:09	21.08.2023 00:45	01 Hrs 36 Mts	Governor	Unit – 3 tripped (QSD) due to TSLG major fault at 23:09 hrs on 20.09.2023. After attending the fault Unit - 3 was synchronized with grid at 00:45 hrs on 21.08.2023.
8	400 kV VP – MZN Line	22.08.2023 07:15	22.08.2023 07:53	00 Hrs 38 Mts	Transmission line fault	400 kV VP - MZN line CB at VP End tripped on Y-N fault and auto-reclosed at 07:15 Hrs at VP end but CB did not clos at MZN end on 22.08.2023,after receiving charging code 400 kV VP - MZN line CB at MZN end closed at 07:53 at MZN end.on 22.08.2023.

9	400 kV VP – MZN Line	22.08.2023 18:35	22.08.2023 19:05	00 Hrs 30 Mts	Transmission line fault	400kV VP-MZN line tripped at VP end on receipt of direct trip command from MZN end at 18:35 hrs on 22.08.2023. After receiving line charging codes, CB of VP-MZN line was closed at VP end at 19:05 hrs on 22.08.2023.
10	400 kV VP – MZN Line	23.08.2023 09:31	23.08.2023 10:40	01 Hrs 09 Mts	Transmission line fault	400 kV VP- MZN line CB tripped at VP end on receipt of Direct Trip Commond (DTR) at 09:59 Hrs on 23.08.2023. After receiving line charging codes, 400 kV VP - MZN line CB at VP end closed at 10:40 Hrs on 23.08.2023.
11	Unit - 1	15.03.2024 02:49	15.03.2024 05:29 (U#4)	02 Hrs 40 Mts	Transmission line fault	400 kV VP-MZN and 400 KV VP- ALK Lines tripped due to bus bar protection operated at 0249 Hrs resulting in tripping of running Units 1 & 3 on 15.03.2024. 400 KV VP -ALK Line was restored at 0519 Hrs & Plant Generation resumed at 0529 Hrs on 15.03.2024. Shutdown of 400 kV VP-MZN Line is availed by VPHEP, as foul smell was observed in the B phase compartment of Circuit Breaker, from 1238 Hrs on 15.03.2024 for inspection and attending the fault. A foul smell was observed in the B- phase compartment of Circuit Breaker at VPHEP end. After replacement of B – phase pole of circuit breaker 400 kV VP-MZN line
	Unit - 3	15.03.2024 02:49	15.03.2024 05:29 (U#4)	02 Hrs 40 Mts	Transmission line fault	
	400 kV VP – MZN Line	15.03.2024 02:49	19.03.2024 19:14	112 Hrs 25 Mts	Transmission line fault	
	400 kV VP – MZN Line	15.03.2024 02:49	15.03.2024 05:19	02 Hrs 30 Mts	Transmission line fault	
12	400 kV VP - MZN Line	29.04.2024 22:59	30.04.2024 00:46	01 Hrs 47 Mts	Transmission line fault	400 kV VP-MZN line tripped and Auto Reclosed at VP end but tripped at MZN end at 22:59 Hrs on 29-04-2024. After receiving S/D codes for 400 kV VP-MZN line, C.B was opened at VP end at 00:11 Hrs on 30.04.2024. 400 kV ALK-MZN line tripped as Bus Bar protection operated at MZN end at 00:16 Hrs on 30-04-2024. but C.B did not opened at VP end, resulting in tripping of running Unit-2 (QSD) due to non-availability of power evacuation system. 400 kV VP-MZN line was charged from MZN end at 00:45 Hrs and C.B at V.P end was closed at 00:46 Hrs on 30-04-2024. Unit-02 was synchronised with grid at 00:48 Hrs.
13	Unit - 2	30.04.2024 00:16	30.04.2024 00:48	00 Hrs 32 Mts	Transmission line fault	400 kV VP-MZN line tripped and Auto Reclosed at VP end but tripped at MZN end at 22:59 Hrs on 29-04-2024. After receiving S/D codes for 400 kV VP-MZN line, C.B was opened at VP end at 00:11 Hrs on 30.04.2024. 400 kV ALK-MZN line tripped as Bus Bar protection operated at MZN end at 00:16 Hrs on 30-04-2024. but C.B did not opened at VP end, resulting in tripping of running Unit-2 (QSD) due to non-availability of power evacuation system. 400 kV VP-MZN line was charged from MZN end at 00:45 Hrs and C.B at V.P end was closed at 00:46 Hrs on 30-04-2024. Unit-02 was synchronised with grid at 00:48 Hrs.

14	400 kV VP - MZN Line	02.05.2024 01:54	02.05.2024 20:02	18 Hrs 08 Mts	Transmission line fault	400 kV VP - MZN Line tripped on R→N fault (Dist-213.84 km) at 01:54 Hrs on 02.05.2024. After receiving charging codes 400 kV VP - MZN Line charged from MZN end at 20:01 Hrs and CB at VP end closed at 20:02 Hrs on 02.05.2024. (400 kV VP - ALK Line remained in service)
15	400 kV VP - MZN Line	04.05.2024 19:12	05.05.2024 11:28	16 Hrs 16 Mts	Transmission line fault	400 kV VP - MZN Line tripped on Y→B fault (Dist-39.71 km) at 19:12 Hrs on 04.05.2024. 400 KV VP-MZN Line was under shut down from 20:34 Hrs on 04.05.2024(Shut down availed by UPPTCL). 400KV VP-MZN Line was charged from MZN end at 11:27 Hrs. and CB at VP end was closed at 11:28 Hrs on 5.05.2024. (400 kV VP - ALK Line remained in service)
16	Unit-3	09.05.2024 16:44	09.05.2024 17:54	01 Hrs 10 Mts	Breakdown	Unit- 03 tripped (QSD) at 16:44 Hrs on 09.05.2024 due to TSLG Major Fault (Governor). After attending Fault Unit-03 Synchronized with Grid at 17:54 Hrs
17	400 kV VP - MZN Line	31.05.2024 16:03	31.05.2024 16:03	00 Hrs 00 Mts	Breakdown	400 kV VP-MZN line tripped and Auto Reclosed at 16:03 Hrs on 31.05.2024.
18	400 kV VP - MZN Line	01.06.2024 18:13	01.06.2024 19:03	00 Hrs 50 Mts	Breakdown	400 kV VP - MZN Line tripped on Y→N fault (Dist-160.90km) at 18:13 Hrs on 01.06.2024. After receiving charging codes 400 kV VP - MZN Line charged from MZN end at 19:03 Hrs and CB at VP end closed at 19:03 Hrs on 01.06.2024. (400 kV VP - ALK Line remained in service)
19	400 kV VP - MZN Line	05.06.2024 14:40	05.06.2024 20:02	05 Hrs 22 Mts	Breakdown	400 kV VP - MZN Line tripped on Y→B fault (Dist-93.21 km) at 14:40 Hrs on 05.06.2024. After receiving codes 400 kV VP - MZN Line charged from MZN end at 20:01 Hrs and CB at VP end closed at 20:02 Hrs on 05.06.2024. (400 kV VP - ALK Line remained in service)

Legends	
	For Transmission Lines
	For 1, 2, 3, 4 Units

Annexure-VII

ग्रिड-इंडिया GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
राष्ट्रीय भार प्रेषण केन्द्र / National Load Despatch Centre

आज़ादी का अमृत महोत्सव

कार्यालय : बी-9, प्रथम एवं द्वितीय तल, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110016
Office : 1st and 2nd Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016
CIN : U40105DL2009GOI188682, Website : www.grid-india.in, E-mail : gridindiacc@grid-india.in, Tel.: 011- 42785855

संदर्भ: Grid-India/NLDC/2024/August/

दिनाँक: 21.08.2024

सेवा मे,

[1] Member Secretary, Northern Regional Power Committee,18-A, Qutab Institutional Area, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110 016
[2] Member Secretary, Eastern Regional Power Committee, 14 Golf Club Road, Tollygunje, Kolkata-700033

महोदय/महोदया,

विषय/Subject: 220 केवी और उससे अधिक वोल्टेज वर्ग की अंतर-क्षेत्रीय लाइनों की ट्रिपिंग में सुरक्षा मानक के उल्लंघन की अधिसूचना

Notifying violation of protection standard in case of tripping of the Inter-Regional lines of voltage class 220 kV and above

220 केवी और उससे अधिक वोल्टेज वर्ग की अंतर क्षेत्रीय लाइनों की ट्रिपिंग के मामले में, केंद्रीय विद्युत प्राधिकरण, 2010 के ग्रिड मानक नियमन की धारा 3.ई के अनुसार फ़ाल्ट निम्नलिखित समय सीमा मे निर्बाधित किया जाना है:

This has reference to violation of protection standard in case of tripping of Inter Regional Lines of voltage class 220 kV and above. As per section 3.e of Grid Standards Regulation of CEA, 2010, fault is to be cleared within the following time:

क्र.स./ Sl. No.	मामूली प्रणाली वोल्टेज (केवी आरएमएस)/ Nominal System Voltage in kV rms	फ़ाल्ट निर्बाधन का अधिकतम समय (मिली सेकंड)/ Maximum time of fault clearing in msec
1	400	100
2	220	160

जुलाई 2024 माह के दौरान 220 केवी और उससे अधिक वोल्टेज वर्ग की अंतर-क्षेत्रीय लाइनों की ट्रिपिंग की सूची संलग्न है, जिनमें उल्लंघन पाए गए हैं। यह देखा गया है कि इन घटनाओं के दौरान निर्दिष्ट समय के भीतर फ़ाल्ट को निर्बाधित नहीं किया गया था। चूंकि, ये घटनाएं चिंता का विषय हैं, यह अनुरोध किया जाता है कि उल्लिखित लाइनों/सबस्टेशनों के संबंधित स्वामियों को उपयुक्त कार्रवाई करने की सलाह दी जाए।

The list of tripping of Inter Regional Lines of voltage class 220 kV and above, during the month of **July 2024** in which violations have been observed is enclosed. It has been observed that fault had not cleared within specified time during these incidents. Since, these events are matter of concern, it is requested that the corresponding owners of mentioned lines/substations may be advised to take suitable actions.

सधन्यवाद,

भवदीय,

(मानस रंजन चंद)
उप महाप्रबंधक, रा.भा.प्रे.कें.

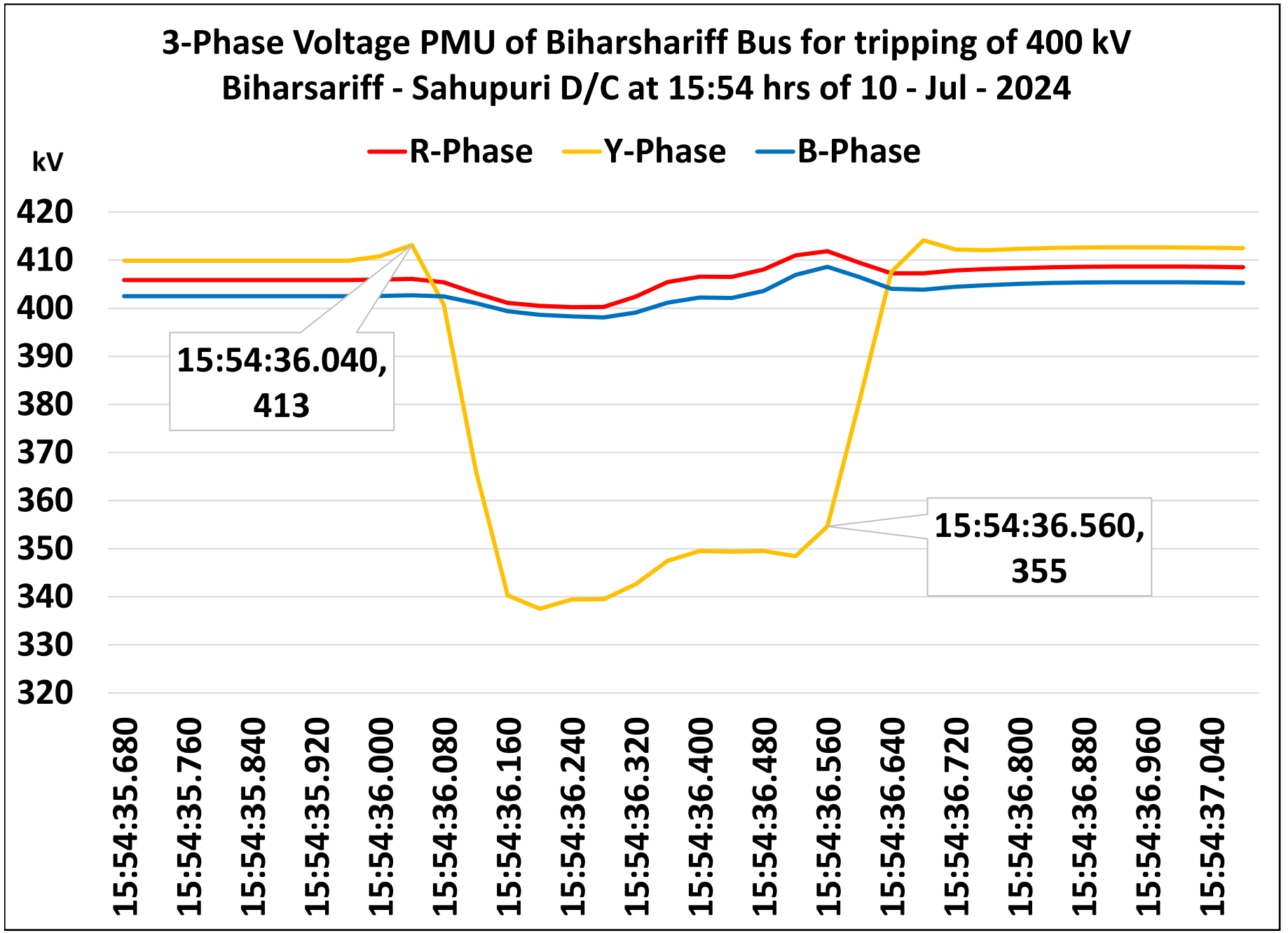
प्रतिलिपि सूचनार्थ :

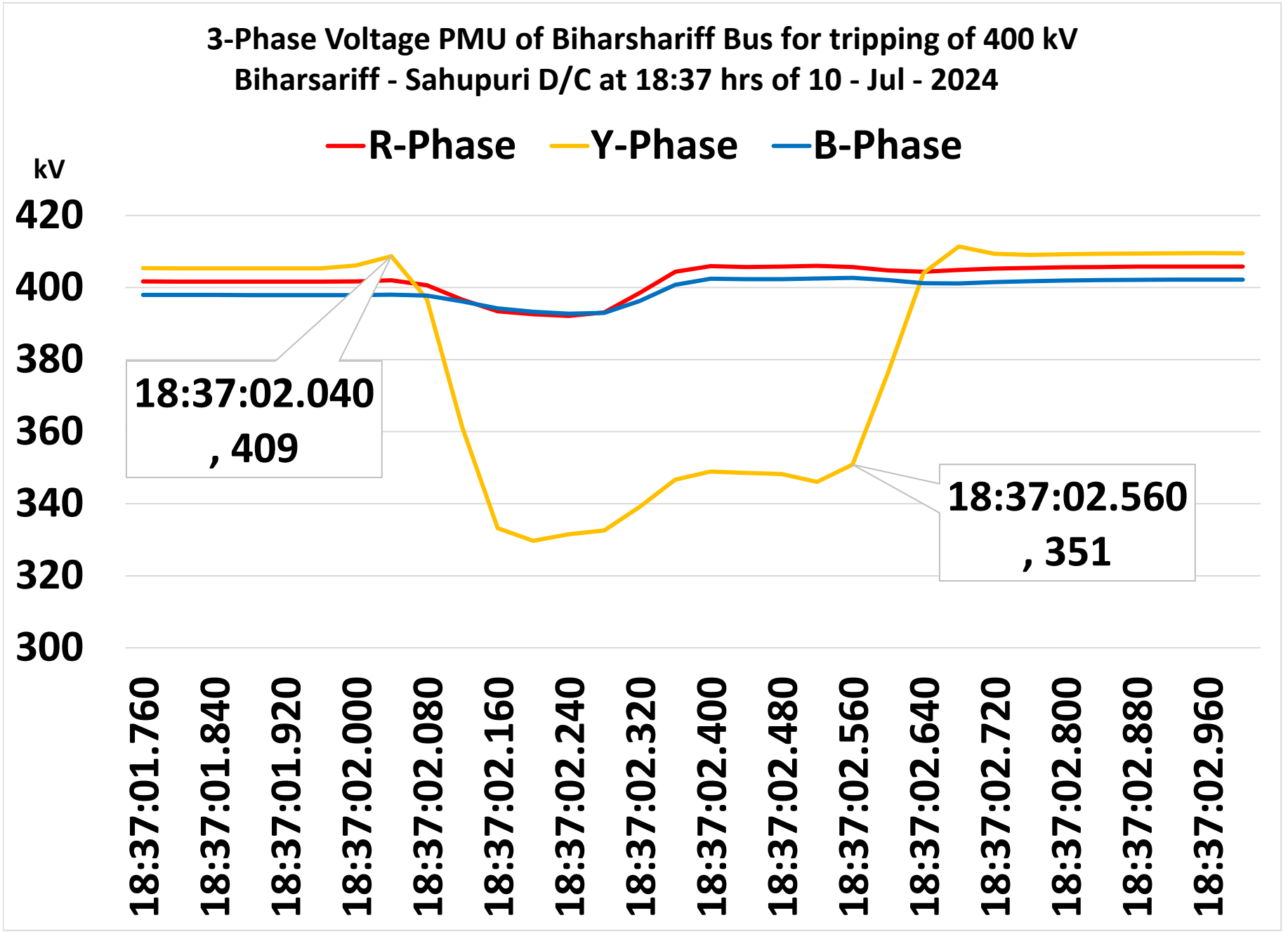
1. कार्यपालक निदेशक, ऊतरी क्षेत्रीय भार प्रेषण केंद्र / पूर्वी क्षेत्रीय भार प्रेषण केंद्र

Violation of Standards in case of tripping of Inter-Regional lines for July 2024

S.No.	Name of Transmission Line	Regions Involved	Tripping Date and Time	Brief Reason/ Relay Indication	Restoration Date and Time	Fault Clearing Time (in msec as per nearest PMU)
1	400 kV Biharsariff - Sahupuri I	ER/NR	10-Jul-2024 15:54	Y-N Phase	10-Jul-2024 17:53	520
2	400 kV Biharsariff - Sahupuri II	ER/NR	10-Jul-2024 15:54	Y-N Phase	10-Jul-2024 17:54	520
3	400 kV Biharsariff - Sahupuri I	ER/NR	10-Jul-2024 18:37	Y-N Phase	10-Jul-2024 23:03	520
4	400 kV Biharsariff - Sahupuri II	ER/NR	10-Jul-2024 18:37	Y-N Phase	10-Jul-2024 23:02	520

Note: Fault clearing time calculated as per nearest PMU voltage


3-Phase Voltage PMU of Biharshariff Bus for tripping of 400 kV Biharsariff - Sahupuri D/C at 15:54 hrs of 10 - Jul - 2024
R-Phase
Y-Phase
B-Phase
kV
420
410
400
390
380
370
360
350
340
330
320
15:54:36.040, 413
15:54:36.560, 355
15:54:35.680
15:54:35.760
15:54:35.840
15:54:35.920
15:54:36.000
15:54:36.080
15:54:36.160
15:54:36.240
15:54:36.320
15:54:36.400
15:54:36.480
15:54:36.560
15:54:36.640
15:54:36.720
15:54:36.800
15:54:36.880
15:54:36.960
15:54:37.040


3-Phase Voltage PMU of Biharshariff Bus for tripping of 400 kV
Biharsariff - Sahupuri D/C at 18:37 hrs of 10 - Jul - 2024
R-Phase
Y-Phase
B-Phase
kV
420
400
380
360
340
320
300
18:37:02.040
, 409
18:37:02.560
, 351
18:37:01.760
18:37:01.840
18:37:01.920
18:37:02.000
18:37:02.080
18:37:02.160
18:37:02.240
18:37:02.320
18:37:02.400
18:37:02.480
18:37:02.560
18:37:02.640
18:37:02.720
18:37:02.800
18:37:02.880
18:37:02.960

Annexure-VIII

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED
[Corporate Identity Number (CIN): U40109RJ2000SGC016485]
Regd. Office: Vidyut Bhawan, Janpath, Jyoti Nagar, Jaipur-302005

RVPN
An ISO 9001:2015 Certified Company

OFFICE OF THE CHIEF ENGINEER (LD)
New Prasaran Bhawan, TCC Building, Heerapura, Jaipur Tel. No. 0141-2948293
E-mail: ce.ld@rvpn.co.in website: www.http://energy.rajasthan.gov.in/rvpnl

No. RVPN/ CE (LD)/SE(SOLD)/XEN-III/ F. / D. 138 Jaipur, D.12/08/24

The Member Secretary
NRPC, New Delhi

Sub:- Agenda Item for inclusion in next Protection Sub-Committee (PSC) meeting-Regarding tripping of 400/220 kV. 315 MVA ICT at 2x600 MW Kalisindh Thermal Power Station, Jhalawar on Sensitive Earth Fault Relay.

On the above captioned subject, it is intimated that Sensitive Earth fault protection (SEF) is used on 400/220kV , 315 MVA ICT at Kalisindh with tripping mode, and recently few tripping occurred on 400/220 kV, 315 MVA ICT due to SEF Protection (details attached) causing a large area disturbance i.e. Jhalawar, Bhawanimandi & Aklera.

So, in view of above a Agenda Item is enclosed herewith for including the above issue in upcoming PSC Meeting Agenda.

Encl: As above

(Manish Athaiya)
Chief Engineer (LD)
RVPN, Jaipur

Copy to the following for information and necessary action :-

1. The Chief Engineer(MPT&S), RVPN, Jaipur.
2. The Chief Engineer, Kalisindh Thermal Power Station, RVUN, Jhalawar.
3. The Superintending Engineer(Prot.Engg.), RVPN, Jaipur
4. The Superintending Engineer(Elect./Operations), Kalisindh Thermal Power Station, RVUN, Jhalawar.

Signature valid
Digitally signed by Manish Athaiya
Designation: Chief Engineer
Date: 2024.08.12 17:42:45 IST
Reason: Approved

Agenda :-**Sensitive Earth Fault relay (to be kept on Alarm Mode only) of 440/220KV 315MVA ICT at 2X600MW Kalisindh Thermal Power Station, Jhalawar**

1. It is to inform that 220KV GSS Jhalawar, Bhawanimandi and Aklera supply is presently fed radially through(400/220 KV,315 MVA ICT)Kalisindh Generating Station (KSTPS).
2. SEF (Sensitive Earth Fault) protection is used in 440/220KV 315MVA ICT with tripping mode having time 1.5 Sec. (DT)
3. Recently few tripping occurred on 440/220KV, 315MVA ICT on SEF (Sensitive Earth Fault) Because of jumper snapping (Broken Conductor) in 220 KV lines. Due to this, supply of large area having 03 Nos. above 220 KV GSS & connected 132 KV GSS disturbed.
4. SEF Protection may operate because of unbalance current that due to broken conductor of 220 kV line.The RVPN has enabled broken conductor protection in 220 & 132 KV lines on alarm mode. In case any alarm observed, the line shall be manually tripped after checking current in all phases.
5. SEF relay is connected on neutral CT having CT ratio 500/1 and current plug setting is 0.1A (i.e. 45.4 Amp only), TMS – 1.5 Sec. DT mode.
6. At Kalisindh Thermal Power Station, Jhalawar the backup protection is also available on ICT which may take care of unbalance current in case of jumper snapping or actual phase to earth fault.
7. Such protection with tripping mode is **nowhere used in RVPN** Transmission system, this protection (SEF) is also **not included in the recent Protection Philosophy**.
8. Therefore Please arrange to disable tripping through SEF relay or increase the setting from existing value & keep it on alarm mode only for 440/220KV, 315MVA ICT at **Kalisindh Thermal Power Station, Jhalawar**.

EHV Tripping details on 220 KV GSS Jhalawar

S.NO.	NAME OF CIRCLE	NAME OF GSS	Name of Line	Tripping Date	Tripping Time	Closing Date	Closing Time	Relay Indication			Remarks
								JWR End	B.Mandi End	Katpp End	
1	SE (T&C) RVPN KOTA	220 KV GSS Jhalawar	220 KV JWR-KATPPI-Bhawanimandi Line	23.02.2024	8:50	23.02.2024	14:56	Supply Fail	Supply Fail	ICT Tripped on SEF	Due to jumper open at 220 KV JWR-Aklera line, Supply affected at 220 KV GSS Jhalawar, 220 KV Bhawanimandi, Aklera GSS
1	SE (T&C) RVPN KOTA	220 KV GSS Jhalawar	220 KV JWR-KATPPI-Bhawanimandi Line	07.07.2024	22:05	07.07.2024	23:11	Supply Fail	Supply Fail	ICT Tripped on SEF	Due to jumper open at 220 KV Aklera-CTPS line at loc. No. 138, Supply effected at 220 KV GSS Jhalawar, 220 KV Bhawanimandi, Aklera, Kawai GSS

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED
[Corporate Identity Number (CIN): U40109RJ2000SGC016485]
Regd. Office: Vidyut Bhawan, Janpath, Jyoti Nagar, Jaipur-302005

RVPN
An ISO 9001:2015 Certified Company

OFFICE OF THE CHIEF ENGINEER (LD)
New Prasaran Bhawan, TCC Building, Heerapura, Jaipur Tel. No. 0141-2948293
E-mail: ce.ld@rvpn.co.in website: www.http://energy.rajasthan.gov.in/rvpnl

No. RVPN/ CE (LD)/ F. / D.148 Jaipur, dt. 20/08/2024

The Member Secretary
NRPC, New Delhi

Sub: - Agenda Item for inclusion in next Protection Sub-Committee (PSC) meeting – regarding excessive trippings of SPS on 400/220kV 2X315 MVA ICT's at STPS Suratgarh

Ref:- MoM of 49th PSC meeting held on 25.1.2024

On the above captioned subject, it is submitted there was excessive trippings on SPS at 400/220kV 2X 315 MVA ICT's at STPS, Suratgarh causing a large area disturbance. SPS of 400/220kV 2x315 MVA ICT's at STPS Suratgarh was approved in the 49th PSC meeting held on 25.1.2024.

So, in view of above a Agenda item is enclosed herewith for including the above issue in upcoming PSC Meeting Agenda.

Encl: 1. Agenda item for upcoming PSC.
2. Detail of tripping on ICT's due to SPS.

(Manish Athaiya)
Chief Engineer (LD)
RVPN, Jaipur

Copy to the following for information and necessary action :-

1. The Chief Engineer(MPT&S), RVPN, Jaipur.
2. The Chief Engineer, STPS, RVUN, Suratgarh.
3. The Superintending Engineer(Prot.Engg.), RVPN, Jaipur
4. The Superintending Engineer(Elect. Operations), STPS, RVUN, Suratgarh
5. The Superintending Engineer(MPT &S),RVPN, Bikaner.

Chie Engineer (LD)
RVPN, Jaipur

RajKaj Ref
9818344

Signature valid
Digitally signed by Manish Athaiya
Designation: Chief Engineer
Date: 2024.08.[illegible]:46:46 IST
Reason: Approved

AGENDA NOTE FOR EXCESSIVE SPS TRIPPING OF 2X315 MVA, 400/220 KV ICT's AT STPS SURATGARH

Ref.:-(1) MoM of 49th PSC of NRPC held on dated 25.01.2024.

(1) Recently the SPS on 400/220 KV, 2X315 MVA ICT's at STPS Suratgarh has been commissioned on dated 06.05.2024 to meet out the N-1 contingency .

(2) Excessive interruptions (i.e. 39 Nos w.e.f. 18/5/24 to 22/7/24) has been observed due to operation of newly commissioned SPS at STPS Suratgarh since commissioning and a large load approx. 150 MW was affected due to same.

(3) After analysis of trippings it is observed that these trippings were due to operation of Over Current element of relay either by gradual overloading, poor power factor, poor voltage profile, Traction load etc. or some other reasons instead of "N-1 contingency".

(4) After analyzing fault records /DR & discussion with RVUN officials, It is found that the present settings of Over current protection element of numerical relay used for SPS initiation is "Any one Phase" on full Load current.

(5) It is recommended to update in the existing approved SPS scheme of STPS Suratgarh to avoid the power supply disturbance caused by gradual overloading instead of "N-1 Contingency".

   a. To update the settings of over current element used for SPS start on "ALL Phase" instead of "Any Phase". As in most of the trippings, there is very much unbalance between the phases and the same may cause undesired initiation of SPS.

   b. To update the Current Setting (I>) from full load to 125 % of load on each ICT as per thermal capability of each ICT's.

   c. To incorporate C.B. status in the tripping circuit of SPS on each 220 KV lines at both end to avoid unnecessary trippings.

   d. To Split the first stage of time delay of 1.0 sec (approx load relief of 150MW) at 220 KV GSS Bhadra by providing timer with 0.85 Sec (with load relief of 20 MW) and with 1.0 Sec (with load relief of rest 140 MW).

Rajkumar Ref
318344

Signature valid
Digitally signed by Mukesh Athaiya
Designation: Chief Engineer
Date: 2024.07.[illegible]:46:46 IST
Reason: Approved

DATE:-22.07.2024

Details of Phase Wise Loading of 400/220 KV,2X315 MVA ILT's of STPS Suratgarh at the time of trippings

SR.NO	ILT-I/ILT-II	TIMING		400/220 KV ILT-I/ILT-II(400 KV Side)						TIE CT						Summation of Main & TIE CT 400/220 KV ILT-I/ILT-II(400 KV Side)					
		DATE	FROM	R-PH	Angle (Deg)	Y-PH	Angle (Deg)	B-PH	Angle (Deg)	R-PH	Angle (Deg)	Y-PH	Angle (Deg)	B-PH	Angle (Deg)	R-PH	Angle (Deg)	Y-PH	Angle (Deg)	B-PH	Angle (Deg)
1	ILT-2	18.05.2024	1:34:19	500	47.9	495	289.3	477	168.1	58	240.9	41	139.7	30	8.3	444	37.83494156	511	19.948	450	89.858
2	ILT-2	21.05.2024	13:26:30	556	221.6	399	92.8	421	354.8	43	234.7	24	174.5	1.773	185.7	593	-81.14297438	423	-82.89	423	-11.33
				470	221.6	394	92.8	419	354.1	44	234.7	24	174.5	4.252	185.7	508	-80.73201164	418	-82.89	419	-51.4
3	ILT-2	30.05.2024	10:11:01	441	189	453	76.1	457	313.2	0.959	52.8	50	327.4	27	202.3	441	29.01411956	503	40.053	442	-52.12
			10:50:35	445	344	459	231	460	108	1.248	42.4	53	121.6	30	356.3	446	89.74701399	415	-88.54	430	67.489
4	ILT-1	31.05.2024	16:05:54	442	260	468	133.2	454	15.6	0.928	166.1	53	247.5	35	134.5	443	-43.05640942	490	77.595	485	-8.096
	ILT-2	31.05.2024	15:26:56	443	104.7	438	350.8	438	227.5	1.055	12.3	45	265.8	23	164.6	443	58.99944884	394	-59.49	461	74.595
5	ILT-2	01.06.2024	12:42:56	441	290.5	455	179.8	466	56.9	0.775	356.6	67	75.7	51	305.5	440	84.41121761	395	45.813	420	17.328
6	ILT-2	02.06.2024	10:10:59	412	74.7	511	323.7	517	197.4	1.015	343.1	85	188.7	57	38.4	412	-40.14350388	426	5.6345	500	-35.96
			12:47:31	452	295.6	495	180.6	497	54.6	0.926	269.8	57	34.4	40	214.8	453	16.55990178	492	81.005	457	68.456
7	ILT-2	03.06.2024	11:57:58	452	4.3	470	250.6	469	125.2	1.059	275.3	48	127.9	12	337.9	453	66.47012106	423	-40.53	476	-27.72
8	ILT-1	04.06.2024	14:01:14	452	189.7	488	66.6	489	310.3	0.77	28.1	39	208.6	38	135.3	452	69.10521639	457	33.024	513	-37.72
			15:04:53	456	256.8	496	134.9	493	80	0.784	229.3	35	293.1	41	12.6	455	-46.51278688	512	-7.272	489	88.424
			15:37:30	452	358.5	489	236.3	484	119.7	0.938	285.4	34	28.4	34	314.4	451	20.62588407	518	37.012	518	18.009
9	ILT-1	05.06.2024	11:19:47	450	80.7	484	316.9	482	200.4	0.706	119.7	39	88.5	33	23.5	450	-56.14399333	462	-26.87	501	-41.04
10	ILT-1	06.06.2024	16:18:22	455	265.2	498	143.3	489	26.5	0.776	200.4	37	312.8	44	222.1	455	74.75056303	535	-70.09	520	81.889
11	ILT-1	10.06.2024	14:56:14	453	248.3	501	127.8	506	9.6	0.999	182.2	40	301.2	55	202.4	452	6.558036086	469	-60.41	487	4.0866
12	ILT-1	11.06.2024	14:14:07	454	314	504	192.5	503	75.3	0.726	256.3	45	2.8	57	265.6	454	-9.208858114	522	44.819	493	0.8312

			16:15:00	454	7.4	506	246.4	507	128.1	0.894	303.3	46	52.6	53	312.6	455	64.05146432	533	81.787	474	-35.57
13	ILT-1	12.06.2024	1:00:44	455	298	464	146.3	464	59	0.973	213.5	16	284	11	273	454	-25.89667527	478	-78.6	474	-39.07
	ILT-2		1:31:13	456	69.6	452	311.8	452	189.8	1.154	33.2	17	223.2	10	228.3	456	27.92583905	466	43.583	459	75.635
14	ILT-1	13.06.2024	11:36:48	450	195.8	478	72.4	474	315.6	0.717	133.9	28	205.9	27	149.8	450	58.5868497	479	11.563	454	80.34
			11:54:49	450	171.1	478	47.5	473	290.7	1.379	115	28	180	26	121.3	451	83.38382537	502	23.228	498	-83.39
			12:34:26	440	183.3	486	60.3	482	300.9	0.617	99.8	30	191	25	128.4	440	62.23846775	496	31.651	458	-40.59
			14:59:39	450	351.2	486	227.8	480	110.6	0.903	263.6	33	15	33	295.2	451	-37.68131558	509	-85.28	457	39.75
			15:06:09	452	22.6	496	258.1	478	140.7	0.62	28.1	35	45.8	33	322.4	452	34.82922135	506	31.894	507	-40.31
			16:49:19	452	237.1	493	113.9	489	356.2	0.963	182.1	38	265.2	39	171.2	452	84.95135716	527	47.985	453	67.045
15	ILT-1	16.06.2024	12:47:52	450	272.6	470	151.4	469	32.5	0.669	187.1	17	280.8	15	219.1	449	-41.11708148	456	33.384	464	60.359
16	ILT-1	17.06.2024	13:55:07	458	317.5	470	194.3	472	77.5	0.82	288.1	23	288.2	15	278.2	458	11.50265258	492	-28.34	486	-60.2
17	ILT-1	18.06.2024	12:46:38	454	142.8	464	19.8	463	264.4	0.977	102.3	19	122.2	21	136.8	453	81.79603006	459	56.725	456	26.539
	ILT-1		13:42:12	454	148.1	471	24.7	471	268.8	0.848	92.1	30	135.5	14	105.6	455	25.56067315	452	-27.64	485	-78.63
18	ILT-1	19.06.2024	15:14:03	469	74.1	483	313.3	501	196.8	0.821	22.6	34	91.9	32	20.2	469	-74.4773637	487	-53.22	526	-66.36
	ILT-1		16:40:25	454	207.3	476	83.1	470	325.8	1.006	122.8	35	[illegible]	[illegible]	117.6	453	-2.625290522	503	83.908	484	-54.91
	ILT-1		16:44:01	464	305.5	485	178.7	464	63.1	0.789	224.9	37	[illegible]	21	209.9	464	43.94656408	467	-17.37	450	17.379
19	ILT-1	20.06.2024	11:46:09	451	319.2	490	198.3	497	80.7	1.024	245.1	30	11.5	48	277.7	451	-71.06196827	487	25.256	469	-51.56
20	ILT-1	05.07.2024	10:55:25	384.9	31.6	860.8	313.15	2881	148.7	45.752	326.1	30.68	26.3	154.14	327.7	418	5.998002923	844	-56.11	2727	60.111
21	ILT-2			428.1	43.9	885.2	339.4	2610	171.6	42.175	167.4	31.72	228.1	154.27	169.9	406	-9.657452906	879	8.2034	2594	-71.43
22	ILT-2	19.07.2024	13:33:34	490.4	[illegible]	418.5	35.1	429.6	276.5	26.868	353.3	25.07	318.2	15.254	282.3	497	-22.40212085	442	32.216	443	1.3667
23	ILT-1			430	284.4	440	161.7	457	49.7	27.148	306.2	24.82	273.6	15.492	235.3	411	-84.36192835	450	81.782	442	-32.89
24	ILT-1	20.07.2024	12:15:09	479	342.8	520	219.9	520	102.5	38.146	197.5	60.75	43.8	79.196	301.4	507	17.93738774	580	-1.678	480	-75.05
25	ILT-2	22.07.2024	15:54:48	461.1	263.4	445.5	144.3	434.5	22.4	19.807	198.2	37.61	90.8	35.239	2	447	-30.06507506	408	-11.73	437	18.797

SUB:Comments of RVUNL, STPS for the Agenda raised by RVPNL regarding SPS on 2x315MVA, 400/220KV ICTs at STPS, Suratgarh

Ref.:

(1) MOM of 49th PSC of NRPC held on 25.01.24

(2) Agenda submitted by RVPNL vide letter No. RVPN/CE (LD) /F. /D.148 dtd 20.08.24 (Enclosed)

On the above cited subject and references, pointvise reply of RVUNL, STPS on the agenda SPS on 2x315MVA, 400/220KV ICTs at STPS, Suratgarh submitted by RVPNL to NRPC are as under:

S. no.	RVPN proposal	RVUN Comments
1.	To update the settings of over current element used for SPS start on "All phase" instead of "Any phase". As in most of the trippings, there is very much unbalance between the phases and the same may cause undesired initiation of SPS	At Generating station the Tripping /alarms of over-current/overload protections on all the electrical equipment i.e. Generator, Transformer, HT Motors, feeders, LT Motors etc **always operates on any phase basis**. Being Generating station it is necessary to initiate alarm as well to isolate the faulty element at the first instance to protect the equipment and curb major damage so as to avoid its downtime and loss of generation. The proposal may be considered to be dropped.
2.	To Update the current setting (I>) from full load to 125% of load on each ICT as per thermal capability of each ICT's.	Presently, Over current setting for ILT is 110% i.e. 500A and setting of SPS is 100% FLC i.e 460A (approx). If SPS is to be operated at 125% of FLC then ILT shall trip first on overcurrent protection before the operation of SPS.
3.	To incorporate CB status in the tripping circuit of SPS on each 220 KV lines at both end to avoid unnecessary trippings.	Once the RVPNL suggestion at point no 4 is implemented then there will be no need to execute point no.3. Besides this, RVUNL also suggest to install underpower relay at the GSS end rather than to interlock of breaker contacts as the chances of malfunctioning of breaker contacts are more. However, this type of SPS scheme is already in function at various Generating Stations/GSS. So, RVUNL request to NRPC to provide guidance/ elaboration on this matter.
4	To Split the first stage of time delay of 1 sec (approx load relief of 150MW) at 220 KV GSS bhadra by providing timer with 0.85 sec (with load relief of 20 MW) and with 1 Sec (With load relief of rest 140 MW)	Agreed but RVUNL, STPS suggest to implement this bifurcation of load relief at each stage/GSS i.e. Bhadra, Halasar and Sriganganagar because lines are not always in service.

Dy. Chief Engineer (Elect.)
RVUN, SSTPS, SURATGARH

Status of Bus bar protection				
Constituent Name	**Name of Station**	**Status of Bus bar protection(as reported)**	**Expected date of revival(as reported)**	**Present Status**
Uttarakhand	220 KV Substation, Ramnagar, Roorkee	Blocked due to more elements added at 220 KV Voltage level.		
	220 KV Sub Station, SIDCUL, Haridwar			
	220kV Jhajhra, Dehradun	Not commissioned yet		
	400KV Kashipur (220kV side)	Available but Non operational	31-Mar-24	Work is under process.
	220kv Haldwani	Not Available	31 December 2024	Budget for FY 2023-24.
	220kv Pantnagar	Available but Non operational	31-Mar-24	Work is under process.
	220kV Rishikesh	Available but Non operational	31 December 2024	It has been Taken in Budget for FY 2023-24.
	220kV Chamba	Not commissioned yet	31 December 2024	It has been Taken in Budget for FY 2023-24.
Haryana	**220kV S/Stn Badshahpur**	**Installed and Operational**		**Commissioned on 20.02.2023**
	220kV S/Stn Sec-52A, Gurgaon	Not Installed	31.12.2024	Panel has been installed. Commissioning pending due to non- availability of shutdown.
	220kV S/Stn Sec-1 Manesar	**Installed and Operational**		**Commissioned on 26.02.2023**
	220kV S/Stn Panchgaon	**Installed and Operational**		**Commissioned on 05.01.2024**
	220kV S/Stn Rewari	Not Installed	31.03.2025	Material is not allocated so far. Installation will be carried out after allocation of material.
	220kV S/Stn Narnaul	Not Installed	31.10.2024	Panel has been installed. Work in progress on turnkey basis. Isolators of 220 kV TFs have to be replaced thereafter the work shall be completed.
	220kV S/Stn Mohinder Garh	**Installed and Operational**		**Commissioned on 28.10.2023**
	220 KV S/Stn Palwal	Not Installed	31.12.2024	Panel has been installed. Commissioning is pending.
	220 KV S/Stn Rangala Rajpur	**Installed and Operational**		**Commissioned on 22.06.2023**
	220 kV Unispur	Installed but Non-Operational	31.08.2024	5 Nos. Peripheral relay of bus bar protection are defective. The same shall be made operational by 31.03.2024.
	220 kV Nissing	Installed but Non-Operational	31.08.2024	Existing Bus bar panel is of old and obsolete design. New Bus Bar protection scheme panel has been drawn from the store & Commissioning& installation are pending. The same shall be made operational by 31.03.2024.
	220KV Pehowa	Installed but Non-Operational	31.03.2025	Old & Obsolete, Allocation of New BBP and allied material awaited.
	220kV Kaithal	Not Installed	31.03.2025	Control Cable for Bus-Bar Protection Scheme has been drawn from DD Stores, 220kV Bus-Bar Protection panel is awaited.
	220 KV Sonepat	Not Installed	31.08.2024	220 KV Bus Bar Protection Scheme will be installed / commissioned within 45 days after the availability of the necessary material i.e 220kV Duplex, Directional, Bus Bar Cum Bus Coupler C and R Panel, Auxiliary Voltage 220V DC (without SAS) required for commissioning. It has been gathered from the P&M wing that the material is likely to be available in DD stores by April 2024.
	220 KV REGC, Sonepat	Not Installed	30.09.2024	The 220KV C&R Panel for Bus Bar Protection has been drawn from DD Store on dated 20.04.2023 and the work for installation of Bus Bar protection scheme is under progress. Erection work & wiring work completed with all respect. Testing of relays is pending at the end of Firm M/s Shifang and Bus Bar protection scheme will be commissioned dt 15.03.2024.
	220KV Jind	**Installed and Operational**		**Commissioned on dated 27.06.23.**
	220 KV Fatehabad	**Installed and Operational**		**Commissioned on dated 22.07.23**
	220 KV Hukmawali	Installed but Non-Operational	30.10.2023	Bus-coupler CB defective & new panel withdrawn from DD store. Errection work under progress & the same will be completed 31.08.23.
	220 KV Bhuna	Installed but Non-Operational	31.12.2024	The Siemens make Bus Bar protection Scheme installed at the time of commissioning of the substation went out of order. The higher authority decided to replace with new one. M/s Schneider make new Scheme was then allocated and drawn from DDS Ballabgarh and installed at site, but while testing of same, three out of four relays of the Bus Bar Panel found faulty for which matter is under pursuance with firm.
	220 KV Sirsa	Not Installed		Not required being single source of supply
	220 KV Rania	Not Installed	31.03.2025	Estimate for Bus Bar Protection is sanctioned but C&R panel is not available in store.
	220 KV Bhiwani	Not Installed	31.03.2025	Bus Bar Protection scheme has been proposed in integrated planning meeting and requirement of material have been generated in PR.
	220kV Madanpur	Not Installed	31.08.2024	Material is not allocated so far. Installation will be carried out after allocation of material.
	220kV Tepla	Installed but Non-Operational	31.08.2024	material allocation is awaited.
	220kV Rajokheri	**Installed and Operational**	31.03.2024	**Made operational on dated 30.05.2024.**
BBMB	**220kV Charkhi Dadri**	**Installed and Operational**		**commissioned on 31.01.2023**
	220kV Samaypur	**Installed and Operational**		**made operational on 23.12.2023**
	220kV Dhulkote	Not Installed		Not feasible
	220kV Jagadhari	Not Installed		
	220kV Barnala	Not Installed		

	220kV Parichha	Installed but Non-Operational	30.06.2023	
	220kV Partapur	Installed but Non-Operational	Jan-23	
	220kV Bareilly (400/220kV	Installed but Non-Operational	Dec-23	Old panel capacity exhausted. New relay panel supplied & need to be
	220kV Pilibhit	**Installed and Operational**		**commissioned on 28.10.2023**
	220kV Amariya	**Installed and Operational**		**commissioned on 15th July 2023**
	220kV Sultanpur	**Installed and Operational**		**commissioned on 02.03.2024**
	220kV New Tanda	**Installed and Operational**		**commissioned on 20.04.2024**
	220kV Shahjhanpur	Installed but Non-Operational	30.06.2024	Cable partially received, work will start soon
	220kV Ajijpur	Installed but Non-Operational		1. HV side 220kV CT of 160MVA T/F-I & II has bot proper ratio for bus bar
	220kV Nirpura	Installed but Non-Operational	Jan-23	
	220kV IITGNL	Installed but Non-Operational	Mar-23	
	220kV Rampur	Installed but Non-Operational	31.03.2024	
	220kV Barahua	**Installed and Operational**		**made operational on 28.01.2024**
	220kV Bansi	**Installed and Operational**		**commissioned on 10th August 2023**
	220 KV S/S Azamgarh-2(Bargahan	**Installed and Operational**		**made operational on 28.01.2024**
	220kV Chandausi	**Installed and Operational**		**made operational on 13.10.2023**
	220kV Rasara	Not Installed		
	220kV Rampur	Installed but Non-Operational	Jun-24	1) Central unit of bus bar protection faulty 2) Bus bar relay fefective of 100MVA T/F-III
	220kV Sec. - 148, Noida	Installed but Non-Operational	31.01.2024	Work has been completed. Testing is due.
	220kV sec. 38A, Botanicla Garden	Not Installed		Panel allotment pending
	220kV sec.-62, Noida	**Installed and Operational**		**made operational on 12.10.2023**
	220kV Dadri	**Installed and Operational**	Apr-24	**made operational on 23.04.2024**
	400kV S/S Agra	**Installed and Operational**		**commissioned on 13th September 2023**
UP	220kV S/S Bah	Not Installed		Requirement sent to design circle, awaited fro allotment.
	220kV Sirsaganj	Not Installed		Requirement sent to design circle, awaited fro allotment.
	220kV S/S Farrukhabad (New)	**Installed and Operational**		**commissioned on 25th August 2023**
	220kV Boner	**Installed and Operational**		**commissioned on 19.03.2024**
	220kV Kasganj (Soron)	**Installed and Operational**		
	220kV Khair	Installed but Non-Operational	30.04.2024	New 160MVA transformer-3 is not configured with bus bar
	220kV Kidwainagar	Installed but Non-Operational		
	220kV Chhata	Installed but Non-Operational	30.04.2024	New 160MVA transformer-3 is not configured with bus bar
	220kV Harduaganj	Installed but Non-Operational	31.12.2023	
	220kV Lalitpur	**Installed and Operational**		**commissioned on 09.02.2024**
	220kV Mahoba	Installed but Non-Operational		Relay is faulty since 29.01.2024
	220kV Sarnath	Installed but Non-Operational	Nov-23	
	220kV Sirathu, Kaushambi	Not Installed	Mar-23	
	220kV substation Fatehpur	**Installed and Operational**		Operational
	220kV S/S Bhelupur	Not Installed		Radial feeder
	220kV Hardoi Road, Lucknow	**Installed and Operational**		**commissioned on 08th October 2023**
	220kV CG City, Lucknow	Installed but Non-Operational	31.05.2024	Agency M/s. Electro Power is decided.
	220kV Barabanki	Installed but Non-Operational	31.05.2024	Agency M/s. Electro Power is decided. 02 no. Peripheral unit found defective.
	220kV Kursi Road, Lucknow	Installed but Non-Operational	31.05.2024	Retrofitting work of auxilliary relay completed. Dut to non-functioning of new
	220kV BKT, Lucknow	Installed but Non-Operational	31.05.2024	LOI issued on Dt. 28.02.24
	220kV Gomti Nagar, Lucknow	Installed but Non-Operational	31.05.2024	Agency M/s. Electro Power is decided.
	400 KV Substation Sarnath	**Installed and Operational**		**Now operational**
	220kV S/S Raja Talab	Installed but Non-Operational	May-24	Relay Defective, concern firm service engineer is awaited
	20kV S/S Harahua	Installed but Non-Operational	Jun-24	NOT COMMISSIONED
	220kv Rewa Road	Installed but Non-Operational	Jun-24	Due to Isolator & CB status not Proper. Informed to Transmission wing but
	220kV S/S Sahupuri	Installed but Non-Operational	Jun-24	Defective, Requirement for New panel has been raised, not received from
	220kv Robertganj	partillay operational	May-24	Line and bus coupler and T/F-I under cover but T/F-II not cover
	220kV S/S Mirzapur	Not Installed	Jun-24	Bubar Protection Panel has been Recived, construction of
	220kV Chamba	**Installed and Operational**		**commissioned in Jan-2024**
	220kV MattaSidh	Installed but Non-Operational		
HP	220kV kangoo	Installed but Non-Operational	31.12.2024	Work in under progress, issues are being taken up with ABB
	220kV Nangal	Installed but Non-Operational		
	220kV Katha Baddi	Installed but Non-Operational		
	220 KV S/S Kotlisurat Malhi	Not Installed		
	220 KV S/S Maur	Not Installed		
	220 KV S/S Science city	Not Installed		
	220 KV S/S Banga	Not Installed	Dec-24	Commissioning is in process. Material has arrived, commissioning shall be done as per shutdown availability.
Punjab	220 KV S/S Hoshiarpur	Not Installed		
	220 KV S/S Goraya	Not Installed		
	220 KV S/S Bhawanigarh	Not Installed		
	220 KV S/S Badhni kalan	**Installed and Operational**		**Commissioned**
	220 KV S/S Bhari	**Installed and Operational**		**Commissioned**
	765 KV GSS Phagi	Installed but non operational		CU of Alstom make Bus-Bar is defective. Purchas case will be taken up
	220 kV GSS Vatika	Not installed		As M/s ER did not finished the project, so it was awarded to M/s Kaycee infra on risk-cost basis , however the bus bar scheme has not been commissioned yet. Matter has been taken up with firm
	220 kV GSS Niwana	Not installed	Sep-24	To be commissioned shortly
	220 kV GSS Alwar	Not installed		To be commissioned shortly
	220 kV GSS Bansur	Not installed		To be commissioned shortly
	220 kV GSS Behror	Not installed		To be commissioned shortly
	220KV GSS Hindaun	Not installed		To be commissioned shortly
	220KV GSS Dooni	Not installed		**commissioned**
	220KV GSS Bhawanimandi	Not installed		**commissioned**
	220 KV GSS Sakatpura, Kota	Not installed		**commissioned on 09.07.2024**
	400 KV GSS Ajmer (220 KV BUS)	Installed but non operational		Isolator status of in 87BB of respective 220 KV bay No. 213,214, 215 & 216 was not avaliable due to this 220 KV Main Bus-bar-II is out of ckt. work under progress
	220 kV GSS, Beawar	Not installed		**commissioned**
	220 KV GSS Jethana	Not installed		**commissioned**
	220 KV GSS Kuchaman City	Installed but non operational		Purchase has been taken up with the firm

Rajasthan	220 KV GSS Bherunda	Not installed		**commissioned**
	220 KV GSS Kuchera	Not installed		**commissioned**
	220 KV GSS Reengus	Installed but non operational		**commissioned**
	220 KV GSS Laxmangarh	Not installed		**Commissioned**
	220KV GSS Khetri Nagar	Installed but non operational		**commissioned**
	400 KV GSS, Babai	Installed but non operational		**commissioned**
	220 KV GSS Chittorgarh	Installed but non operational	20.08.2024	To be commissioned shortly
	400 KV GSS BHILWARA(220 KV BUS)	Installed but non operational		BAY UNIT OF 220 KV TBC DEFECTIVE. Matter has been taken up with firm
	220 KV GSS MANDALGARH	Not installed		**commissioned**
	220KV GSS Debari	Not installed	31.08.2024	To be commissioned shortly
	220KV GSS Amberi	Not installed		**commissioned**
	220KV GSS Madri	Not installed	14.08.2024	To be commissioned shortly
	400 KV GSS Surpura (Jodhpur)	Installed but non operational	30.09.2024	To be commissioned shortly
	400 KV GSS Akal (Jaisalmer) 220	Installed but non operational		One PU defective. Case has been taken up with firm
	220 KV GSS Jodhpur	Installed but non operational		A&FS and TS issued. Case has been send for approval
	220 KV GSS NPH Jodhpur	Not installed		Case file moved
	220 KV GSS Badisid	Not installed		**commissioned**
	220 KV GSS Bhadla	Not installed	25.09.2024	Allotted & Panel Received. To be commissioned shortly
	220 KV GSS Pali	Installed but non operational		**commissioned**
	220 KV GSS Ramgarh	Not installed	05.09.2024	Allotted & Panel Received. To be commissioned shortly
	220 KV GSS Balotra	Installed but non operational		**commissioned**
	220 KV GSS Sayla	Not installed		**commissioned**
	400 KV GSS Bikaner 400 KV BUS	Installed but non operational		to be done with transformer work
	220 KV GSS Ratangarh	Not installed		**commissioned**
	220 KV GSS Sujangarh	Not installed	10.08.2024	Allotted & Panel Received. To be commissioned shortly
	220 KV GSS Halasar	Not installed	25.07.2024	Allotted & Panel Received. To be commissioned shortly
	220 KV GSS Tehandesar	Not installed	15.09.2024	Allotted & Panel Received. To be commissioned shortly
	220 KV GSS Rawatsar	Not installed		**commissioned**

Status of protection relay type				
Constituent Name	**Name of Station**	**Element Name**	**Present Status**	**Remark**
Uttarakhand	220kV Rishikesh	SIDCUL line	Main-II is not installed	
		Chamba line		
		Dharasu line-2		
	220kV Chamba	Rishikesh line		
HP	220kV MattaSidh	220kV transformer bank-1 & 2	Static relay	
Rajasthan	220 kV GSS Sanganer	220 kV HEERAPURA	Static	
	220 kV GSS Phulera	220 KV HEERAPURA	Static	Replaced by numerical relay
		220 kV Makrana	Static	
	220 KV GSS CHOMU	220 kV Heerapura	Static	
		220 kV Reengus Line	Static	
	220 kV GSS Kukas	220 kV Manoharpur Line	Static	Replaced by numerical relay
		220 kV Alwar Line	Static	
	220kV GSS Dausa	220 kV SawaiMadhopur Line	Static	
		220 kV Bassi-I Line	Static	
		220 kV Bassi-II Line	Static	
		220 kV Alwar Line	Static	
		220 kV Mandawar Line	Static	
	220KV BHARATPUR GSS	220 KV DHOLPUR	Static	Replaced by numerical relay
	220 KV GSS SAKATPURA	220 kV ANTA(NTPC)	Static	
	220 KV DAHRA	220 kV BARAN	Static	
		220 kV SAKATPURA	Static	
	220KV GSS MODAK	220 kV RANPUR	Static	
		220 kV Jhalawar	Static	
	220 KV GSS JHALAWAR	220 kV Modak	Static	
	220KV GSS HINDAUN	220KV Sikrai Line	Static	relay defective
	220KV GSS DHOLPUR	220 kV DCPP	Static	
	220 KV GSS Reengus	220 KV Laxmangarh	Static	
	220 KV GSS Nagour	220KV NOKHA	Static	
		220KV KUCHERA	Static	
	220KV GSS Kankroli	220 KV PGCIL-I	Static	
	220 KV GSS SIROHI	220 KV (400) KV PGCIL Bhinmal	Static	
	220 KV GSS SIROHI	220 KV Jalore	Static	
	220 KV GSS BHINMAL	220 KV (400) KV PGCIL Bhinmal-I	Static	
	220 KV GSS BALI	220kV Sirohi	Static	Replaced by numerical relay
	220 KV GSS Suratgarh	220 KV STPS-I	Static	
		220 KV STPS-II	Static	
		220 KV Hanumangarh Line	Static	
	220 KV GSS Sri Ganganagar	220 KV Hanumangarh Line	Static	Replaced by numerical relay
	220 KV GSS Hanumangarh	220 KV Suratgarh	Static	
	220KV GSS Ratangarh	220KV Rawatsar	Static	
	220KV GSS Ratangarh	220KV Halasar	Static	
	220KV GSS Ratangarh	220KV InterConnector-I	Static	
	220KV GSS Ratangarh	220KV InterConnector-II	Static	
	220KV GSS Sujangarh	220KV Ratangarh	Static	
	220 KV GSS Bikaner	220 KV Badnu Line	Static	
	220 KV GSS Bikaner	220 KV Interconnector-I Line	Static	
	220 KV GSS Bikaner	220 KV Spare Line	Static	
	220kV Madanpur	220/66kV 100 MVA PTF T-1	Electromechanical	Working properly, need to be replace with numerical relay
		220/66kV 100 MVA PTF T-1 A	Electromechanical	Working properly, need to be replace with numerical relay
		220kV Bus-Coupler	Backup relay -Numerical all other relays are	Working properly, need to be replace with numerical relay
		220/66kV 100 MVA PTF T-1 A	Electromechanical Execept Differential relay (Numerical)	Working properly, need to be replace with numerical relay
	220 KV S/Stn Shahbad	100 MVA 220/66 KV T/F T-1	Electrostatic	Working properly, need to be replace with numerical relay
		220 KV Bus Coupler	Electrostatic	Working properly, need to be replace with numerical relay
		Incomer of 220/66 KV T/F T-1	Electrostatic	Working properly, need to be replace with numerical relay
		Incomer of 220/66 KV T/F T-2	Electrostatic	Working properly, need to be replace with numerical relay
	220 KV S/STnTepla	220KV Bus Coupler	Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -DCRTPP Ckt-1	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -DCRTPP Ckt-2	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -Shahbad Ckt-1	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay

Haryana	220KV S/Stn Jorian	220KV Jorian -Shahbad Ckt-2	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -Abdullapur Ckt-1	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220KV Jorian -Abdullapur Ckt-2	Main-1 & Main-2 = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220/66, 160MVA T/F T-1	Defferntial Relay = Numerical all other Electromechanical	Working properly, need to be replace with numerical relay
		220/66, 100MVA T/F T-2	All Electromechanical	Working properly, need to be replace with numerical relay
		220/66, 100MVA T/F T-3	Defferntial & REF Relay = Numerical all other	Working properly, need to be replace with numerical relay
	220 kv Salempur	220 KV BAKANA–SALEMPUR CKT-I	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV BAKANA–SALEMPUR CKT-II	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV SALEMPUR-NISSING CKT-I	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV SALEMPUR-NISSING CKT-II	All electromechanical type,except DPR relays	Working properly, need to be replace with numerical relay
		220 KV BUS-COUPLER	All electromechanical type	Working properly, need to be replace with numerical relay
		220/66 KV 100MVA T/F T-I	All electromechanical type,except Differential relays	Working properly, need to be replace with numerical relay
		220/66 KV 100MVA T/F T-2	All electromechanical type,except Differential relays	Working properly, need to be replace with numerical relay
	TS Division Karnal	220kV Nissing-PTPS Ckt-I	All electromechanical type,except DPR relays	
		100 MVA 220/132kV T-8	All electromechanical type,except Differential relay	Differential relay replcaed with Numerical type
		220 kV Bus-coupler	All electromechanical type	C&R panel will be replaced soon
		220 KV DCRTPP–UNISPUR CKT-I	All electromechanical type,except DPR relays	
		220 KV DCRTPP–UNISPUR CKT-II	All electromechanical type,except DPR relays	
		220 KV KARNAL–UNISPUR LINE	All electromechanical type,except DPR relays	
		220/132 KV 100 MVA T/F T-1	All electromechanical type,except R.E.F & Differential relay	
		220/132 KV 100 MVA T/F T-2	All electromechanical type,except R.E.F & Differential relay	
		220/132 KV 160 MVA T/F T-4	All electromechanical type,except R.E.F & Differential relay	
	220kV S/Stn Palla	100MVA 220/66kV T-1	REF & backup Electromechnical	
		100MVA 220/66kV T-2	REF & backup Electromechnical	
		100MVA 220/66kV T-7	Diff & Backup lectromechnical and REF static	
		220kV Palla - Sector 78	backup Electromechnical	
		220kV Palla - FGPP ckt-II	backup Electromechnical	
	220 kV S/Stn. Pali	100 MVA 220/66 kV T-1	REF & backup Electromechnical	
		100 MVA 220/66 kV T-3	REF & backup Electromechnical	
		220 kV Pali-BBMB Samaypur Ckt 1	backup Electromechnical	
		220 kV Pali-BBMB Samaypur Ckt 2	backup Electromechnical	
		220 kV Pali-Sector 46 Ckt 1	backup Electromechnical	
		220 kV Pali-Sector 46 Ckt 2	backup Electromechnical	
		220 kV Pali-Sector 65 Ckt 1	backup Electromechnical	
		220 kV Pali-Badshahpur Ckt 2	backup Electromechnical	
		220 kV Pali-Sector 56 Ckt 1	backup Electromechnical	
		220 kV Pali-Sector 56 Ckt 2	backup Electromechnical	
	220kV S/Stn Palwal	220/66kV 160MVA T-1 T/F	REF & backup Electromechnical	
		220/66kV 100MVA T-2 T/F	Diff, REF & Backup Electromechnical	
		220kV Prithala Palwal Ckt I	backup Electromechnical	
		220kV Prithala Palwal Ckt II	backup Electromechnical	
	220kv S/Stn. Sector 52A GGM	Sec 56-Sec 52A ckt 1	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
		Sec 56-Sec 52A ckt 2	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
		Sec 72-Sec 52A	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
		Sec 57-Sec 52A	NUMERICAL RELAY qty 02 and electromechanical qty 01 (backup)	LINE IS PROVIDED WITH 2 MAIN NUMERICAL DPR AND 01 ELECTROMECHANICAL FOR BACKUP
	220KV S/Stn. Sonepat		(Diff.-3 , REF-3, O/C/E/F-4 , Electromechnical Relays	The electromechanical differential and DPR are not available in the store. However, the same shall be replaced after availability in the store.
	220kV Rohtak		(REF-2, O/C/E/F-12) Electromechnical Relays	

UP	400 KV S/S Moradabad	400 KV MORADABAD - RAMPUR LINE	LBB- ABB(RAICA) / STATIC	UNDER PGCIL
		400 KV MORADABAD - KASHIPUR LINE	LBB- English Electric(CTIG) / Electromechnical	
		400 KV, TRANSFER BUS	LBB- English Electric(CTIG) / Electromechnical	
		400 KV, BUS COUPLER	LBB- English Electric(CTIG) / Electromechnical	
	220kV S/S BARAUT	220/132kV 200MVA TRANSFORMER-1	REF Protection - Electromechanical	
	220kV S/S BAGHPAT	220/132kV 160MVA TRANSORMER-1	Backup (L.V. Side) - Electromechanical	
	220 kV KHURJA	220/132Kv 200MVA Transformer-I	REF-Static	
	220 kV DEBAI	220/132Kv 100MVA Transformer-I	Numerical	
	220 kV Jahangirabad	220/132Kv 160MVA Transformer-I	REF-Static	
	400KV S/S MURAD NAGAR	220KV LONI LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	Will be replaced by July24
		220KV FARID NAGAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV INTER CONNECTOR-I MURAD NAGAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV INTER CONNECTOR-II MURAD NAGAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV SAHIBABAD LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV PRATAP VIHAR LINE	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		220KV TBC	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		400KV TBC	O/C & E/F RELAY IS ELECTROMECHANICAL.	
		400KV ALIGARH LINE	LBB RELAY IS ELECTROMECHANICAL.	
		400KV ATOUR LINE	LBB RELAY IS ELECTROMECHANICAL.	
	220KV S/S MURAD NAGAR	220KV BUS COUPLER	O/C RELAY IS ELECTROMECHANICAL	
	400KV S/S Gorakhpur	400KV TBC	Electromechanical	
		220KV TBC	Electromechanical	
	220KV S/S Barahua	220KV PGCIL	Back up relay electromechenical	
	220KV S/S Basti	220 KV Basti Tanda line	67N(2TJM12)(Electromechanical)	
		63MVA Transformer-II	HV Side directional o/c&e/f(Electromechanical)	
	400 KV SS Kasara,Mau	200MVA, 400/132KV ICT-1st	REF & Over flux relay Electromechanical	
		200MVA, 400/132KV ICT-2nd	REF & Over flux relay Electromechanical	
	220 KV SS Substation Hafizpur Azamgarh	160 MVA ICT -1	Electromechanical(EE Make)	Replaced with Siemens make numerical relay on 16.10.2023
	220kV Khara		Electromechanical	process of replacing electrochemical relay with numerical relay has been started, it will be completed within 2 3 months.
	220kV Gokul	160MVA ICT-1	Electromechanical (Diff and O/C)	
	220kV Meetai	200MVA ICT-1	Electromechanical (E/F and O/C), Diff:Static	New panels are available at S/s and replacement work is under process
		200MVA ICT-2	Electromechanical (E/F and O/C), Diff:Static	
	220kV Atrauli	160MVA ICT-1	Electromechanical + Numerical	Tender process is complete.
		160MVA ICT-2	Electromechanical + Numerical	
	220kV Mainpuri	160MVA ICT-1	Electromechanical(REF) + Numerical	New panels are available at S/s and replacement work is under process
		160MVA ICT-2	Electromechanical(REF) + Numerical	
	220kV Panki	220kV Bus coupler	Electromechanical	Under process
	400kV S/S Sultanpur	240 MVA ICT-II	Non Numerical	
		50 MVAR Obra Line Reactor	Non Numerical	
	220kV S/S Sultanpur	220kV B/C	Non Numerical	
		160 MVA T/F-I	Non Numerical	
NPCIL	220kV RAPPC	220KV Anta line	Backup relay: Static relay(RAPDK3)	Completed
	220kV NAPP	NAPP-SAMBHAL		Completed
		NAPP-SIBHOLI		Completed
		NAPP-DIBAI		Completed
		NAPP-KHURJA		Completed
		NAPP-ATRAULI		Completed

~~Annex V~~

Annexure-XIII

Status of Recording Instruments (220kV & above stations)						
Sr. No	Station Name	Voltage Level	Disturbance Recorder/Station Event logger healthy (Yes or No)	Standardisation (Yes or No)	Time Sync (Yes or No)	Remarks

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV Anta(NT)-Sakatpura(RS) (RS) Ckt-1	01-Aug-24	05:29	Phase to earth fault B-N. As per PMU and DR (Sakatpura), B-N fault occured, no auto-reclosing is observed. DR not recevied from Anta end.
		09-Aug-24	22:37	Phase to earth fault B-N. As per PMU and DR (Sakatpura), B-N fault occured, no auto-reclosing is observed. DR not recevied from Anta end.
		13-Aug-24	21:39	Phase to earth fault B-N. As per PMU and DR (Sakatpura), B-N fault occured, no auto-reclosing is observed. DR not recevied from Anta end.
		14-Aug-24	08:33	Phase to earth fault B-N. As per PMU and DR (Sakatpura), B-N fault occured, no auto-reclosing is observed. DR not recevied from Anta end.
2	220 KV DandhariKalanI(PS)-Ludhiana(PG) (PSTCL) Ckt-2	01-Aug-24	01:37	Phase to Phase Fault R-B. As per PMU & DR, R-N fault occured, no auto-reclosing is observed.
		06-Aug-24	14:23	Phase to earth fault B-N. As per PMU & DR, B-N fault occured, no auto-reclosing is observed.
		26-Aug-24	21:52	Phase to earth fault R-N. As per PMU & DR, R-N fault occured, no auto-reclosing is observed.
3	220 KV NAPP(NP)-Khurja(UP) (UP) Ckt-1	14-Aug-24	23:09	Phase to earth fault R-N. As per PMU and DR, R-N fault occurred with no A/R operation at Khurja end and successful A/R operation at NAPP end is observed. dat/cfg file of DR not received from NAPP end.
		17-Aug-24	10:16	Phase to earth fault R-N. As per PMU and DR, R-N fault occurred with no A/R operation at Khurja end and successful A/R operation at NAPP end is observed. dat/cfg file of DR not received from NAPP end.
		21-Aug-24	15:14	Phase to earth fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed. As per DR (Khurja end), R-N fault is observed in zone-3. As reported, line tripped on zone-3 distance protection from Khurja end only due to fault on 220kV Khurja-Debari line.
		24-Aug-24	08:54	Phase to earth fault R-N. As per PMU and DR (NAPP end), B-N fault with no A/R operation is observed. DR of Khurja end not received.
		24-Aug-24	20:54	Phase to earth fault R-N. As per PMU and DR, B-N fault with no A/R operation is observed. As reported, tripping time was 22:42hrs.
		28-Aug-24	05:16	Phase to earth fault B-N. As per PMU, no fault is observed. As per DR of NAPP end, B-N fault is observed. DR not received from Khurja end. Dat/cfg file of DR not received from NAPP end.
4	220 KV Saharanpur(PG)-Shamli(UP) (UP) Ckt-1	01-Aug-24	03:37	Phase to earth fault R-N. As per PMU and DR (Saharanpur end), R-N fault with no A/R operation at Saharanpur end and successful A/R operation at Shamli end. DR of Shamli end not received.
		11-Aug-24	22:09	Phase to earth fault R-N. As per PMU and DR, R-N fault with no A/R operation at Saharanpur end and successful A/R operation at Shamli end.
		13-Aug-24	05:13	Phase to earth fault Y-N. As per PMU and DR, Y-N fault with no A/R operation at Saharanpur end and successful A/R operation at Shamli end.
		17-Aug-24	23:58	Earth fault. As per PMU and DR (Shamli end), B-N fault with no A/R operation at Saharanpur end and successful A/R operation at Shamli end. DR of Saharanpur end not received.
5	400 KV Agra-Unnao (UP) Ckt-1	03-Aug-24	01:53	Phase to earth fault Y-N. As per PMU, Y-N fault occured, no auto-reclosing is observed.
		12-Aug-24	18:03	Phase to earth fault R-N. As per PMU and DR, R-N fault with unsuccessful A/R operation at Unnao end is observed.
		28-Aug-24	04:37	Phase to earth fault R-N. As per PMU and DR, R-N fault is observed with A/R operation started from both ends. Line succussfully closed from agra end and finally line tripped from Unnao end.
		28-Aug-24	08:05	Over Voltage. DR not received from both ends.
6	400 KV Bhadla-Merta (RS) Ckt-1	02-Aug-24	07:31	Phase to Phase Fault R-Y. As per PMU, R-Y fault is observed. DR of Bhadla end is not readable. DR not received from Merta end.
		02-Aug-24	18:06	Phase to Phase Fault R-Y. As per PMU and DR (Merta end), R-Y fault is observed. DR of Bhadla end is not readable. Time sync issue in DR of Merta end.
		04-Aug-24	15:37	Phase to Phase Fault Y-B. As per PMU, R-Y fault is observed. As per DR (Merta), Y-B fault is observed. DR of Bhadla end is not readable. Time sync issue in DR of Merta end.
		13-Aug-24	15:48	Phase to Phase Fault Y-B. As per PMU, R-Y fault is observed. As per DR (Merta), Y-B fault is observed. DR of Bhadla end is not received.
		27-Aug-24	17:44	DT received & 86 relay operated at Merta end. As per PMU, no fault is observed only fluctuation in voltage is observed. DR of Bhadla end is not readable. DR of Merta end is not received.
7	400 KV Dadri(NT)-Panipat(BB) (PG) Ckt-1	02-Aug-24	05:25	Phase to earth fault B-N. As per PMU and DR, Y-N fault with no A/R operation at Dadri end and successful A/R operation at Panipat end. Dat/cfg file of DR of Dadri end not received.
		18-Aug-24	03:24	Earth fault. As per PMU and DR (Panipat end), Y-N fault with no A/R operation at Dadri end and successful A/R operation at Panipat end. DR of Dadri end not received.
		20-Aug-24	10:51	Phase to earth fault R-N. As per PMU, B-N fault and unsuccessful auto-reclosing observed. As per DR of Dadri end, R-N fault is observed. As per DR of Panipat end, B-N fault with unsuccessful A/R operation at Panipat end is observed. Dat/cfg file of DR of Dadri end not received.

Sr No	Incident/tripping	Outage Date	Outage Time	Reason	Remedial actions
1	Frequent tripping of 220 KV Khara(UP)-Saharanpur(PG) (UP) Ckt-1 during July24	06-Jul-24	12:15	Phase to earth fault B-N. As per PMU, fluctuation in voltage is observed, no fault in the system. DR not received from both ends.	static/electromechanical relays at Khara(UP) will be replaced by numerical relay
		07-Jul-24	16:37	Phase to earth fault B-N. As per PMU and DR (of Saharanpur end), B-N fault with no A/R operation at Saharanpur end and successful A/R operation at Khara end is observed. DR not received from Khara end.	
		08-Jul-24	19:41	Phase to earth fault R-N. As per PMU and DR (of Saharanpur end), R-N fault with delayed fault clearance time of 560ms and no A/R operation at Saharanpur end is observed. DR not received from Khara end.	
		18-Jul-24	17:06	Phase to earth fault B-N. As per PMU and DR (of Saharanpur end), Y-N fault with no A/R operation at Saharanpur end and unsuccessful A/R operation at Khara end is observed. DR not received from Khara end.	
		28-Jul-24	11:02	Phase to earth fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed.. As per DR (of Saharanpur end), R-Y fault is observed. Time sync issue in DR of Saharanpur end and DR not received from Khara end.	
2	Frequent tripping of 400 KV Bikaner-Bhadla (RS) Ckt-1 during July24	04-Jul-24	14:18	Phase to earth fault Y-N. As per PMU, R-N fault occured, no auto-reclosing is observed.	a) issue in BCU at Bikaner end due to which command is not reaching to breaker. b) dead time setting in A/R, it seems that it is kept as 600msec which need to be ~1sec
		05-Jul-24	16:12	Phase to earth fault B-N. As per PMU, B-N fault and unsuccessful auto-reclosing observed. Auto-reclosing time is 600msec.	
		11-Jul-24	22:27	Transient fault. As per PMU, no fault is observed. As per DR of Bikaner end, Y-N fault is observed and line tripped on DT received from the remote end before completion of auto-reclosing action.	
3	Multiple elements tripping event at Baghpat(PG) & Baghpat(UP)	1-Jul-24	21:37	i)220kV Baghpat(UP) has main and transfer bus scheme at 220kV level. ii)During antecedent condition, incoming power at Baghpat(UP) was approx. 80 MW through 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-1 & 2. 220 KV Baghpat(PG)-Baghpat(UP) (UP) D/C, 220/132kV 160MVA ICT-1 and 220/132kV 100MVA ICT-2 were connected to 220kV main bus. 220 KV Baghpat(PG)-Baghpat(UP) (UP) D/C is on the same towers. iii)As per SCADA SOE, 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-2 tripped at 21:37:59.415hrs and 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-1 tripped at 21:37:59.535 hrs. iv)As reported, at 21:37 hrs, 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-2 tripped on Y-B-N double phase to earth fault and line tripped on zone-1 distance protection operation from both ends. As per Baghpat(UP) reporting, initially a B-ph fault occurred on 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-2 with fault current - 10.39kA in zone-1. At the same time, jumper at tower no 45 of 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-2 got broken which created line-line (Y-B) fault due to which line got tripped from both ends. v)Further 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-1 also tripped on B-N phase to earth fault with fault current of ~9.7kA and fault distance of 11.8km from Baghpat(PG) end. As per DR of Baghpat(PG) end, B-N phase to earth fault with no A/R operation is observed and line tripped on zone-1 distance protection operation. Since there was no source remaining at 220kV Baghpat(UP) hence 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-1 didn't trip from Baghpat(UP) end. vi)As per PMU at Meerut(PG), Y-B phase to phase fault with fault clearance time of 80ms is observed. vii)Due to tripping of 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-1 & 2, Baghpat(UP) lost its connectivity from the grid and 220kV Baghpat(UP) S/s became dead. viii) As per SCADA, change in demand of approx. 68 MW in UP control area. However, SLDC-UP reported 80MW load loss.	A/R operation ot observed in 220 KV Baghpat(PG)-Baghpat(UP) (UP) Ckt-1 tripped on B-N fault.
4	Multiple elements tripping event at Ziankote(J&K) & Amargarh(INDIGRID)	18-Jul-24	11:01	i)220/132kV Ziankote S/s have two bus at 220kV side i.e., main bus & reserve bus. 220kV Amargarh-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km. ii)During antecedent condition, 220kV Amargarh(INDIGRID) –Ziankote(JK) D/C was carrying 109 MW each and feeding Ziankote load.	Status of carrier communication and A/R scheme implementation at Ziankote end. Z-2 time delay setting at Amargarh end.
		26-Aug-24	13:53	i)220/132kV Ziankote S/s have two bus at 220kV side i.e., main bus & reserve bus. 220kV Amargarh-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km. ii)During antecedent condition, 220kV Amargarh(INDIGRID) –Ziankote(JK) D/C was carrying 104 MW each and feeding Ziankote load. iii)As reported, at 13:53 hrs, 220 KV Amargarh(INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2 tripped from both ends on R-Y phase to phase fault with fault distance of 6.6km and fault current of Ir=~2.15kA & Iy=~2.37kA from Ziankote(JK) end. 220 KV Amargarh(INDIGRID)-Ziankote(JK) (PDD JK) Ckt-1 tripped only from Amargarh(INDIGRID) end on the same R-Y phase to phase fault (Exact reason of fault is yet to be received). iv)As per DR of Amargarh(INDIGRID) end of 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-1, R-Y phase to phase fault is observed in zone-2 with fault current of Ir=~2.5kA & Iy=~2.1kA. v)As per DR of Amargarh(INDIGRID) end of 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2, R-Y phase to phase fault is observed in zone-1 with fault current of Ir=~5.2kA & Iy=~4.9kA. vi)As confirmed by Amargarh(INDIGRID), in view of non-availability of carrier communication and A/R scheme at Ziankote end, A/R has been kept disabled at Amargarh end and time delay of Z-2 also kept as instantaneous at Amargarh end. vii)As per PMU at Amargarh(PG), R-Y phase to phase fault which cleared within 120 msec is observed. viii)As per SCADA, change in demand of approx. 180MW is observed in J&K control area.	
5	Multiple elements tripping event at Patiala(PG)	19-Jul-24	18:50	i)400/220kV Patiala(PG) has one and half bus scheme at 400kV level and double main & transfer bus scheme at 220kV level. ii)During antecedent condition, 400/220kV 315 MVA ICT-1 & 500 MVA ICT-3, 220kV Bahadurgarh-I, Nabha-I, Ablowal-I were connected at 220kV Bus-1 and 400/220kV 315 MVA ICT-2 & 500 MVA ICT-4, 220kV Bahadurgarh-II, Nabha-II, Ablowal-II were connected at 220kV Bus-2. 400/220kV ICT-1,2,3 & 4 were carrying approx. 156MW, 153MW, 243MW & 238 MW respectively. 220kV D/C to Nabha, Bahadurgarh & Ablowal were carrying approx. 171MW, 98MW & 127MW respectively per circuit. iii)As reported at 18:50 hrs, B-N phase to earth fault occurred on 220 KV Patiala(PG)-Nabha(PS) (PSTCL) Ckt-1. Fault location was ~7.3km from Nabha end. Distance protection at Patiala end sensed fault in Z-2 and initiated tripping command however, breaker at Patiala end failed to open. This further led to the operation of LBB protection of Nabha-I bay at Patiala(PG). iv)On the result of LBB protection operation, 400/220kV 315 MVA ICT-1, Ablowal-I, bus coupler tripped however, 400/220kV 500 MVA ICT-3 & 220kV Bahadurgarh-I didn't trip. v)Further, 400/220kV 500 MVA ICT-3 tripped on over current earth fault protection operation and 220kV Bahadurgarh-I tripped from Bahadurgarh end only. vi)Further, at the same time, Nabha-II, Ablowal-II also tripped due to overloading. vii)At 18:50:33 hrs, 220 KV Bahadurgarh(PS)-Patiala(PG) (PSTCL) Ckt-2 tripped on another B-N fault. As reported, fault occurred due to conductor snapping at distance ~1.5km from Bahadurgarh end. viii)As per PMU at Patiala(PG), B-N phase to earth fault at 18:50:15 hrs & 18:50:33 hrs with fault clearance time of 2400 msec at 18:50:15 hrs and 120 msec at 18:50:33 hrs is observed. ix)As per SCADA, change in demand of approx. 245MW is observed in Punjab control area. x)As reported by POWERGRID(NR-2), CB operating mechanism problem of 220kV Nabha-I line has been rectified and reason of non-tripping of 400/220kV 500 MVA ICT-3 & 220kV Bahadurgarh-I at Patiala(PG) on LBB operation is under investigation.	Status of replacement of bus bar relay
6	Multiple elements tripping event at Mandaula(PG), Bawana(DTL) & Maharani Bagh(PG)	28-Jul-24	18:24	i)400 KV Mandaula(PG)-Maharani Bagh(PG) (DTL) D/C and 400 KV Bawana(DTL)-Maharani Bagh(PG) (DTL) D/C are on same towers. ii)During antecedent condition, incoming power at Maharani Bagh(PG) through 400 KV Mandaula(PG)-Maharani Bagh(PG) (DTL) D/C and 400 KV Bawana(DTL)-Maharani Bagh(PG) (DTL) Ckt-1 was approx. 295 MW and 292 MW respectively (as per SCADA). iii)As reported, at 18:24 hrs, 400 KV Bawana(DTL)-Maharani Bagh(PG) (DTL) Ckt-1 and 400 KV Mandaula(PG)-Maharani Bagh(PG) (DTL) Ckt-2 tripped on Y-B phase to phase fault and at the same time 400 KV Mandaula(PG)-Maharani Bagh(PG) (DTL) Ckt-1 also tripped from Mandaula(PG) end (reason of tripping is yet to be received). iv)During patrolling of Ckts, it was found that Y-B phase to phase fault occurred on 400 KV Bawana(DTL)-Maharani Bagh(PG) (DTL) Ckt-1 and 400 KV Mandaula(PG)-Maharani Bagh(PG) (DTL) Ckt-2 due to kite thread. v)As per PMU at Maharani Bagh(PG), Y-B followed by Y-B phase to phase fault with fault clearing time of 120msec & 120msec is observed. vi)As per DR of Bawana(DTL) end of 400 KV Bawana(DTL)-Maharani Bagh(PG) (DTL) Ckt-1, Y-B phase to phase fault (Iy=~9.8kA & Ib=~10.3kA) sensed in zone-2 with carrier signal received is observed. Fault distance was 39.58km from Bawana(DTL) end (as reported). vii)As per SCADA, change in demand of approx. 95 MW in Delhi control area.	Reason of tripping of 400 KV Mandaula(PG)-Maharani Bagh(PG) (DTL) Ckt-1
7	Multiple elements tripping event at Nara(UP)	11-Aug-24	18:25	i)220kV Nara(UP) has main and transfer bus scheme at 220kV level. ii)During antecedent condition, loading at Nara(UP) S/s was approx. 80 MW. Loading of 220/132kV 160 MVA ICT-1 & 220/132kV 200 MVA ICT-2 at Nara(UP) S/s were approx. 35 MW and 45 MW respectively. iii)As reported, at 18:25 hrs, 220 KV Meerut(PG)-Nara(UP) (PG) Ckt tripped from Meerut(PG) end on B-N phase to earth fault with fault distance of 10.5 km (33.02%) from Meerut(PG) end with fault current of Ib=14.05kA. iv)On this fault, B-phase pole of CB of 220 KV Meerut(PG)-Nara(UP) (PG) Ckt at Nara(UP) end got stuck and could not open properly. On this, LBB of Meerut bay at Nara(UP) S/s operated which led to tripping of 220kV line from Nara(UP) to Roorkee(UK), 200/132kV 160 MVA ICT-1 and 200 MVA ICT-2 at Nara(UP) S/s. v)As reported, during inspection (at Nara(UP) S/s) it was found that tripping command was issued to both 220kV Muzaffarnagar and 220kV Jansath bay also but their breakers were not tripped (cable found broken) hence both these lines were tripped from other end in zone -3. vi)As per PMU at Muzaffarnagar(UP), B-N phase to earth fault with delayed fault clearance time of 1240msec is observed. vii)As per DR of Meerut end of 220 KV Meerut(PG)-Nara(UP) (PG) Ckt, B-N phase to earth fault with fault current of Ib=~12.3kA with unsuccessful A/R operation is observed. Zone-1 distance protection operated from Meerut(PG) end. viii) Due to LBB operation at Nara(UP) S/s and tripping of 220 KV Nara-Jansath (UP) Ckt & 220 KV Nara-Muzaffarnagar (UP) Ckt from remote ends, Nara(UP) S/s lost its connectivity from Grid which led to blackout at 220kV Nara(UP) S/s. ix) As reported, no fault record found at Nara(UP) S/s. During inspection, it was found that DC main fuse of relay panel was blown off. x) As per SCADA, change in demand of approx. 70 MW & 40 MW in UP and Uttarakhand control area respectively. However, SLDC-UP has reported load loss of approx. 80 MW at Nara(UP) S/s.	Status of work related to relay communication cables replacement of Muzaffarnagar & Jansath Ckt bay at Nara(UP) S/s.

8	Multiple elements tripping event at Vishnuparyag HPS	25-Aug-24	04:25	i)During antecedent condition, 400 kV Muzaffarnagar(UP)-Vishnuprayag(UP) (UP) Ckt, 110 MW Unit-1 & 4 at Vishnuprayag(UP) were connected to 400kV Bus-1 at Vishnuprayag(UP) and 400 kV Alaknanda(UP)-Vishnuprayag(UP) (UP) Ckt, 110 MW Unit-2 & 3 at Vishnuprayag(UP) were connected to 400kV Bus-2 at Vishnuprayag(UP). 400 kV Vishnuprayag (UP)- Muzaffarnagar(UP) (UP) Ckt, 400kV Alaknanda-Muzaffarnagar ckt and 400kV Vishnuprayag-Alaknanda ckt were carrying ~343 MW, ~462 MW & 86 MW respectively. ii)As reported, at 04:25 hrs, 400 kV Muzaffarnagar(UP)-Vishnuprayag(UP) (UP) Ckt tripped on Y-B phase to phase fault. Fault occurred due to tree falling on the line between tower location no. 102 & 103, tower base at location no. 102 also got damaged due to land slide. Fault distance was ~225km (~79%) from Muzaffarnagar end. iii)Further after ~50msec, 400kV bus coupler at Vishnuprayag HEP tripped on over current stage-2 (DT) protection operation. iv)With the tripping of 400kV Bus coupler at Vishnuprayag HEP, 110 MW Unit-1 & 4 at Vishnuprayag HEP also tripped due to loss evacuation path. v)As per PMU at Muzaffarnagar(UP) and line DR files, Y-B phase to phase which cleared within 80msec is observed. Fault was in Z-1 from Vishnuprayag end. vi)As per SCADA, generation loss of ~220MW occurred at 110 MW Unit-1 & 4 at Vishnuprayag HEP due to tripping of 110 MW Unit-1 & 4. vii)As tower base at location no. 102 of 400 kV Muzaffarnagar(UP)-Vishnuprayag(UP) (UP) Ckt damaged during the event, line was taken under emergency shutdown after the event. Unit-1&4 were revived by 06:00 hrs and taken into service through 400kV Bus-2. Generation evacuated through 400kV Vishnuprayag-Alaknanda ckt & 400kV Alaknanda-Muzaffarnagar ckt path. viii)400 kV Muzaffarnagar(UP)-Vishnuprayag(UP) (UP) Ckt was revived at 17:33 hrs on 27.08.024. 400kV Bus-1 was also taken into service with the revival of 400 kV Muzaffarnagar(UP)-Vishnuprayag(UP) (UP) Ckt.	Status of remedial action taken for issue of O/C protection applied on bus coupler at Vishnuprayag.
9	Multiple elements tripping event at Bawana(DV), Mundka (DV) & Maharanibagh(PG)	31-Aug-24	16:40	i)400kV Bawana(DTL) S/s has one and half breaker bus arrangement at 400kV level. ii)During antecedent condition, incoming power at Bawana(DTL) through 400 KV Bawana-Mundka (DV) Ckt-1 & 2 were approx. 514MW & 503MW respectively and outgoing power from Bawana(DTL) to Maharani Bagh(PG) through 400 KV Bawana(DV)-Maharanibagh(PG) (DTL) Ckt-1 & 2 were approx. 294 MW & 294 MW. iii)As reported, at 16:40 hrs, 400 KV Bawana(DV)-Maharanibagh(PG) (DTL) Ckt-1 tripped on R-Y phase to phase fault with fault distance of 4.71km and with fault current of Ir=~31.38kA & Iy=~29.27kA from Bawana end (Reason of fault is yet to be received). 400 KV Bawana(DV)-Maharanibagh(PG) (DTL) Ckt-1 tripped on zone-1 distance protection from Bawana(DTL) end. iv)As per DR of Bawana(DTL) end of 400 KV Bawana(DV)-Maharanibagh(PG) (DTL) Ckt-1, R-Y phase to phase fault is observed with fault current of Ir=~31.3kA, Iy=~29.3kA and line tripped on zone-1 distance protection. v)As reported, the same fault sensed in zone-1 from Mundka(DTL) end and 400 KV Bawana-Mundka (DV) Ckt-1 & 2 tripped on zone-1 distance protection from Mundka(DTL) end. vi)As per PMU at Maharani Bagh(PG), R-Y phase to phase fault with fault clearing time of 120msec is observed. vii)As per SCADA, change in demand of approx. 105MW is observed in Delhi control area. viii)As reported by SLDC Delhi, the case of over reach of GE D60 relays at Mundka(DTL) S/s is already forwarded to GE company for analysis and necessary corrective recommendations.	Status of remedial action taken for issue of over reaching of distance relays at Mundka(DTL) end.

Annexure-XVI

Tripping events to be discussed in 52nd PSC Meeting

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Event (As reported)	Loss of generation / loss of load during the Grid Disturbance		Fault Clearance time (in ms)
					Date	Time		Generation Loss(MW)	Load Loss (MW)	
1	GD-1	1)220 KV Chinhat-Satrikh Road (UP) Ckt 2)220 KV Chinhat-Gomtinagar (UP) Ckt 3)220 KV Chinhat-Kursi Road (UP) Ckt 4)220 KV Chinhat(UP)-Lucknow_1(PG) (UP) Ckt	Uttar Pradesh	PGCIL, UPPTCL	1-Jul-24	00:15	i)220kV Chinhat(UP) has main and transfer bus scheme at 220kV level. ii)During antecedent condition, incoming power at Chinhat(UP) was through 220kV Satrikh ckt (~100MW), Kursi Road ckt (~30MW) and Lucknow(PG) ckt (~80MW) and outgoing power was through 220kV Gomatinagar ckt (~30MW) and load at Chinhat(UP) S/s (~90MW). All 220kV lines and ICTs connected to 220kV main bus at Chinhat(UP) S/s. 220kV Chinhat-LMRC D/C is radial line from Chinhat(UP) S/s. iii)As reported, at 00:15 hrs, LA of 220 KV Chinhat-Satrikh Road (UP) Ckt bay burst at Chinhat(UP) S/s which caused R-N phase to earth fault. iv)On this fault 220kV lines from Chinhat(UP) to Satrikh Road (UP), Gomtinagar (UP), Kursi Road (UP) & Lucknow_1(PG) tripped (Reason of tripping and type of protection operated for all elements yet to receive). v)Due to these trippings at Chinhat(UP) S/s, 220kV Chinhat-LMRC D/C, 220/132kV ICT-1 & 2 became dead and blackout occurred at 220kV Chinhat(UP) S/s. vi)As per PMU at Lucknow(PG), R-N phase to earth fault with delayed fault clearance of 440msec is observed (reason for delayed fault clearance yet to receive). vii)As per SCADA, change in demand of approx. 195 MW in UP control area.	0	195	440
2	GI-1	1)220 KV Akal-Akal(Suzlon) (RS) Ckt-2 2)220 KV Akal-Akal(Suzlon) (RS) Ckt-1 3)220 KV Akal-Mulana (RS) Ckt	Rajasthan	RVPNL, Mulana, Suzlon	6-Jul-24	05:26	i)400/220kV Akal(RS) has one and half breaker scheme at 400kV level and double main and transfer bus scheme at 220kV level. ii)During antecedent condition, incoming power at Akal(RS) S/s through 220 KV Akal-Akal(Suzlon) (RS) D/C and 220 KV Akal-Mulana (RS) Ckt were approx. 235 MW and 125 MW respectively. iii)As reported, at 05:26 hrs, R-phase conductor of 220 KV Akal-Akal(Suzlon) (RS) ckt-2 broke at a distance of approx. 160m from Akal(RS) S/s which caused R-N phase to earth fault and subsequently 220 KV Akal-Akal(Suzlon) (RS) ckt-2 tripped on zone-1 distance protection from Akal(RS) end. iv)As per PMU at ASPS1(IP), R-Y phase to phase fault followed by R-N phase to earth fault with fault clearance time of 80msec and 80msec respectively are observed. v)At the same time, 220 KV Akal-Akal(Suzlon) (RS) Ckt-1 and 220 KV Akal-Mulana (RS) Ckt also tripped from Akal(RS) end (Reason of tripping yet to be received). vi)During this event, dip in Rajasthan wind generation of approx. 1800 MW is observed out of which approx. 1150 MW recovered within 10 minutes. (As per SCADA). vii)As per SCADA, no change in demand is observed in Rajasthan control area. viii)As per SCADA, change in Rajasthan wind generation of approx. 168MW is observed.	650	0	80
3	GI-2	1)400 KV Azamgarh-Mau (UP) Ckt 2)400 KV Mau(UP)-Balia(PG) (PG) Ckt 3)400/132 kV 200 MVA ICT 3 at Mau(UP)	Uttar Pradesh	PGCIL, UPPTCL	7-Jul-24	11:44	i)220kV Mau(UP) has double main and transfer bus scheme at 400kV level. ii)During antecedent condition, 400 KV Azamgarh-Mau (UP) Ckt, 400 KV Mau(UP)-Balia(PG) (PG) Ckt & 400/132 kV 200 MVA ICT-3 connected to 400kV bus-1 and 400kV Mau-Rasra (UP) ckt, 400/132/33kV 200MVA ICT-1 & 2 connected to 400kV bus-2. 400 KV Anpara_B(UPUN)-Mau(UP) (UP) Ckt was not in service during the event. iii)As reported, at 11:44 hrs, B-phase CT of 400 KV Azamgarh-Mau (UP) Ckt burst which caused bus fault on 400kV bus-1 which led to bus bar protection operation on 400kV bus-1 at Mau(UP) S/s (Reason for delayed operation of bus bar protection yet to be received). iv)As per PMU at Azamgarh(UP), B-N phase to earth fault converted into Y-B phase to phase fault with delayed fault clearance time of 560ms is observed (Reason for delayed fault clearance is yet to receive). v)Due to bus bar protection operation, all elements connected to 400kV bus-1 (400kV Azamgarh(UP) ckt, Balia(PG) ckt and 400/132 kV 200 MVA ICT-3) tripped at 400kV Mau(UP) S/s. vi)As per SCADA, change in demand of approx. 60 MW in UP control area.	0	60	560
4	GI-2	1)400 KV Varanasi(PG)-Sahupuri(UP) (PG) Ckt-1 2)400 KV Varanasi(PG)-Sahupuri(UP) (PG) Ckt-2 3)400 KV Sahupuri(UP)-Biharshariff(PG) (PG) Ckt-1 4)400 KV Sahupuri(UP)-Biharshariff(PG) (PG) Ckt-2 5)400/220 kV 500 MVA ICT 2 at Sahupuri(UP) 6)132 KV Sahupuri(UP)-Karamnasa(BS) (UP) Ckt-1	Uttar Pradesh	PGCIL, UPPTCL	10-Jul-24	15:54	i)400/220kV Sahupuri(UP) has double main double scheme at 400kV and 220kV level. ii)During antecedent condition at 15:52 hrs, 400 KV Varanasi(PG)-Sahupuri(UP) (PG) Ckt-2, 400 KV Sahupuri(UP)-Biharshariff(PG) (PG) Ckt-1 and 400/220 kV 500 MVA ICT-2 were connected to 400kV bus-1 and 400 KV Varanasi(PG)-Sahupuri(UP) (PG) Ckt-1 and 400 KV Sahupuri(UP)-Biharshariff(PG) (PG) Ckt-2 were connected to 400kV bus-2 at 400kV Sahupuri(UP) S/s. 400/220 kV 500 MVA ICT-1 at Sahupuri(UP) is under installation (commissioning) process. iii)As reported, at 15:54 hrs, Y-N phase to earth fault occurred in GIS compartment at 400kV Sahupuri(UP) (exact location of fault is yet to be received). It is suspected that fault location was in the bay of 400 KV Varanasi(PG)-Sahupuri(UP) (PG) Ckt-2 in GIS compartment at 400kV Sahupuri(UP). iv)On this fault, 400 KV Sahupuri(UP)-Biharshariff(PG) (PG) Ckt-1 & 2 (fault current Iy=~1.1kA from Sahupuri end) tripped only from Sahupuri(UP) end on zone-4 distance protection. 400 KV Varanasi(PG)-Sahupuri(UP) (PG) Ckt-1 & 2 (fault current Iy=~3.3kA from Varanasi end, Iy=~3.6kA from Sahupuri end) tripped only from Varanasi(PG) end on zone-2 distance protection and fault sensed in zone-4 from Sahupuri(UP) end. 400/220 kV 500 MVA ICT 2 at Sahupuri(UP) and also tripped (details of protection operation is yet to receive). v)As reported, from 15:27 hrs to 17:49 hrs, multiple 220 & 132kV line also tripped at 220kV Sahupuri S/s i.e. 220kV Sahupuri-Churk ckt, 220kV Sahupuri-Raja Talab ckt, 220kV Sahupuri(400kV)-Sahupuri(200kV) interconnector, 132kV Sahupuri-Aliapur ckt, 132kV Sahupuri-Karamnasha ckt, 132kV Sahupuri-Chandauli ckt, 132kV Sahupuri-Sadat ckt and 132kV Sahupuri-Dhanapur ckt. Reason of tripping of these lines are yet to be received. vi)As per PMU at Varanasi(PG), at 15:54 hrs, Y-N phase to earth fault with delayed fault clearance time of 400msec is observed (Reason for delayed fault clearance is yet to receive). vii)As per SCADA, at 15:54 hrs, change in demand of approx. 100 MW in UP control area. viii)By 18:29 hrs, 400 KV Sahupuri(UP)-Biharshariff(PG) (PG) D/C and 400/220 kV 500 MVA ICT-2 were charged.	0	100	400
5	GI-2	1)400/220 kV 500 MVA ICT 1 at Lucknow(UP) 2)400/220 kV 500 MVA ICT 2 at Lucknow(UP) 3)220kV Lucknow-Hardoi Road (UP) ckt 4)220kV Lucknow-Unnao (UP) ckt 5)220/132 kV 200 MVA ICT 1 at Lucknow(UP) 6)220/132 kV 200 MVA ICT 2 at Lucknow(UP)	Uttar Pradesh	UPPTCL	14-Jul-24	15:53	i)220kV Lucknow(UP) has double main and transfer bus scheme at 220kV level. ii)During antecedent condition, 400/220kV 500 MVA ICT-1 & 2, 220/132kV 200 MVA ICT-1 & 2, 220kV Lucknow-Hardoi Road (UP) ckt & 220kV Lucknow-Unnao (UP) ckt were connected to 220kV bus-1 and 220kV lines from Lucknow(UP) to Bachrawan, Gomatinagar, Kanpur Road & 220/132kV 200MVA ICT-1 & 2 connected to 220kV bus-2 at 220kV Lucknow(UP) S/s. 220kV Lucknow-Kanpur Road (UP) ckt was not in service during the event. iii)As reported, at 15:53 hrs, R-N phase to earth fault occurred on 220kV bus-1 which led to tripping of all elements connected to 220kV bus-1 at 220kV Lucknow(UP). Bus bar protection failed to operate and 400/220 kV 500 MVA ICT-1 & 2 tripped on LBB protection (Type of protection operated in tripping of other elements is yet to receive) iv)As per PMU at Lucknow(PG), R-N phase to earth fault with delayed fault clearance time of 880ms is observed (Reason for delayed fault clearance is yet to receive). v)As per SCADA, change in demand of approx. 280 MW in UP control area. However, approx. 250 MW load loss in UP control area as per SLDC-UP.	0	250	880
6	GD-1	1) 220 KV Samaypur (BB)-Palli (HV) (HVPNL) Ckt-1 2) 220 KV Samaypur (BB)-Palli (HV) (HVPNL) Ckt-2 3) 220 KV Badshahpur (HV)-Palli (HV) (HVPNL) Ckt-1 4) 220 KV Badshahpur (HV)-Palli (HV) (HVPNL) Ckt-2 5) 220 KV Palla (HV) (Sec-46) -Palli (HV) (HVPNL) Ckt-1 6) 220 KV Palla (HV) (Sec-46) -Palli (HV) (HVPNL) Ckt-2 7) 220 KV Sector 52 (HV) (Sec-56 Gurgoan)-Palli (HV) (HVPNL) Ckt-1 8) 220 KV Sector 52 (HV) (Sec-56 Gurgoan)-Palli (HV) (HVPNL) Ckt-2	Haryana and Delhi	BBMB, HVPNL	16-Jul-24	22:10	i)During antecedent condition, 220 kV Palli S/S importing load from 220 KV Samaypur (BB)-Palli (HV) (HVPNL) Ckt-1 & Ckt-2, 220 KV Badshahpur (HV)-Palli (HV) (HVPNL) Ckt-1 & ckt-2 and 220 KV Sector-56 (Gurgaon) -Palli (HV) (HVPNL) Ckt-1 & Ckt-2 and feeding that load to 220 KV Palla (HV) (Sec-46) & 220 KV Palli (2*100MVA+1*160MVA) S/S. ii)As reported, to manage the line loading on sector-72 Gurgaon ckt, 220 KV Sector 52 (HV) (Sec-56 Gurgaon)-Palli (HV) (HVPNL) Ckt-1 was opened at 22:10 hrs on the instruction of SLDC-Haryana. This led to sparking on the 220 KV Sector 52 (HV) (Sec-56 Gurgaon)-Palli (HV) (HVPNL) Ckt-2 at Palli S/S end. iii)At the same time, busbar protection operated at 220kV Palli(HV) due to which all the elements connected to 220kV Bus-1 and 2 at Palli(HV) tripped and complete blackout occurred at Palli(HV) S/s. iv)As per PMU, R-Y phase to phase fault with delayed fault clearing time of 880 ms was observed. v)As per SCADA, change in demand of approx. 600 MW and 980 MW in Delhi and Haryana control area respectively were observed. However, as reported, approx. 400 MW load loss occurred at Palli & Sec-46 (Faridabad). Rest of the change in demand is suspected due to stalling of induction motor.	0	1580	880
7	GD-1	1) 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-1 2) 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2 3) 220 KV Khodri(UK)-Sarsawan(UP) (UP) Ckt 4) 220 KV Khodri(UK)-Saharanpur(UP) (UP) Ckt 5) 220 KV Khodri-Chhibro (UK) Ckt-1 6) 220 KV Khodri-Chhibro (UK) Ckt-2 7) 30 MW Khodri Unit-1, 2, 3 & 4 8) 60 MW Chhibro Unit-1, 2, 3 & 4	Uttarakhand	PTCUL, HPPTCL, UPPTCL	19-Jul-24	21:31	i)During antecedent condition, all the four 30MW units of Khodri and 60 MW units of Chhibro were running and total active power generation of Khodri and Chhibro was approx. 89 MW and 196 MW (as per SCADA). Total generation of Chhibro was evacuating through 220 KV Khodri-Chhibro (UK) Ckt-1 & 2. ii)As reported, at 21:31 hrs, while taking out 30MW Khodri Unit-2, B-phase pole of CB of Unit-2 did not open. This led to LBB protection operation which further resulted in tripping of all the elements connected to both the buses at 220kV Khodri(UK) and complete blackout occurred at 220kV Khodri(UK) S/s. iii)Due to tripping of 220 KV Khodri-Chhibro (UK) Ckt-1 & 2, 60 MW Chhibro Unit-1, 2, 3 & 4 also tripped due to loss of evacuation path and complete blackout occurred at 220kV Chhibro(UK) S/s. iv)As per PMU, no fault was observed in the system. v)As per SCADA, change in demand and generation of approx. 30 MW and 300 MW respectively in Uttarakhand control area were observed. vi)As remedial action taken, over hauling & testing of generator CB has been performed and found satisfactory.	300	30	NA

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Event (As reported)	Loss of generation / loss of load during the Grid Disturbance		Fault Clearance time (in ms)
					Date	Time		Generation Loss(MW)	Load Loss (MW)	
8	GI-1	1) 220kV Bhadla(RS)-Saurya Urja Ckt-2 2) 220 kV Bus sectionalizer-I (Bay no. 09) 3) 220 kV Bus Coupler-I (Bay no. 13) 4) 220kV Bhadla(RS)-RSDCL I Ckt-2	Rajasthan	RVPNL	30-Jul-24	11:38	i)400/220kV Bhadla(RS) has double main and transfer bus arrangement at 220kV side. ii)During antecedent condition, 220 kV Bhadla(RS)-Saurya Urja-2 and 220kV Bhadla(RS)-RSDCL I Ckt-2 were carrying approx. 242 MW & 128 MW respectively (reported data). iii)As reported, at 11:38hrs, B-ph jumper of 220kV Bhadla(RS)-Saurya Urja Ckt-2 snapped from Main Bus at Bhadla(RS) which led to tripping of 220kV Bhadla(RS)-Saurya Urja Ckt-2. iv)During the same time, 220 kV Bus sectionalizer-I (Bay no. 09) and 220 kV Bus Coupler-I (Bay no. 13) at Bhadla(RS) also tripped due to B-N phase to ground fault (As per PMU, Y-N fault; phase sequence issue is observed). v)Further as reported, 220kV Bhadla(RS)-RSDCL I Ckt-2 also tripped from RSDCL I end only due to LBB operation at the same time (exact reason of LBB operation yet to be shared). vi)As per PMU at Bhadla(PG), Y-N phase to ground fault is observed with delayed fault clearing time of 160 ms. vii) As per SCADA, change in solar generation of approx. 905MW is observed in Rajasthan control area. viii)As reported by SLDC Rajasthan, approx. 370 MW of solar generation loss occurred in Rajasthan control area and there is total approx. 730 MW reduction in solar generation by RE plants connected at Bhadla(RS).	370	0	160
9	GI-1	1)220/132kV 160MVA ICT-1 at Barn (JK) 2)220/132kV 160MVA ICT-2 at Barn (JK) 3)220/132kV 160MVA ICT-3 at Barn (JK) 4)132kV Barn-Canal (JK) Ckt-1 5)132kV Barn-Canal (JK) Ckt-2	Jammu and Kashmir	JK PDD	2-Aug-24	15:03	i)As reported, at 15:03hrs, 220/132kV 160MVA ICT-1, 132kV Barn-Canal (JK) D/C tripped at Barn(JK) S/s on Y-B phase to phase fault which occurred on 132kV Barn-Canal (JK) D/C (exact reason, location of fault and type of protection operated is yet to be received). ii)As reported, due to tripping of ICT-1, the complete load shifted on 220/132kV 160MVA ICT-2 & 3 which led to tripping of 220/132kV 160MVA ICT-2 & 3 on overloading at Barn(JK) S/s. iii)As per PMU at Kishenpur(PG), Y-B phase to phase fault with fault clearing time of 120ms is observed. iv)As per SCADA, load loss of approx. 345MW occurred in J&K control area.	0	345	120
10	GI-2	1)400/220 kV 315 MVA ICT 1 at Muzaffarnagar(UP) 2)400/220 kV 315 MVA ICT 2 at Muzaffarnagar(UP) 3)400/220 kV 315 MVA ICT 3 at Muzaffarnagar(UP) 4)400/220 kV 500 MVA ICT 4 at Muzaffarnagar(UP) 5)220kV Muzaffarnagar-Charla (UP) Ckt 6)220kV Muzaffarnagar-Jansath (UP) Ckt 7)220kV Muzaffarnagar-Shamli (UP) Ckt 8)220kV Muzaffarnagar-Khatauli (UP) Ckt	Uttar Pradesh	UPPTCL	21-Aug-24	09:02	i)During antecedent condition, 400/220kV 315 MVA ICT-1, 400/220kV 500 MVA ICT-4, 220kV Muzaffarnagar-Shamli (UP) Ckt, 220kV Muzaffarnagar-Khatauli (UP) Ckt, 220kV Muzaffarnagar-Badhni kalan (UP) Ckt & 220/132kV 160MVA ICT-4 were connected to 220kV bus-1 and 400/220 kV 315 MVA ICT-2, 400/220 kV 315 MVA ICT-3, 220kV Muzaffarnagar-Charla (UP) Ckt, 220kV Muzaffarnagar-Jansath (UP) Ckt & 220/132kV 160MVA ICT-5 were connected to 220kV bus-2 at Muzaffarnagar(UP) S/s. Bus coupler of 220kV bus-1 and 220kV bus-2 was in ON condition and 220kV Muzaffarnagar-Nara (UP) Ckt was not in service (under shutdown) during the tripping event. ii)As reported, at 09:02 hrs, R-N phase to earth fault occurred on 220kV Muzaffarnagar-Badhni kalan (UP) Ckt with fault distance of 3.8km from Muzaffarnagar(UP) end and 20.4km from Badhni kalan(UP) end. Fault was sensed in zone-1 from both ends. iii)On this fault 220kV Muzaffarnagar-Badhni kalan (UP) Ckt tripped from Badhni kalan end on zone-1 distance protection on R-N fault. During fault clearing process at Muzaffarnagar(UP) end, R-phase CB interrupting chamber got damaged which resulted into continuation of sparking between R phase male contact and R phase dropper wire of breaker. The circuit breaker operated mechanically (auxiliary contacts operated properly) and thus breaker status reflected as OPEN. iv)As breaker didn't open completely (sparking between R phase male contact and R phase dropper wire of breaker was still there), fault was not cleared yet. Due to continuous fault feeding 400/220kV 315MVA ICT-1 & 2 and 400/220kV 500 MVA ICT-4 tripped on directional earth fault protection and 400/220kV 315 MVA ICT-3 tripped on back up impedance protection. 220 kV Charla line, 220 kV Jansath line and 220 kV shamli line tripped from remote ends on zone-3 distance protection (it is confirmed from respective DRs also). v)Ideally, this fault would have been cleared by LBB protection of Badhni kalan bay, but as CB status changed from ON to OFF due to proper operation of breaker auxiliary contacts, LBB initiation got reset. vi)Further, as reported, bus bar protection of 220kV bus-1 at Muzaffarnagar(UP) also operated after 1 second of fault starting time due to persisting differential current. vii)As per DR of bus bar protection at Muzaffarnagar(UP), busbar protection operated on 220kV bus-1 after 1.05 second of fault starting time. On this, all remaining elements also tripped which were connected to 220kV bus-1 i.e. 220kV Muzaffarnagar-Khatauli (UP) Ckt, 220/132kV 160MVA ICT-4 and bus coupler of 220kV bus-1 and bus-2. viii) As per PMU at Meerut(PG), R-N phase to earth fault with delayed fault clearing time of 1080 msec is observed. ix)As per SCADA, load loss of approx. 290 MW in UP control area. However, SLDC-UP reported load loss of 127 MW in UP control area.	0	127	1080
11	GD-1	1)220 KV Abdullapur(PG)-Rajokheri (HV) (HVPNL) Ckt-1 2)220 KV Abdullapur(PG)-Rajokheri (HV) (HVPNL) Ckt-2 3)220 KV Shahbad-Rajokheri(HV)(HVPNL) Ckt-1 4)220 KV Shahbad-Rajokheri(HV)(HVPNL) Ckt-2 5)220 KV Tepla-Rajokheri(HV)(HVPNL) Ckt-1 6)220 KV Tepla-Rajokheri(HV)(HVPNL) Ckt-2 7)220 KV Shahbad-Durla(HV)(HVPNL) Ckt-1 8)220 KV Shahbad-Durla(HV)(HVPNL) Ckt-2 9)220 KV Shahbad-Joria(HV)(HVPNL) Ckt-1 10)220 KV Shahbad-Joria(HV)(HVPNL) Ckt-2	Haryana	PGCIL, HVPNL	26-Aug-24	22:58	i)220kV Rajokheri(HV) & 220kV Shahbad(HV) S/s have double main bus arrangement at 220kV side. ii)During antecedent condition, incoming power at Rajokheri(HV) S/s through 220 KV Abdullapur(PG)-Rajokheri (HV) (HVPNL) D/C was approx. 115 MW and outgoing power from Rajokheri(HV) through 220 KV Shahbad-Rajokheri(HV)(HVPNL) D/C was approx. 90 MW. Loading of 220 KV Shahbad-Joria(HV)(HVPNL) D/C and 220 KV Shahbad-Durla(HV)(HVPNL) D/C were approx. 100 MW and 75 MW feeding to Shahbad(HV) and Durla(HV) respectively. iii)As reported, at 22:58 hrs, due to inclement weather conditions, Y-B phase to phase occurred on 220 KV Shahbad-Rajokheri(HV)(HVPNL) Ckt-1 & 220 KV Abdullapur(PG)-Rajokheri (HV) (HVPNL) Ckt-1. iv)As reported, 220 KV Abdullapur(PG)-Rajokheri (HV) (HVPNL) D/C tripped only from Abdullapur(PG) end not from Rajokheri(HV) end. 220 KV Shahbad-Rajokheri(HV)(HVPNL) Ckt-1 tripped on zone-1 distance protection on Y-B-G double phase to ground fault with fault distance of 29km and fault current of Iy=~5.79kA & Ib=~5.39kA from Rajokheri(HV) end. 220 KV Shahbad-Rajokheri(HV)(HVPNL) Ckt-2 & 220 KV Tepla-Rajokheri(HV)(HVPNL) Ckt-2 tripped on direction earth fault from Rajokheri(HV) end. 220 KV Tepla-Rajokheri(HV)(HVPNL) Ckt-1 tripped on zone-3 distance protection on Y-B phase to phase fault from Rajokheri(HV) end (details regarding trippings at Shahbad(HV) S/s is yet to be received). v)As per PMU at Abdullapur(PG), Y-B phase to phase fault converted into R-Y-B three phase fault with delayed fault clearing time of 2040msec is observed. vi)Due to tripping of all 220kV lines at Rajokheri(HV) & Shahbad(HV), both sub-stations lost their connectivity from Grid which led to blackout of 220kV Rajokheri(HV) S/s & 220kV Shahbad(HV) S/s. vii)As per SCADA, change in demand of approx. 350 MW in Haryana control area.	0	350	2040

Utilities are requested to prepare detailed analysis report and present the event details during 52nd PSC meeting. Events involving more than one utility may be jointly prepared and presented.

Annexure-XVII

RE: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Thu 8/29/2024 7:29 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>; CPCC1 <rtamc.nr1@powergrid.in>;

Cc:seo-nrpc <seo-nrpc@nic.in>; Somara Lakra (सोमारा लाकरा) <somara.lakra@grid-india.in>; Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>; Arunkumar P <Arunkumar.P@adani.com>; Sugata Bhattacharya (सुगाता भट्टाचार्या) <sugata@grid-india.in>; Deepak Kumar <deepak.kr@grid-india.in>; AMIT SHARMA <amsharma@grid-india.in>; Bikas Kumar Jha (बिकास कुमार झा) <bikaskjha@grid-india.in>; Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>; Aman Gautam (अमन गौतम) <amangautam@grid-india.in>; Gnanaguru . <Gnanaguru.1@adani.com>; Sumeet Sharma <Sumeet.Sharma@adani.com>; Naman Vyas <Namany.Vyas@adani.com>; Milan Popat <Milan.Popat@adani.com>; Nihar Raj <nihar.raj@adani.com>; Abhishek Kukreja <Abhishek.Kukreja@adani.com>;

5 attachments (9 MB)

Counter (2).jpg; Counter.jpg; TPS (2).jpg; TPS.jpg; 220KV Alwar ss.jpg;

Dear Sir,

Please find the attached Photos. on 28-08-2024, a representative from M/s. Commtel Networks visited the Mahendragarh site and confirmed the healthiness of the SDH and TPS, along with their associated cards.

All SPS System equipment are functioning properly. The 15 TPS installed in the remote substation.

The details and status of TPS and Counter at Mahendragarh End.

S.No	TPS	TPS Status	Counter	Counter Status
1	PG Hissar	ON	17	OKAY
2	Bhiwani	ON	17	OKAY
3	Dadari	ON	17	OKAY
4	Alwar	ON	-	OFF
5	Bhilwara	ON	12	OKAY
6	Merta	ON	14	OKAY
7	Ratangarh	ON	-	OFF
8	Gobinugarg	ON	-	OFF
9	Malerkotla	ON	-	OFF
10	Laton Kalan	ON	6	OKAY
11	Mandula	ON	12	OKAY
12	Bamnauli	ON	-	OFF
13	Shamli	ON	-	OFF
14	Bahadurgarh	ON	10	OKAY

15	Dhanonda	ON	-	OFF

There alarms on the system are due to the following reasons.

1. Equipment Failure/ card failure/ power failure at Remote Sites.
2. Cable connectivity break between the remote System and cable coming from Field.
3. E1 connectivity outage at remote Sites.

Our team, with support from Commtel Networks, visited the nearest TPS installed at the 220/132 kV Alwar Substation to check its healthiness. However, during the inspection, the panel was found to be de-energized, necessitating an end-to-end test. (Photo Attached) Similarly, each substation needs to be ensured the healthiness of the TPS by respective Substation owner.

We request you to please confirm the healthiness of the Sr no 1 and 2 .

Thanks and Regards,

Kalicharan Sahu
(O&M) HVDC & EHV Substations,
Adani Energy Solutions Limited
| ±500kV HVDC Mahendragarh Terminal Sub Station I
Village-Kheri- Aghiyar, Taluka- Kanina, Mahendragarh 123 029, Haryana, India
Mob +91 9764006167| Off +91 1285 277326

From: NRLDC SO 2 <nrldcso2@grid-india.in>
Sent: Tuesday, August 27, 2024 10:07 AM
To: SLDC Punjab <se-sldcprojects@pstcl.org>; PC PSTCL SLDC PUNJAB <pcpstcl@gmail.com>; Haryana <sldcharyanacr@gmail.com>; Delhi <sldcmintoroad@gmail.com>; UP <sera@upsldc.org>; Rajasthan <SE.LDRVPNL@RVPN.CO.IN>; ce.ld@rvpn.co.in; CPCC1 <rtamc.nr1@powergrid.in>; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room <pccont@bbmb.nic.in>; se.prot.engg@rvpn.co.in; Arunkumar P <Arunkumar.P@adani.com>; Kali Charan Sahu <Kalicharan.Sahu@adani.com>; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org; sesldcop@hvpn.org.in; cepso@upsldc.org; se-sldcop <se-sldcop@pstcl.org>; SICHVDC Controlroom <SICHVDC.Controlroom@adani.com>
Cc: seo-nrpc <seo-nrpc@nic.in>; somara.lakra <somara.lakra@grid-india.in>; Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>; Sugata Bhattacharya (सुगाता भट्टाचार्या) <sugata@grid-india.in>; deepak.kr <deepak.kr@grid-india.in>; AMIT SHARMA <amsharma@grid-india.in>; bikaskjha <bikaskjha@grid-india.in>; Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>; Aman Gautam (अमन गौतम) <amangautam@grid-india.in>
Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Sir,

In reference of the trailing mail, it is to be mentioned that inputs have received from Rajasthan only. Members agreed to shared the details by 22nd August 2024, however no further details received from Haryana, Punjab, Delhi, UP & ADANI.

Kindly share the details as discussed during the meeting held on 20th August 2024, so that further remedial actions can be initiated on the basis of those details.

सादर धन्यवाद/ Thanks & Regards
प्रणाली संचालन-II/ System Operation-II
उ॰क्षे॰भा॰प्रे॰के॰/ NRLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
Formerly known as
पोसोको / POSOCO

From: NRLDC SO 2
Sent: Tuesday, August 20, 2024 12:49:55 PM
To: SLDC Punjab; PC PSTCL SLDC PUNJAB; Haryana; Delhi; UP; Rajasthan; ce.ld@rvpn.co.in; CPCC1; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room; se.prot.engg@rvpn.co.in; Arunkumar.P@adani.com; Kalicharan.Sahu@adani.com; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org; sesldcop@hvpn.org.in
Cc: seo-nrpc; Somara Lakra (सोमारा लाकरा); Mahavir Prasad Singh (महावीर प्रसाद सिंह); Sugata Bhattacharya (सुगाता भट्टाचार्या); Deepak Kumar; AMIT SHARMA; Bikas Kumar Jha (बिकास कुमार झा); Manas Ranjan Chand (मानस रंजन चंद); Aman Gautam (अमन गौतम)
Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Sir,

Please find attached presentation w.r.t. review of SPS of HVDC Mundra-Mahindergarh link.

As discussed during online meeting held today from 10:30hrs onward with SLDCs, ADANI and POWERGRID, following action plan has been decided:

1. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load

relief through respective feeders.
2. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of availability of communication path for incorporation of proposed revised/additional feeders.
3. Mahindergarh(ADANI) shall coordinate with the POWERGRID and share the action plan to make the SPS system healthy and operational at Mahindergarh(ADAIN), Bhiwani(PG) & Bhiwani(BBMB).
4. POWERGRID & ADANI shall review the healthiness of SPS system at different load centers and communication path between them in coordination with the SLDCs.

Kindly take necessary actions w.r.t. your control area and share the inputs by afternoon of 22nd August 2024.

सादर धन्यवाद/ Thanks & Regards
प्रणाली संचालन-II/ System Operation-II
उ°क्षे°भा°प्रे°के°/ NRLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
Formerly known as
पोसोको / POSOCO

From: NRLDC SO 2
Sent: Friday, August 16, 2024 5:36:26 PM
To: SLDC Punjab; PC PSTCL SLDC PUNJAB; Haryana; Delhi; UP; Rajasthan; ce.ld@rvpn.co.in; CPCC1; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room; se.prot.engg@rvpn.co.in; Arunkumar.P@adani.com; Kalicharan.Sahu@adani.com; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org
Cc: seo-nrpc; Somara Lakra (सोमारा लाकरा); Mahavir Prasad Singh (महावीर प्रसाद सिंह); Sugata Bhattacharya (सुगाता भट्टाचार्या); Deepak Kumar; AMIT SHARMA; Bikas Kumar Jha (बिकास कुमार झा); Manas Ranjan Chand (मानस रंजन चंद); Aman Gautam (अमन गौतम)
Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Sir,

Kindly refer trailing mail.

ADANI has shared the identified issues in communication link of SPS and load related details have been received from UP only. Other members are also requested to share the details w.r.t. their control area. POWERGRID and ADANI are requested to review the status of healthiness of communication links to load centers.

In this regard an online meeting has been scheduled on 20th August 2024 (Tuesday). Kindly ensure that concerned members shall connect in the meeting.

Online meeting to review the healthiness of SPS of 500kV HVDC Mundra-Mahindergarh link
Hosted by NRLDCSO Grid_India

https://nrldc.webex.com/nrldc/j.php?MTID=m8a6b11dfbb5341cc4b8de3e5403b9ff6
Tuesday, August 20, 2024 10:30 AM | 5 hours | (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Meeting number: 2514 426 7076
Password: rgEcnsPB934

सादर धन्यवाद/ Thanks & Regards
प्रणाली संचालन-II/ System Operation-II
उ°क्षे°भा°प्रे°के°/ NRLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
Formerly known as
पोसोको / POSOCO

From: NRLDC SO 2
Sent: Tuesday, August 13, 2024 4:32 PM
To: SLDC Punjab; PC PSTCL SLDC PUNJAB; Haryana; Delhi; UP; Rajasthan; ce.ld@rvpn.co.in; CPCC1; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room; se.prot.engg@rvpn.co.in; Arunkumar.P@adani.com; Kalicharan.Sahu@adani.com; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org
Cc: seo-nrpc; Somara Lakra (सोमारा लाकरा); Mahavir Prasad Singh (महावीर प्रसाद सिंह); Sugata Bhattacharya (सुगाता भट्टाचार्या); Deepak Kumar; AMIT SHARMA; Bikas Kumar Jha (बिकास कुमार झा)

Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Sir,

Non operation of SPS of 500kV HVDC Mundra-Mahindergarh inter regional link on 17th May 2024 on outage of both pole (carrying total ~1500MW) was discussed during 51st PSC meeting. ADANI was requested to share the details w.r.t. SPS operation during the meeting.

As per details received from ADANI, there are two links for SPS signal communication to load centers. One is directly to 220kV Dhanonda(HR) and communication to rest of load centers is through Bhiwani & Hissar S/s of POWERGRID. Other stations are also involved in further communication to all the load centers. SPS communication network (received from ADANI) is attached herewith the mail.

During 17th May incident, SPS operated at Dhanonda S/s however, operation didn't occur at load centers on second path. During investigation by ADANI team, it was identified that communication link between Bhiwani and Hissar is not healthy and there are chances that communication link between other stations may also be not healthy.

During online meeting conducted on 05th August 2023, states also highlighted the challenges regarding changes / unavailability in identified load feeders and load shedding in Punjab, Haryana, Delhi, UP and Rajasthan.

In view of above following actions are desired:

1. POWERGRID and concerned states are requested to identify the issue in communication links and take expeditious actions to make the all the communication link healthy.
2. States are requested to go through the details of load feeders mentioned in SPS document and share the changes / modifications as per present scenario and also share the inputs w.r.t. unavailability in identified load feeders and load shedding.

Details have received from UP only. POWERGRID and states are requested to share their inputs at the earliest. Necessary actions also need to be taken on priority.

सादर धन्यवाद/ Thanks & Regards
प्रणाली संचालन-II/ System Operation-II
उ°क्षे°भा°प्रे°के°/ NRLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
Formerly known as
पोसोको / POSOCO

From: NRLDC SO 2
Sent: Thursday, August 8, 2024 12:22:45 PM
To: SLDC Punjab; PC PSTCL SLDC PUNJAB; Haryana; Delhi; UP; Arshad Jamal; Rajasthan; ce.ld@rvpn.co.in
Cc: seo-nrpc; N Roy (एन रॉय); S Usha (एस उषा); Somara Lakra (सोमारा लाकरा); Mahavir Prasad Singh (महावीर प्रसाद सिंह); Manas Ranjan Chand (मानस रंजन चंद); Rahul Shukla (राहुल शुक्ला); Aman Gautam (अमन गौतम); Minnakuri Venkateswara Rao (मिन्नाकुरी वेंकटेश्वर राव); Sugata Bhattacharya (सुगाता भट्टाचार्या); Deepak Kumar; AMIT SHARMA
Subject: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Ma'am/Sir,

As you are well aware that an online meeting was scheduled on 05.08.2024 among NLDC, WRLDC, NRLDC, SLDC Gujarat, SLDC Delhi, SLDC UP, SLDC Haryana, SLDC Punjab and ATL team to discuss the mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link and some challenges were highlighted during the meeting regarding changes/unavailability in identified load feeders and load shedding in Punjab, Haryana, Delhi, UP and Rajasthan.

As per IEGC clause 16.1, *“SPS for identified system shall have redundancies in measurement of input signals and communication paths involved up to the last mile to ensure security and dependability.”*

As per IEGC clause 16.2, *"For the operational SPS, RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s) shall perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year. RLDC or NLDC shall share the report of such studies and mock testing including any short comings to respective RPC(s). The data for such studies shall be provided by CTU to the concerned RPC, RLDC and NLDC.’’*

In view of the above, states may confirm the status of the identified load feeders (whether operational or not) and whether any changes done in the existing load details. SPS scheme of 500kV HVDC Mundra-Mahindergarh is attached herewith.

सादर धन्यवाद/ Thanks & Regards
सुगता भट्टाचार्य/ Sugata Bhattacharya
प्रणाली संचालन-II/ System Operation-II
उ॰क्षे॰भा॰प्रे॰के॰/ NRLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
Formerly known as
पोसोको / POSOCO

Fwd: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Tue 8/27/2024 4:58 PM

Inbox

To:NRLDC SO 2 <nrldcso2@grid-india.in>;

---------- Forwarded message ---------
From: SE T&C Meerut < setncmrt@upptcl.org>
Date: Tue, Aug 27, 2024 at 4:34 PM
Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link
To: SE (R&A) <sera@upsldc.org>

As per telephonic conversation with EEEMTD,Meerut,It is to inform that Six pairs(12Nos)fiber are available between 220KV Substation, Shamli&400KV Substation, Shamli. Further modalities regarding availability &sharing of these fiber can be discussed with EMTD&Transmission wing.

On Tue, 27 Aug, 2024, 16:24 SE (R&A), <sera@upsldc.org> wrote:

> Sir ,
>
> As per trailing mail and in reference to the meeting held on 20.08.2024, kindly share the status of availability/status/healthiness of communication path between 220kV Shamli and 400kV Shamli, availability of communication path for incorporation of proposed revised/additional feeders along with the healthiness of existing communication path of SPS incorporated feeders at 220kV Shamli.
>
> ---------- Forwarded message ---------
> From: NRLDC SO 2 < nrldcso2@grid-india.in>
> Date: Tue, Aug 27, 2024 at 10:07 AM
> Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link
> To: SLDC Punjab <se-sldcprojects@pstcl.org>, PC PSTCL SLDC PUNJAB <pcpstcl@gmail.com>, Haryana <sldcharyanacr@gmail.com>, Delhi <sldcmintoroad@gmail.com>, UP <sera@upsldc.org>, Rajasthan <SE.LDRVPNL@rvpn.co.in>, ce.ld@rvpn.co.in <ce.ld@rvpn.co.in>, CPCC1 <rtamc.nr1@powergrid.in>, neerajk@powergrid.in <neerajk@powergrid.in>, setncmrt@upptcl.org <setncmrt@upptcl.org>, bharatlalgujar@gmail.com <bharatlalgujar@gmail.com>, akashdeep3433786@gmail.com <akashdeep3433786@gmail.com>, xenemtcbhpp2@bbmb.nic.in <xenemtcbhpp2@bbmb.nic.in>, PC Control Room <pccont@bbmb.nic.in>, se.prot.engg@rvpn.co.in <se.prot.engg@rvpn.co.in>, Arunkumar.P@adani.com <Arunkumar.P@adani.com>, Kalicharan.Sahu@adani.com <Kalicharan.Sahu@adani.com>, rajbir-walia79@yahoo.com <rajbir-walia79@yahoo.com>, ase-sldcop@pstcl.org <ase-sldcop@pstcl.org>, sesldcop@hvpn.org.in <sesldcop@hvpn.org.in>, cepso@upsldc.org <cepso@upsldc.org>, se-sldcop <se-sldcop@pstcl.org>, sicHVDC.Controlroom@adani.com <sicHVDC.Controlroom@adani.com>
> Cc: seo-nrpc <seo-nrpc@nic.in>, Somara Lakra (सोमारा लाकरा) <somara.lakra@grid-india.in>, Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>, Sugata Bhattacharya (सुगाता भट्टाचार्या) <sugata@grid-india.in>, Deepak Kumar <deepak.kr@grid-india.in>, AMIT SHARMA <amsharma@grid-india.in>, Bikas Kumar Jha (बिकास कुमार झा) <bikaskjha@grid-india.in>, Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>, Aman Gautam (अमन गौतम) <amangautam@grid-india.in>
>
> Sir,

In reference of the trailing mail, it is to be mentioned that inputs have received from Rajasthan only. Members agreed to shared the details by 22nd August 2024, however no further details received from Haryana, Punjab, Delhi, UP & ADANI.
Kindly share the details as discussed during the meeting held on 20th August 2024, so that further remedial actions can be initiated on the basis of those details.

सादर धन्यवाद/ Thanks & Regards
प्रणाली संचालन-II/ System Operation-II
उ॰क्षे॰भा॰प्रे॰के॰/ NRLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
Formerly known as
पोसोको / POSOCO

From: NRLDC SO 2
Sent: Tuesday, August 20, 2024 12:49:55 PM
To: SLDC Punjab; PC PSTCL SLDC PUNJAB; Haryana; Delhi; UP; Rajasthan; ce.ld@rvpn.co.in; CPCC1; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room; se.prot.engg@rvpn.co.in; Arunkumar.P@adani.com; Kalicharan.Sahu@adani.com; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org; sesldcop@hvpn.org.in
Cc: seo-nrpc; Somara Lakra (सोमारा लाकरा); Mahavir Prasad Singh (महावीर प्रसाद सिंह); Sugata Bhattacharya (सुगाता भट्टाचार्या); Deepak Kumar; AMIT SHARMA; Bikas Kumar Jha (बिकास कुमार झा); Manas Ranjan Chand (मानस रंजन चंद); Aman Gautam (अमन गौतम)
Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Sir,

Please find attached presentation w.r.t. review of SPS of HVDC Mundra-Mahindergarh link.

As discussed during online meeting held today from 10:30hrs onward with SLDCs, ADANI and POWERGRID, following action plan has been decided:

1. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load relief through respective feeders.
2. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of availability of communication path for incorporation of proposed revised/additional feeders.

उत्तर प्रदेश राज्य भार प्रेषण केन्द्र लि०
यू०पी०एस०एल०डी०सी०परिसर, विभूति
खण्ड II,गोमती नगर, लखनऊ–226010
ई मेल : sera@upsldc.org

U.P. State Load Despatch Centre Ltd.
UPSLDC Complex, Vibhuti Khand II
Gomti Nagar, Lucknow- 226010
E-mail: sera@upsldc.org

No: - 2661 /SE(R&A)/EE-II/SPS Dated:- 07/08/ 2024

General Manager, NRLDC18-A,
SJSS Marg, Katwaria Sarai,
New Delhi – 110016

Subject- Regarding SPS of HVDC Mundra-Mahendargarh line

Kindly refer to SE (ETC) Muzaffarnagar letter no/062/E.T.C./MZN/400 kV S/S Shamli dated 05.05.2024. (copy enclosed) regarding feeder wise load of Shamli area. As per the letter, at present complete load relief (i.e. 300MW) may not be provided by 220 kV Shamli, so that alternatively feeder and load details of 400 kV Shamli has also been provided. Also it is informed that at present SPS system at 220 kV Shamli is not healthy which is being maintained by PGCIL.

It is therefore requested to kindly instruct the concerned to incorporate 132 kV feeders of 220 kV Shamli & 400 kV Shamli in SPS of HVDC Mundra-Mahendargarh line so that appropriated load relief may be provided from UP Control area and take necessary action regarding healthiness of SPS system

Sangeet
(Sangeeta)
Superintending Engineer (R&A)

No: - /SE(R&A)/EE-II/SPS Dated: - 2024

Copy forwarded to following via e-mail for kind information and necessary action:-

1. Director, UPSLDC, Vibhuti Khand – II, Gomti Nagar, Lucknow.
2. Director (Operation), UPPTCL, 11th Floor, Shakti Bhawan Extn., Lucknow.
3. Chief Engineer (PSO), Vibhuti Khand – II, Gomti Nagar, Lucknow.
4. Chief Engineer (Trans. West),PareshanBhawan, 130D, Hydel Colony, Victoria Park, Meerut 250001.
5. SE (Operations), 18 A SJSS Marg, Katwaria Sarai, New Delhi, 110016.

(Sangeeta)
Superintending Engineer (R&A)

कार्यालय
अधीक्षण अभियन्ता
विद्युत पारेषण मण्डल
उ०प्र०पावर ट्रांसमिशन कारपोरेशन लि०
132 के०वी० भोपारोड उपकेन्द्र
मुजफ्फरनगर-251001

OFFICE OF THE
SUPERINTENDING ENGINEER
Electricity Transmission Circle
U.P. Power Transmission Corporation Ltd.
132 KV Bhopa Road Sub-station
Muzaffarnagar-251001

दूरभाष [0131-2608038
Ph.[0131-2608038
E-mail : seetcmzn@upptcl.org, seetcmzn@gmail.com

संख्या / No. 1062 /E.T.C./MZN/400 KV S/S Shamli दिनांक / DATED 05/08/24

Subject: - Regarding SPS of HVDC Mundra-Mahendargarh.

Superintending Engineer (R & A)
U.P State Load Despatch Centre Ltd.
UPSLDC Complex, Vibhuti Khand-II
Gomti Nagar, Lucknow.
Email. sera@upsldc.org

Please refer to your office letter no. 2187 dt. 01.07.2024, forwarded to this office by SE (T&C), Meerut vide endorsement no. 2237/CE(TW)/MT/SPS dt. 23.07.2024 vide which it has been requested to provide details of 132 KV feeders for planned relief to HVDC Mundra-Mahendargarh SPS.

In this reference, it is to apprise that following is the details of 132 KV feeders being fed from 220 KV Sub-Station Shamli.

S.No.	Name of feeder	Connected Load (MVA)	Maximum Load (MW)	Average Load (MW)
1	132 KV Lalukheri	63+63	72	47
2	132 KV Jhinjhana	63+40+40	80	52
3	132 KV Kairana-I/II	63+63	41	27
4	132 KV Jasala	63+40	58	38
	Total		251	164

1. Following Case wise Trippings of 132 KV Feeders at 220 KV Sub-Station, Shamli for tripping of HVDC Mundra-Mahendergarh Line may be used.

(A) In Maximum Load Condition:-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 300 MW	220 KV Subsatatio n, Shamli	132 KV Jasala	58	1	1	1	1
2			132 KV Kairana-I	20.5		1		1
3			132 KV Kairana-II	20.5	-	1		1
4			132 KV Lalukheri	72	-	-	1	1
5			132 KV Jinjhana	80	-		1	1
			Total Relief	251	58	99	210	251

(B) In Average Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	220 KV Subsatatio n, Shamli	132 KV Jasala	38	1		1	1
2			132 KV Kairana-I	13.5	1		1	1
3			132 KV Kairana-II	13.5	-		1	1
4			132 KV Lalukheri	47	-	1	1	1
5			132 KV Jinjhana	52	-	1	1	1
			Total Relief	164	51.5	99	164	164

Alternatively HVDC Mundra-Mahendargarh SPS may be shifted to 400 KV Sub-Station Shamli, details of 132 KV feeders from 400 KV Sub-Station Shamli with its Maximum and Average load is as follows :

S.No.	Name of feeder	Connected Load (MVA)	Maximum Load (MW)	Average Load (MW)
1	132 KV Budhana	63+40	82	53
2	132 KV Kharad	63+40	78	51
3	132 KV Jalalpur	40+40	41	27
4	132 KV Thanabhawan	63+63+40	74	48
5	132 KV Kaniyan	40+40	35	23
	Total		310	202

2. Following Case wise Trippings of 132 KV Feeders at 400 KV Sub-Station, Shamli for tripping of HVDC Mundra-Mahendergarh Line is hereby recommended

(A). In Maximum Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	400 KV Subsatatio n, Shamli	132 KV Budhana	82	-	-	1	1
2			132 KV Kharad	78	-	-	1	1
3			132 KV Jalalpur	41	1	-	1	1
4			132 KV Thanabhawan	74	-	1	-	1
5			132 KV Kaniyan	35	1	1	-	1
			Total Relief	310	76	109	201	310

(B). In Average Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	400 KV Subsatatio n, Shamli	132 KV Budhana	53	-	1	1	1
2			132 KV Kharad	51	1	1	1	1
3			132 KV Jalalpur	27	-	-	1	1
4			132 KV Thanabhawan	48	-	-	1	1
5			132 KV Kaniyan	23	-		1	1
			Total Relief	202	51	104	202	202

Submitted for information and necessary action

(Nikhil Kumar)
Superintending Engineer

संख्या / No. /E.T.C./MZN/ दिनांक / DATED

Copy forwarded to the following for information and necessary action :

1. Chief Engineer (TW) UPPTCL Meerut.
2. Superintending Engineer, Electricity (T&C) Circle, UPPTCL Meerut.
3. Executive Engineer Electricity Transmission Division, Shamli

(Nikhil Kumar)
Superintending Engineer

कार्यालय
अधीक्षण अभियन्ता
विद्युत परीक्षण एवं परिचालन मण्डल
उ0प्र0 पावर ट्रांसमिशन कारपोरेशन लि0
प्रथम तल पारेषण भवन, 130–डी, विक्टोरिया पार्क
मेरठ– 250 003
मोबाइल: 9412749817

OFFICE OF THE
SUPERINTENDING ENGINEER
Electricity Test & Commissioning Circle
U.P. POWER TRANSMISSION CORPORATION LTD.
1st Floor Pareshan Bhawan, 130-D, Victoria Park,
Meerut 250 003
Mobile: 9412749817

No.82.. / ETCC-MT /

Dated- 30/05/24

Sub :- SPS related to HVDC Mundra-Mahendargarh.

(By e-mail)

Superintending Engineer (R&A)
UPSLDC Vibhuti Khand ,
Gomti Nagar,
Lucknow.

In reference to the above cited subject, UPSLDC via email on 22.05.2024 informed that on 17.05.2024 at 16:20 hrs, Case-3 of SPS related to HVDC Mundra - Mahendergarh operated. As per action in case-3 operation of this line SPS, 200MW load relief at 220kV Shamli (UP) is desired. However, no load relief at 220kV Shamli was observed at given date and time. It is to bring in your notice that due to commissioning of 400kV Shamli S/s entire power flow scenario has been changed. Current situation is summarized as below.

At 220kV Shamli S/s feeders shown in the list	Planned load relief (MW)	Current situation
Thana Bhawan -1	25	The only line cateting Thana Bhawan has been made LILO at 132kV Jalalpur. Now Jalalpur is fed from 220kV Shamli S/s while load of Thana Bhawan is fed from 400kV Shamli S/s.
Thana Bhawan -2	25	
Jasala-1	25	Only one line exists.
Jasala-2	25	
Kharad-1	50	Only one line exists which is normally kept open at Kharad and load of Kharad is normally fed from 400kV Shamli S/s.
Kharad-2	50	
Baraut-1	150 (case-4)	No such line exist at 220kV Shamli S/s.
Baraut-2	150 (case-4)	

In view of the above facts, entire load relief strategy needs to be reviewed and redesigned for SPS. On 17.05.2024 at 16:20 hrs, no tripping observed at 220kV S/S Shamli as SPS system is unhealthy, which is being maintained by M/s PGCIL.

Hence it is requested to you to kindly coordinate with M/s PGCIL for modification of the scheme and rectification of the fault in SPS.

(Pramod Kumar Mishra)
Superintending Engineer

No.82.. /ETCC-MT/ Dated/– 30/05/24

Copy forwarded to the following for information & necessary action:-

1. Chief Engineer (TW), UPPTCL Victoria Park, Meerut.
2. Executive Engineer, Electricity Test & Commissioning Div., Muzaffarnagar.

(Pramod Kumar Mishra)
Superintending Engineer

SK/SENew/NewEngLetter01

Revised updated feeder details (radial) along with expected average Load Relief

S.No.	Name of Sub- Station	Feeder name as per existing detail	Revised name of Existing Feeder /Line/Equipment	Average Load relief (MW)	Remark
1	220 kV GSS Alwar	132 kV GSS Mundawar	132 kV GSS Pinan	25	
		132 kv GSS Bansoor	132 kV GSS Telco	45	
		132 kV GSS Ramgarh	132 kV GSS Ramgarh	65	
		132 kV GSS Malakhera	132 kV GSS Malakhera	50	
		132 kV Alwar (LOCAL)	132 kV GSS Alwar (LOCAL)	120	
2	220 kV GSS Ratangarh	132 kV Sardar Sher			Generally Feed from 220 kV Halasar
3	220 kV GSSV Bhilwara	132 kV GSS Gangapur	132 kv GSS Karoi	15	
		132 kV GSS Danta	132 kV GSS Danta	30	
		132 kV GSS Devgarh	132 kV GSS Bankali	18	
		132 kV GSS Kareda			
4	400 kV GSS Merta	132 kV GSS Kuchera	132 kV GSS Dhawa	25	
		132 kV GSS Lamba	132 kV GSS Lamba jatan	55	
		132 kV GSS Gotan			

Email **Control Room CONTROL ROOM SLDC**

Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

From : Executive Engineer TS Rewari <xentsrwr@hvpn.org.in> Thu, Aug 29, 2024 01:20 PM

Subject : Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

To : Control Room CONTROL ROOM SLDC <controlroomsldc@hvpn.org.in>

Cc : SE TS GGN <setsggn@hvpn.org.in>, Executive Engineer Executive Engineer <xen400kvdhanoda@hvpn.org.in>, Substation Engineer <sse220kvlulaahir@hvpn.org.in>

In continuation of trailing email and discussion held today telephonically, it is gathered that desired load relief shall not get as load of 220 kV Lula Ahir shall be fed through 220 kV Dadri-Lula Ahir line being synchronized. Therefore, it is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added.

The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA

The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>
To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvnarnaul@hvpn.org.in>
Sent: Wednesday, August 28, 2024 12:46:13 PM
Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In reference of trailing email it is submitted that 220 kV Lula Ahir is connected with 400 kV Dhanonda through 220kV D/C line and with 220 kV Dadri through 220kV S/C line and with 220 kV Rewari with 220kV S/C line.
In general circuits of 400 kV Dhanonda and 220 kV Dadri runs in synchronization. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. It is further added that in general 220 kV Dadri takes load from 220 kV Lula Ahir substation and thus act as sink.

In case of operation of SPS at 400 kV Dhanonda, the desired load relief as mentioned in trailing email (90+95 MW) can be achieved through existing scheme (by outage of three no. 100 MVA TFs and 220 kV Dadri (acting as sink)).

Regards
XEN/TS Division
HVPNL Rewari.

From: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
To: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>, "Executive Engineer TS Rohtak" <xentsrtk@hvpn.org.in>, "Executive Engineer Ts Bhiwani" <xentsbhw@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, xendhanonda@gmail.com
Cc: "Chief Engineer SO Commercial" <cesocomml@hvpn.org.in>, "Chief Engineer TS Panchkula" <cetspkl@hvpn.org.in>, "Chief Engineer TS Hisar" <cetshsr@hvpn.org.in>, "Superintending Engineer SLDC OP" <sesldcop@hvpn.org.in>, "SE TS Rohtak" <setsrtk@hvpn.org.in>, "SE TS GGN" <setsggn@hvpn.org.in>, "Superintending Engineer TS Hisar" <setshsr@hvpn.org.in>, "Superintending Engineer MP CC Dhulkote" <sempccdkt@hvpn.org.in>, "Superintending Engineer MP CC Delhi" <sempccdelhi@hvpn.org.in>, "Executive Engineer MP Rohtak" <xenmpccrtk@hvpn.org.in>, "XEN MP Hisar" <xenmpcchsr@hvpn.org.in>, "XEN MP CC" <xenmpccggn@hvpn.org.in>
Sent: Wednesday, August 21, 2024 11:57:59 AM
Subject: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Sir,

Please see the attachments.

--
Regards,
SCE (पाली प्रभारी अभियंता)/SLDC Control room,
HVPNL Panipat
Contact No- 9053090722,9053090721,0180-2664095

Fwd: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Control Room CONTROL ROOM SLDC <controlroomsldc@hvpn.org.in>

Fri 8/30/2024 12:44 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>; NRLDC SO-II <nrldcso2@gmail.com>; Deepak Kumar <deepak.kr@grid-india.in>;

Cc:Superintending Engineer SLDC OP <sesldcop@hvpn.org.in>;

2 attachments (209 KB)

Email SPS Rewari.pdf; Regarding SPS Bhiwani.pdf;

Sir,

In reference to the SPS installed for 500kV HVDC Munda - Mahindergarh link the information received from TS wing (copy attached) is as under:

1. At 400kV Dhanonda through Lula Ahir substation:- It is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA.

2. At 400/220kV Bhiwani BBMB: It is proposed that in the existing scheme SPS, the tripping of 220 kV Bapora (Bhiwani HVPNL) D/C line at Bhiwani BBMB end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV T-1 & T-2 TFs) at 220 kV Bapora (Bhiwani HVPNL) substation may be added. The maximum load on two no. 100 MVA TFs installed at 220kV Bhiwani HVPNL is 80 MW and 85 MW respectively. The average load on two no. 100 MVA TFs installed at 220kV Bhiwani HVPNL is 70 MW and 70 MW respectively.

3. At 132kV Charkhi Dadri: It is proposed that in the existing scheme SPS, the tripping of 132kV Kalanaur line at Dadri BBMB end may be removed and tripping of 132kV Haluwas & 132kV Dadri old at Dadri BBMB may be added. The maximum load on 132kV Haluwas & 132kV Dadri old line is 45 MW and 50 MW respectively. The average load on 132kV Haluwas & 132kV Dadri old line is 40 MW and 40 MW respectively.

Rest information kept unchanged. It is also added here that the fiber connectivity is also available on all the above substations.
It is also pertinent to mention here that 700 MW load relief is expected from Haryana. Rest of the states have been allotted with a relative less amount of relief as compared to Haryana for 500kV HVDC Mundra - Mahendargarh link. The Haryana share from APL Mundra has also been reduced now. In view of the above, the expected load relief from the NR states is required to be reviewed accordingly. The same was also pointed out by this office during the online meeting held on dated 20.08.2024.

This is for information & further necessary action please.

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>
To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvlulaahir@hvpn.org.in>
Sent: Thursday, August 29, 2024 1:20:08 PM
Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In continuation of trailing email and discussion held today telephonically, it is gathered that desired load relief shall not get as load of 220 kV Lula Ahir shall be fed through 220 kV Dadri-Lula Ahir line being synchronized. Therefore, it is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added.

The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA
The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>
To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvnarnaul@hvpn.org.in>
Sent: Wednesday, August 28, 2024 12:46:13 PM
Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In reference of trailing email it is submitted that 220 kV Lula Ahir is connected with 400 kV Dhanonda through 220kV D/C line and with 220 kV Dadri through 220kV S/C line and with 220 kV Rewari with 220kV S/C line.
In general circuits of 400 kV Dhanonda and 220 kV Dadri runs in synchronization. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. It is further added that in general 220 kV Dadri takes load from 220 kV Lula Ahir substation and thus act as sink.

In case of operation of SPS at 400 kV Dhanonda, the desired load relief as mentioned in trailing email (90+95 MW) can be achieved through existing scheme (by outage of three no. 100 MVA TFs and 220 kV Dadri (acting as sink)).

Regards
XEN/TS Division
HVPNL Rewari.

From: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
To: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>, "Executive Engineer TS Rohtak" <xentsrtk@hvpn.org.in>, "Executive Engineer Ts Bhiwani" <xentsbhw@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, xendhanonda@gmail.com
Cc: "Chief Engineer SO Commercial" <cesocomml@hvpn.org.in>, "Chief Engineer TS Panchkula" <cetspkl@hvpn.org.in>, "Chief Engineer TS Hisar" <cetshsr@hvpn.org.in>, "Superintending Engineer SLDC OP" <sesldcop@hvpn.org.in>, "SE TS Rohtak" <setsrtk@hvpn.org.in>, "SE TS GGN" <setsggn@hvpn.org.in>, "Superintending Engineer TS Hisar" <setshsr@hvpn.org.in>, "Superintending Engineer MP CC Dhulkote" <sempccdkt@hvpn.org.in>, "Superintending Engineer MP CC Delhi" <sempccdelhi@hvpn.org.in>, "Executive Engineer MP Rohtak" <xenmpccrtk@hvpn.org.in>, "XEN MP Hisar" <xenmpcchsr@hvpn.org.in>, "XEN MP CC" <xenmpccggn@hvpn.org.in>
Sent: Wednesday, August 21, 2024 11:57:59 AM
Subject: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Sir,

Please see the attachments.

--
Regards,
SCE (पाली प्रभारी अभियंता)/SLDC Control room,
HVPNL Panipat
Contact No- 9053090722,9053090721,0180-2664095

--
Regards,
SCE (पाली प्रभारी अभियंता)/SLDC Control room,
HVPNL Panipat
Contact No- 9053090722,9053090721,0180-2664095

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HARYANA VIDYUT PRASARAN NIGAM LIMITED

Regd. Office: Shakti Bhawan, Plot No. C-4, Sector-6, Panchkula, 134109.
Corporate Identity Number: U40101HR1997SGC033683
Website: www.hvpn.org.in, E-mail - xentsbhw@hvpn.org.in
Phone No: 01664-242797(O)

To

The Executive Engineer,
LDPC, HVPNL,
Panipat.

Memo No.Ch-116/OMBE-7 Dated: 29.08.2024

Subject: SPS scheme at HVPNL substations for getting load relief due to tripping of 500Kv HVDC Mundra – Mahendargarh

Please refer to this O/Memo No. 108/OMBE-7 dated 27.08.2024 and O/Email dated 09.08.2024 on the subject cited matter.

In this continuation to above, the details of SPS under TS division, HVPNL, Bhiwani is as under:

S No.	Name of feeding S/Stn	Feeder/Line/Equipment	SPS Installed	Max. Load	Load Relief (Avg Load)	Remarks
1	220KV S/Stn Bhiwani	132KV IA Bhiwani Line	UFR	50MW	40 MW	SPS (UFR)Installed and healthy
2	220KV S/Stn Bhiwani	132KV Bhiwani Ckt 2	UFR	50MW	40 MW	SPS (UFR)Installed and healthy
3	220KV S/Stn Bhiwani	132KV Tosham	UFR	-	-	SPS (UFR) Installed and healthy but line is running on No load as 2nd source to 132KV Tosham
4	220KV S/Stn Bhiwani	132KV Incomer of Transformer 100MVA Transformer T2	-	85MW	70 MW	SPS may be provided for load relief as mentioned on subject above.
5	220KV S/Stn Bhiwani	132KV Incomer of 100MVA Transformer T1	-	80MW	70 MW	SPS may be provided for load relief as mentioned on subject above.
6	132kV substation Dadri-2	132kV Dadri-kalanaur ckt	Yes		Nil	SPS Installed and healthy but line is running on No load as 2nd source to 132KV Kalanaur
7	132kV substation Dadri-2	132kV Dadri-Makrani ckt	Yes		Nil	SPS Installed and healthy but line is running on No load as 2nd source to 132KV Makrani
8	132kV substation Dadri-2	132kV Dadri-Haluwas ckt	-	45MW	40MW	SPS may be provided for load relief as mentioned on subject above.
9	132kV substation Dadri-2	132kV Dadri-Dadri old	-	50MW	40MW	SPS may be provided for load relief as mentioned on subject above.

This is for kind information and necessary action please.

Executive Engineer,
Transmission System Division,
HVPNL, Bhiwani

CC to:

1. SE/TS Circle, HVPNL, Hisar for kind information, please.

Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

SLDC, DELHI <sldcmintoroad@gmail.com>

Wed 8/28/2024 3:48 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>;

Cc:sinha.surendra <sinha.surendra@yahoo.com>; dgmsodelhisldc@gmail.com <dgmsodelhisldc@gmail.com>; Manager (T) SO <managersogd@gmail.com>;

In reference to trailing mail, the maximum load on 220kV feeders covered under SPS of 500kV HVDC Mundra-Mahindergarh link are as under:

S. No.	Name of the Element	MW
1	220 KV BAMNAULI-PAPANKALAN-I CKT.-I	120
2	220 KV BAMNAULI-PAPANKALAN-I CKT.-II	120
3	220 KV MANDAULA- GOPALPUR CKT.-I	212
4	220 KV MANDAULA- GOPALPUR CKT.-II	214

Regards,
SLDC Delhi

On Tue, Aug 27, 2024 at 10:07 AM NRLDC SO 2 <nrldcso2@grid-india.in> wrote:

> Sir,
>
> In reference of the trailing mail, it is to be mentioned that inputs have received from Rajasthan only. Members agreed to shared the details by 22nd August 2024, however no further details received from Haryana, Punjab, Delhi, UP & ADANI.
>
> Kindly share the details as discussed during the meeting held on 20th August 2024, so that further remedial actions can be initiated on the basis of those details.
>
> सादर धन्यवाद/ Thanks & Regards
> प्रणाली संचालन-II/ System Operation-II
> उ॰क्षे॰भा॰प्रे॰के॰/ NRLDC
> ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
> Formerly known as
> पोसोको / POSOCO

Date	Time	Load throw-off quantum (State-wise)						Total Load throw-off quantum	Remarks
		Delhi	Punjab	Haryana	Rajasthan	UP	Uttarakhand		
5/25/2024	12:46	82	1375	0	140	172	0	1769	as reported by SLDCs
5/27/2024	14:36	280	0	540	0	140	100	1060	as per SCADA data at NRLDC, SLDCs have not confirmed yet
6/1/2024	13:26	0	440	0	0	100	0	540	as per SCADA data at NRLDC, SLDC-Punjab have confirmed
6/1/2024	13:44	270	580	120	0	220	0	1190	SLDC-Punjab & UP have confirmed
6/3/2024	5:28	0	300	0	0	0	0	300	as reported by SLDC-Punjab
6/4/2024	12:35	0	400	0	0	0	0	400	as per SCADA data at NRLDC, SLDC-Punjab have confirmed
6/9/2024	11:21	0	435	0	0	0	0	435	as per SCADA data at NRLDC, SLDC-Punjab have not confirmed yet
6/19/2024	12:42	0	723	0	107	220	0	1050	as reported by SLDCs
6/23/2024	9:11	0	880	0	0	0	0	0	as reported by SLDC-Punjab

Bays Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Owner	Voltage Level (in kV)	Bay No	Bay Type	Substation	State	Approved in SCM/Staturo Body	Remark	Intimation request for charging of new element (FormatA1)	Acknowledgement sent by NRLDC (Format I1)	Request for test charging and trial run (FormatB)	Provisional Approval for Test Charging/Trial operation(Format IV)	Actual date & time of charging		Request for Trial Operation Certificate(Format C)	Trial Run Operation Certificate Details	
												Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
7	1119112	May - 2024	400kV Main Bay 401 of 400 KV ALIGARH- SHAMLI CKT-I at Shamli(UP)	UPPTCL	400kV	401	Main Bay	Shamli(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE C)(7), 55		11 May 2024 19:38	15 May 2024 17:18	29 Jun 2024 15:51, 24 Jun 2024 16:13	02 Jul 2024 15:02, 28 Jun 2024 09:38	03-Jul-2024	17:51			
8	1119115	May - 2024	400kV Main Bay 402 of 400 KV ALIGARH- SHAMLI CKT-II at Shamli(UP)	UPPTCL	400kV	402	Main Bay	Shamli(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE C)(7), 55		11 May 2024 19:41	15 May 2024 15:39	29 Jun 2024 15:51, 24 Jun 2024 16:14	02 Jul 2024 15:03, 28 Jun 2024 09:39	03-Jul-2024	18:36			
11	1119122	May - 2024	765kV Main Bay 710 of GT-II at Jawaharpur TPS(UP)	UPRVUNL	765kV	710	Main Bay	Jawaharpur TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7&8		14 May 2024 16:37	20 May 2024 12:13	02 Jul 2024 16:27	05 Jul 2024 16:57	12-Jul-2024	20:06			
12	1119139	Jun - 2024	400kV Main Bay 401 of 400 KV Main Line Ludhiana 1 Bay (Bay No. 401) at Ropar(PSTCL)	PSTCL	400kV	401	Main Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:23, 04 Jul 2024 16:36, 30 Jun 2024 14:24, 27 Jun 2024 12:31	06 Jul 2024 10:37, 05 Jul 2024 11:50, 03 Jul 2024 10:22, 27 Jun 2024 14:38	19 Jul 2024 19:22, 16 Jul 2024 23:52	20 Jul 2024 10:11, 19 Jul 2024 10:48	20-Jul-2024	15:35			
13	1119139	Jun - 2024	400kV Main Bay 404 of 400 KV Main Line Koldam 1 Bay (Bay No. 404) and NA at Ropar(PSTCL)	PSTCL	400kV	404	Main Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:23, 04 Jul 2024 16:36, 30 Jun 2024 14:24, 27 Jun 2024 12:31	06 Jul 2024 10:37, 05 Jul 2024 11:50, 03 Jul 2024 10:22, 27 Jun 2024 14:38	19 Jul 2024 19:22, 16 Jul 2024 23:52	20 Jul 2024 10:11, 19 Jul 2024 10:48	20-Jul-2024	16:31			
14	1119177	Jul - 2024	400kV Main Bay 431 A of 400 kV S/c line from 400 kV GSS Jaisalmer-2 to Renew Hans Urja Pvt. Ltd. at Jaisalmer(RS)	RRVPNL,Renew Hans urja pvt Ltd	400kV	431 A	Main Bay	Jaisalmer(RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		23 Jul 2024 21:36, 23 Jul 2024 17:43	23 Jul 2024 21:48, 23 Jul 2024 20:51	25 Jul 2024 17:41, 24 Jul 2024 15:07, 23 Jul 2024 22:30	26 Jul 2024 12:38, 25 Jul 2024 12:52, 24 Jul 2024 09:39	24-Jul-2024	12:34			
15	1119177	Jul - 2024	400kV Tie Bay 432 T of 400 kV S/c line from 400 kV GSS Jaisalmer-2 to Renew Hans Urja Pvt. Ltd. and Future Bay at Jaisalmer(RS)	RRVPNL,Renew Hans urja pvt Ltd	400kV	432 T	Tie Bay	Jaisalmer(RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		23 Jul 2024 21:36, 23 Jul 2024 17:43	23 Jul 2024 21:48, 23 Jul 2024 20:51	25 Jul 2024 17:41, 24 Jul 2024 15:07, 23 Jul 2024 22:30	26 Jul 2024 12:38, 25 Jul 2024 12:52, 24 Jul 2024 09:39	24-Jul-2024	12:36			
16	1119177	Jul - 2024	400kV Main Bay 401 of 400 kV S/c line from 400 kV GSS Jaisalmer-2 to Renew Hans Urja Pvt. Ltd. at M/s Renew Hans urja pvt Ltd (RS)	RRVPNL,Renew Hans urja pvt Ltd	400kV	401	Main Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		23 Jul 2024 21:36, 23 Jul 2024 17:43	23 Jul 2024 21:48, 23 Jul 2024 20:51	25 Jul 2024 17:41, 24 Jul 2024 15:07, 23 Jul 2024 22:30	26 Jul 2024 12:38, 25 Jul 2024 12:52, 24 Jul 2024 09:39	24-Jul-2024	15:33			
17	1119177	Jul - 2024	400kV Tie Bay 402 of 400 kV S/c line from 400 kV GSS Jaisalmer-2 to Renew Hans Urja Pvt. Ltd. and 400/33 kV, 200 MVA, T/F NO. 1 at M/s Renew Hans urja pvt Ltd (RS)	RRVPNL,Renew Hans urja pvt Ltd	400kV	402	Tie Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		23 Jul 2024 21:36, 23 Jul 2024 17:43	23 Jul 2024 21:48, 23 Jul 2024 20:51	25 Jul 2024 17:41, 24 Jul 2024 15:07, 23 Jul 2024 22:30	26 Jul 2024 12:38, 25 Jul 2024 12:52, 24 Jul 2024 09:39	24-Jul-2024	15:33			
18	1119181	Jul - 2024	400kV Tie Bay 408 of 400/33 kV, 200 MVA, ICT No. 3 and Future Bay at M/s Renew Hans urja pvt Ltd (RS)	Renew Hans urja pvt Ltd	400kV	408	Tie Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45	26-Jul-2024	16:48			
19	1119181	Jul - 2024	400kV Main Bay 409 of 400/33 kV, 200 MVA, ICT No. 3 at M/s Renew Hans urja pvt Ltd (RS)	Renew Hans urja pvt Ltd	400kV	409	Main Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45	26-Jul-2024	16:48			
20	1119181	Jul - 2024	400kV Main Bay 406 of 400/33 kV, 200 MVA, ICT No. 2 at M/s Renew Hans urja pvt Ltd (RS)	Renew Hans urja pvt Ltd	400kV	406	Main Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45	26-Jul-2024	17:12			
21	1119181	Jul - 2024	400kV Tie Bay 405 of 400/33 kV, 200 MVA, ICT No. 2 and Future bay at M/s Renew Hans urja pvt Ltd (RS)	Renew Hans urja pvt Ltd	400kV	405	Tie Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45	26-Jul-2024	17:16			
22	1119181	Jul - 2024	400kV Main Bay 403 of 400/33 kV, 200 MVA, ICT No. 1 at M/s Renew Hans urja pvt Ltd (RS)	Renew Hans urja pvt Ltd	400kV	403	Main Bay	M/s Renew Hans urja pvt Ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1, 1		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45	26-Jul-2024	17:33			
23	1119182	Jul - 2024	765kV Main Bay 722 of 765/400 kV 1500 MVA ICT-5 at Fatehgarh_II(PG)	POWERGRID	765kV	722	Main Bay	Fatehgarh_II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2(iv), 4		26 Jul 2024 14:21	27 Jul 2024 12:14	27 Jul 2024 15:01	28 Jul 2024 14:33	29-Jul-2024	23:39	16 Aug 2024 11:03, 03 Aug 2024 12:02	29-07-2024 - 23:40 to 30-07-2024 - 23:40	GRID-INDIA/NRLDC/SO/530
24	1119182	Jul - 2024	765kV Tie Bay 723 of 765/400 kV 1500 MVA ICT-5 and 765KV Fatehgarh-2 to Bhadla-2 circuit 4 at Fatehgarh_II(PG)	POWERGRID	765kV	723	Tie Bay	Fatehaarh II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2(iv). 4		26 Jul 2024 14:21	27 Jul 2024 12:14	27 Jul 2024 15:01	28 Jul 2024 14:33	30-Jul-2024	00:18	16 Aug 2024 11:03, 03 Aug 2024 12:02	30-07-2024 - 00:20 to 31-07-2024 - 00:20	GRID-INDIA/NRLDC/SO/530
25	1119166	Jul - 2024	400kV Main Bay 412 of 400 KV Bhadla_2- Azure Line at Bhadla _2 (PG)	POWERGRID	400kV	412	Main Bay	Bhadla_2 (PG)	RAJASTHAN	20-01-2020 - 10:30, 4, 7.2, SI.2, 41		16 Jul 2024 18:49	19 Jul 2024 15:19	31 Jul 2024 16:24, 24 Jul 2024 22:55	01 Aug 2024 13:25, 31 Jul 2024 09:03	01-Aug-2024	18:01			
26	1119167	Jul - 2024	400kV Main Bay 415 of 400 KV Bhadla_2-Adani Green Energy Four Ltd. Line at Bhadla _2 (PG)	POWERGRID	400kV	415	Main Bay	Bhadla_2 (PG)	RAJASTHAN	20-01-2020 - 10:30, 4, 7.2, SI.3, 41		16 Jul 2024 18:49	19 Jul 2024 15:18	31 Jul 2024 16:19, 24 Jul 2024 22:55	01 Aug 2024 13:25, 31 Jul 2024 09:02	01-Aug-2024	18:20			
27	1119167	Jul - 2024	400kV Tie Bay 414 of 400 KV Bhadla_2-Adani Green Energy Four Ltd. Line and Future at Bhadla _2 (PG)	POWERGRID	400kV	414	Tie Bay	Bhadla_2 (PG)	RAJASTHAN	20-01-2020 - 10:30, 4, 7.2, SI.3, 41		16 Jul 2024 18:49	19 Jul 2024 15:18	31 Jul 2024 16:19, 24 Jul 2024 22:55	01 Aug 2024 13:25, 31 Jul 2024 09:02	01-Aug-2024	18:21			
28	1119166	Jul - 2024	400kV Tie Bay 411 of 400 KV Bhadla_2- Azure Line and Future at Bhadla _2 (PG)	POWERGRID	400kV	411	Tie Bay	Bhadla_2 (PG)	RAJASTHAN	20-01-2020 - 10:30, 4, 7.2, SI.2, 41		16 Jul 2024 18:49	19 Jul 2024 15:19	31 Jul 2024 16:24, 24 Jul 2024 22:55	01 Aug 2024 13:25, 31 Jul 2024 09:03	01-Aug-2024	18:22			
29	1119153	Jun - 2024	400kV Main Bay 403 of 400 KV, 500 MVA ICT-1 at Ropar(PSTCL)	PSTCL	400kV	403	Main Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56	10-Aug-2024	13:59			
30	1119139	Jun - 2024	400kV Tie Bay 402 of 400 KV Ropar Ludhiana Ckt 1 and 500 MVA ICT 1 at Ropar(PSTCL)	PSTCL	400kV	402	Tie Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:23, 04 Jul 2024 16:36, 30 Jun 2024 14:24, 27 Jun 2024 12:31	06 Jul 2024 10:37, 05 Jul 2024 11:50, 03 Jul 2024 10:22, 27 Jun 2024 14:38	19 Jul 2024 19:22, 16 Jul 2024 23:52	20 Jul 2024 10:11, 19 Jul 2024 10:48	10-Aug-2024	13:59			
31	1119153	Jun - 2024	220kV Main Bay 209 of LV side of 500 MVA ICT -1 at Ropar(PSTCL)	PSTCL	220kV	209	Main Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56	10-Aug-2024	14:23			
32	1119153	Jun - 2024	400kV Main Bay 406 of 400 KV, 500 MVA ICT -2 at Ropar(PSTCL)	PSTCL	400kV	406	Main Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56	10-Aug-2024	14:39			
33	1119139	Jun - 2024	400kV Tie Bay 405 of 400 KV Ropar-koldam Ckt 1 and 500 MVA ICT 2 at Ropar(PSTCL)	PSTCL	400kV	405	Tie Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:23, 04 Jul 2024 16:36, 30 Jun 2024 14:24, 27 Jun 2024 12:31	06 Jul 2024 10:37, 05 Jul 2024 11:50, 03 Jul 2024 10:22, 27 Jun 2024 14:38	19 Jul 2024 19:22, 16 Jul 2024 23:52	20 Jul 2024 10:11, 19 Jul 2024 10:48	10-Aug-2024	14:41			
34	1119153	Jun - 2024	220kV Main Bay 208 of LV side of 500 MVA ICT -2 at Ropar(PSTCL)	PSTCL	220kV	208	Main Bay	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56	10-Aug-2024	14:51			
35	1119187	Aug - 2024	220kV Main Bay 232(A202) of 220 kV EDEN Renewable Bercy Ltd at Fatehgarh_II(PG)	POWERGRID	220kV	232(A202)	Main Bay	Fatehaarh II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2, xix, 5		08 Aug 2024 14:31, 04 Aug 2024 23:03	09 Aug 2024 12:21, 07 Aug 2024 14:24	12 Aug 2024 13:11, 11 Aug 2024 13:20	12 Aug 2024 15:00, 12 Aug 2024 12:57	12-Aug-2024	19:17			
36	1119187	Aug - 2024	220kV Main Bay 233(A203) of 220 kV EDEN Renewable Passy Ltd at Fatehgarh_II(PG)	POWERGRID	220kV	233(A203)	Main Bay	Fatehgarh_II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2, xix, 5		08 Aug 2024 14:31, 04 Aug 2024 23:03	09 Aug 2024 12:21, 07 Aug 2024 14:24	12 Aug 2024 13:11, 11 Aug 2024 13:20	12 Aug 2024 15:00, 12 Aug 2024 12:57	12-Aug-2024	19:18			
37	1119187	Aug - 2024	220kV Main Bay 235(A205) of Bay Vacant and Yet to be allocated by CTU at Fatehaarh II(PG)	POWERGRID	220kV	235(A205)	Main Bay	Fatehaarh II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2, xix, 5		08 Aug 2024 14:31, 04 Aug 2024 23:03	09 Aug 2024 12:21, 07 Aug 2024 14:24	12 Aug 2024 13:11, 11 Aug 2024 13:20	12 Aug 2024 15:00, 12 Aug 2024 12:57	12-Aug-2024	19:21			
38	1119187	Aug - 2024	220kV Main Bay 236(A206) of Bay Vacant and Yet to be allocated by CTU at Fatehgarh_II(PG)	POWERGRID	220kV	236(A206)	Main Bay	Fatehgarh_II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2, xix, 5		08 Aug 2024 14:31, 04 Aug 2024 23:03	09 Aug 2024 12:21, 07 Aug 2024 14:24	12 Aug 2024 13:11, 11 Aug 2024 13:20	12 Aug 2024 15:00, 12 Aug 2024 12:57	12-Aug-2024	19:23			
39	1119187	Aug - 2024	220kV Main Bay 239(A209) of 220 kV Adani Renewable Energy Holding Four Ltd ckt-I at Fatehaarh II(PG)	POWERGRID	220kV	239(A209)	Main Bay	Fatehaarh II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2, xix, 5		08 Aug 2024 14:31, 04 Aug 2024 23:03	09 Aug 2024 12:21, 07 Aug 2024 14:24	12 Aug 2024 13:11, 11 Aug 2024 13:20	12 Aug 2024 15:00, 12 Aug 2024 12:57	12-Aug-2024	19:24			
40	1119187	Aug - 2024	220kV Main Bay 240(A210) of 220 kV Adani Renewable Energy Holding Four Ltd ckt-II at Fatehgarh_II(PG)	POWERGRID	220kV	240(A210)	Main Bay	Fatehgarh_II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2, xix, 5		08 Aug 2024 14:31, 04 Aug 2024 23:03	09 Aug 2024 12:21, 07 Aug 2024 14:24	12 Aug 2024 13:11, 11 Aug 2024 13:20	12 Aug 2024 15:00, 12 Aug 2024 12:57	12-Aug-2024	19:27			
41	1119133	Jun - 2024	400kV Main Bay 422 of 400kV Sikar-II (PSTL)-Neemrana (PG) Ckt-1 at Neemrana(PG)	POWERGRID D SIKAR TRANSMISSION LIMITED	400kV	422	Main Bay	Neemrana(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.27 Sl.11, 4		13 Jun 2024 17:54, 07 Jun 2024 20:32	14 Jun 2024 12:27, 12 Jun 2024 10:08	30 Jul 2024 12:56, 16 Jul 2024 14:02	02 Aug 2024 08:56, 19 Jul 2024 15:00, 19 Jul 2024 14:58	13-Aug-2024	18:35			
42	1119133	Jun - 2024	400kV Tie Bay 423 of 400kV Sikar-II (PSTL)-Neemrana (PG) Ckt-1 and Future at Neemrana(PG)	POWERGRID D SIKAR TRANSMISSION LIMITED	400kV	423	Tie Bay	Neemrana(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.27 Sl.11, 4		13 Jun 2024 17:54, 07 Jun 2024 20:32	14 Jun 2024 12:27, 12 Jun 2024 10:08	30 Jul 2024 12:56, 16 Jul 2024 14:02	02 Aug 2024 08:56, 19 Jul 2024 15:00, 19 Jul 2024 14:58	13-Aug-2024	18:36			
43	1119133	Jun - 2024	400kV Main Bay 425 of 400kV Sikar-II (PSTL)-Neemrana (PG) Ckt- 2 at Neemrana(PG)	POWERGRID D SIKAR TRANSMISSION LIMITED	400kV	425	Main Bay	Neemrana(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.27 Sl.11, 4		13 Jun 2024 17:54, 07 Jun 2024 20:32	14 Jun 2024 12:27, 12 Jun 2024 10:08	30 Jul 2024 12:56, 16 Jul 2024 14:02	02 Aug 2024 08:56, 19 Jul 2024 15:00, 19 Jul 2024 14:58	13-Aug-2024	18:37			
44	1119133	Jun - 2024	400kV Tie Bay 426 of 400kV Sikar-II (PSTL)-Neemrana (PG) Ckt-2 and Future at Neemrana(PG)	POWERGRID D SIKAR TRANSMISSION LIMITED	400kV	426	Tie Bay	Neemrana(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.27 Sl.11, 4		13 Jun 2024 17:54, 07 Jun 2024 20:32	14 Jun 2024 12:27, 12 Jun 2024 10:08	30 Jul 2024 12:56, 16 Jul 2024 14:02	02 Aug 2024 08:56, 19 Jul 2024 15:00, 19 Jul 2024 14:58	13-Aug-2024	18:38			
45	1119125	May - 2024	400kV Main Bay 403 of HV SIDE OF 500 MVA ICT-III at Jawaharpur TPS(UP)	UPRVUNL	400kV	403	Main Bay	Jawaharpur TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		22 May 2024 15:14	25 May 2024 12:23	18 Jul 2024 12:24, 08 Jul 2024 11:27	19 Jul 2024 16:53, 10 Jul 2024 09:16	14-Aug-2024	17:16			
46	1119178	Jul - 2024	220kV Main Bay 215 of 220KV Sonipat (PG)-IMT Kharkhoda CKT 1 at Sonipat(PG)	POWERGRID	220kV	215	Main Bay	Sonipat(PG)	HARYANA	28-09-2022 - 10:30, 9, 4.1.2(ii), 10		25 Jul 2024 10:49	26 Jul 2024 14:43	16 Aug 2024 21:10, 16 Aug 2024 14:12	17 Aug 2024 13:44, 16 Aug 2024 20:45	18-Aug-2024	15:29	23 Aug 2024 15:19	18-08-2024 - 15:30 to 19-08-2024 - 15:30	
47	1119178	Jul - 2024	220kV Main Bay 216 of 220KV Sonipat (PG)- IMT Kharkhoda CKT 2 at Sonipat(PG)	POWERGRID	220kV	216	Main Bay	Sonipat(PG)	HARYANA	28-09-2022 - 10:30, 9, 4.1.2(ii), 10		25 Jul 2024 10:49	26 Jul 2024 14:43	16 Aug 2024 21:10, 16 Aug 2024 14:12	17 Aug 2024 13:44, 16 Aug 2024 20:45	18-Aug-2024	15:33	23 Aug 2024 15:19	18-08-2024 - 15:35 to 19-08-2024 - 15:35	
48	1119123	May - 2024	220kV Main Bay 207 of LV SIDE OF 500 MVA ICT-III at Jawaharpur TPS(UP)	UPRVUNL	220kV	207	Main Bay	Jawaharpur TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		22 May 2024 15:14	25 May 2024 12:23	18 Jul 2024 12:24, 08 Jul 2024 11:27	19 Jul 2024 16:53, 10 Jul 2024 09:16	20-Aug-2024	17:04			
49	1119128	May - 2024	400kV Main Bay 401 of HV SIDE OF 500 MVA ICT-IV at Jawaharpur_TPS(UP)	UPRVUNL	400kV	401	Main Bay	Jawaharpur_TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		22 May 2024 15:17	25 May 2024 12:22	18 Jul 2024 12:25, 08 Jul 2024 11:27	19 Jul 2024 16:52, 10 Jul 2024 09:18	22-Aug-2024	18:09			
50	1119175	Jul - 2024	400kV Main Bay 404 of 400 KV MODIPURAM(MEERUT) LINE-I at Shamli(UP)	UPPTCL	400kV	404	Main Bay	Shamli(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXUREC)(7), 55		26 Jul 2024 11:19, 23 Jul 2024 11:14	30 Jul 2024 11:07, 24 Jul 2024 11:11	14 Aug 2024 16:13, 02 Aug 2024 11:42	20 Aug 2024 10:19, 06 Aug 2024 15:50	23-Aug-2024	16:50			

51	1119175	Jul - 2024	400kV Main Bay 408 of 400 KV MODIPURAM(MEERUT) LINE-II at Shamli(UP)	UPPTCL	400kV	408	Main Bay	Shamli(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE(7).55		26 Jul 2024 11:19, 23 Jul 2024 11:14	30 Jul 2024 11:07, 24 Jul 2024 11:11	14 Aug 2024 16:13, 02 Aug 2024 11:42	20 Aug 2024 10:19, 06 Aug 2024 15:50	23-Aug-2024	16:52				
52	1119175	Jul - 2024	400kV Main Bay 407 of HV SIDE OF 500 MVA ICT-II at Shamli(UP)	UPPTCL	400kV	407	Main Bay	Shamli(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE(7).55		26 Jul 2024 11:19, 23 Jul 2024 11:14	30 Jul 2024 11:07, 24 Jul 2024 11:11	14 Aug 2024 16:13, 02 Aug 2024 11:42	20 Aug 2024 10:19, 06 Aug 2024 15:50	23-Aug-2024	16:55				
53	1119175	Jul - 2024	220kV Main Bay 208 of LV SIDE OF 500 MVA ICT-II at Shamli(UP)	UPPTCL	220kV	208	Main Bay	Shamli(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE(7).55		26 Jul 2024 11:19, 23 Jul 2024 11:14	30 Jul 2024 11:07, 24 Jul 2024 11:11	14 Aug 2024 16:13, 02 Aug 2024 11:42	20 Aug 2024 10:19, 06 Aug 2024 15:50	23-Aug-2024	16:57				
54	1119128	May - 2024	220kV Main Bay 206 of LV SIDE OF 500 MVA ICT-IV at Jawaharpur_TPS(UP)	UPRVUNL	220kV	206	Main Bay	Jawaharpur_TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		22 May 2024 15:17	25 May 2024 12:22	18 Jul 2024 12:25, 08 Jul 2024 11:27	19 Jul 2024 16:52, 10 Jul 2024 09:18	24-Aug-2024	13:18				
55	1119123	May - 2024	400kV Tie Bay 402 of 500 MVA ICT-III and 500 MVA ICT-IV at Jawaharpur_TPS(UP)	UPRVUNL	400kV	402	Tie Bay	Jawaharpur_TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		22 May 2024 15:14	25 May 2024 12:23	18 Jul 2024 12:24, 08 Jul 2024 11:27	19 Jul 2024 16:53, 10 Jul 2024 09:16	24-Aug-2024	15:06				
56	1119206	Aug - 2024	400kV Main Bay 413 (C13) of 400KV TEHRI PSP-KOTESHWAR(PG) LINE#3 at Tehri(THDC)	Tehri PSP	400kV	413 (C13)	Main Bay	Tehri(THDC)	UTTARAKHAND	30-05-2009 - 10:00, 27th , 9.0, 10 of 41		20 Aug 2024 10:58, 17 Aug 2024 09:25	21 Aug 2024 09:30, 19 Aug 2024 14:39	22 Aug 2024 16:35, 21 Aug 2024 11:57	22 Aug 2024 17:13, 22 Aug 2024 14:34	29-Aug-2024	13:51				
57	1119141	Jun - 2024	400kV Main Bay 427 of 400/220 kV, 500 MVA ICT-3 at Bikaner(PG)	POWERGRID	400kV	427	Main Bay	Bikaner(PG)	RAJASTHAN	30-06-2022 - 10:30, 8, Sl. no.03, 22		15 Jun 2024 12:21	17 Jun 2024 15:51	29 Aug 2024 21:30, 28 Aug 2024 14:58, 28 Aug 2024 14:38	30 Aug 2024 10:03, 29 Aug 2024 21:00	30-Aug-2024	23:40			01-09-2024 - 03:10 to 02-09-2024 - 03:10	
58	1119141	Jun - 2024	400kV Tie Bay 426 of 400/220 kV, 500 MVA ICT-3 and Future at Bikaner(PG)	POWERGRID	400kV	426	Tie Bay	Bikaner(PG)	RAJASTHAN	30-06-2022 - 10:30, 8, Sl. no.03, 22		15 Jun 2024 12:21	17 Jun 2024 15:51	29 Aug 2024 21:30, 28 Aug 2024 14:58, 28 Aug 2024 14:38	30 Aug 2024 10:03, 29 Aug 2024 21:00	30-Aug-2024	23:54			01-09-2024 - 03:10 to 02-09-2024 - 03:10	
59	1119141	Jun - 2024	220kV Main Bay 211 of 400/220 kV, 500 MVA ICT-3 at Bikaner(PG)	POWERGRID	220kV	211	Main Bay	Bikaner(PG)	RAJASTHAN	30-06-2022 - 10:30, 8, Sl. no.03, 22		15 Jun 2024 12:21	17 Jun 2024 15:51	29 Aug 2024 21:30, 28 Aug 2024 14:58, 28 Aug 2024 14:38	30 Aug 2024 10:03, 29 Aug 2024 21:00	01-Sep-2024	03:06			01-09-2024 - 03:10 to 02-09-2024 - 03:10	
60	1119172	Jul - 2024	220kV Main Bay 202 of 220 kV Bikaner_2-Juna Line at Bikaner_2 (PBTSL)	PBTSL	220kV	202	Main Bay	Bikaner_2 (PBTSL)	RAJASTHAN	29-09-2021 - 10:30, 50, 4.B (Point No.)1, 12		29 Aug 2024 22:26, 23 Jul 2024 16:15, 20 Jul 2024 15:00	30 Aug 2024 17:33, 25 Jul 2024 10:39, 22 Jul 2024 17:00	31 Aug 2024 13:10	02 Seo 2024 15:03	02-Seo-2024	17:25				
61	1119183	Jul - 2024	400kV Main Bay 416 of 400 kV Bikaner_2-SIVN Line at Bikaner_2 (PBTSL)	PBTSL	400kV	416	Main Bay	Bikaner_2 (PBTSL)	RAJASTHAN	29-12-2021 - 10:30, 2, 4, 10		30 Aug 2024 15:25, 27 Jul 2024 14:59	02 Sep 2024 11:52, 29 Jul 2024 09:55	03 Sep 2024 12:20, 02 Sep 2024 15:15	03 Sep 2024 17:07, 02 Sep 2024 17:10	04-Sep-2024	18:29				
62	1119137	Jun - 2024	765kV Tie Bay 726 of 765KV Fatehgarh-2 to Bhadla-2 circuit 3 (Upcoming) and 765/400 kV ICT-6 at Fatehgarh_II(PG)	POWERGRID	765kV	726	Tie Bay	Fatehgarh_II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 15 & 16, 7		09 Jun 2024 09:02	13 Jun 2024 11:03	08 Jul 2024 18:03, 03 Jul 2024 23:18	10 Jul 2024 16:31, 08 Jul 2024 17:07	05-Sep-2024	19:15				
63	1119170	Jul - 2024	400kV Main Bay 409 of 125 MVAr BUS REACTOR at Jawaharpur_TPS(UP)	UPRVUNL	400kV	409	Main Bay	Jawaharpur_TPS(UP)	UTTAR PRADESH	27-10-2022 - 00:00, 24381/2022, 2.5(ii), 2		19 Jul 2024 17:03	23 Jul 2024 10:32	03 Sep 2024 15:29, 30 Aug 2024 16:21, 24 Aug 2024 15:43	04 Sep 2024 15:21, 02 Sep 2024 11:22, 28 Aug 2024 11:04	06-Sep-2024	18:30				
64	1119170	Jul - 2024	400kV Main Bay 407 of 400 KV SPARE BAY at Jawaharpur_TPS(UP)	UPRVUNL	400kV	407	Main Bay	Jawaharpur_TPS(UP)	UTTAR PRADESH	27-10-2022 - 00:00, 24381/2022, 2.5(ii), 2		19 Jul 2024 17:03	23 Jul 2024 10:32	03 Sep 2024 15:29, 30 Aug 2024 16:21, 24 Aug 2024 15:43	04 Sep 2024 15:21, 02 Sep 2024 11:22, 28 Aug 2024 11:04	06-Sep-2024	18:48				
65	1119170	Jul - 2024	400kV Tie Bay 408 of 125 MVAr BUS REACTOR and SPARE BAY at Jawaharpur_TPS(UP)	UPRVUNL	400kV	408	Tie Bay	Jawaharpur_TPS(UP)	UTTAR PRADESH	27-10-2022 - 00:00, 24381/2022, 2.5(ii), 2		19 Jul 2024 17:03	23 Jul 2024 10:32	03 Sep 2024 15:29, 30 Aug 2024 16:21, 24 Aug 2024 15:43	04 Sep 2024 15:21, 02 Sep 2024 11:22, 28 Aug 2024 11:04	06-Sep-2024	18:49				
66	1119127	May - 2024	765kV Main Bay 803R of 330 MVAr LINE REACTOR at Ghatampur_TPS(UP)	GTL_PQYTL	765kV	803R	Main Bay	Ghatampur_TPS(UP)	UTTAR PRADESH	13-11-2018 - 00:00, 2 & 37, 18 & 1.2.2.2(d), 42 &4		22 May 2024 15:18	28 May 2024 16:43	30 Aug 2024 15:54, 21 Aug 2024 12:21, 13 Aug 2024 14:06	02 Sep 2024 16:15, 23 Aug 2024 17:01, 16 Aug 2024 16:38	06-Sep-2024	21:13				
67	1119144	Jun - 2024	765kV Main Bay 724 of 765/400KV 1500 MVA ICT-4 at Bhadla_2 (PG)	POWERGRID	765kV	724	Main Bay	Bhadla_2 (PG)	RAJASTHAN	30-09-2019 - 10:30, 6, Point no. (xiv), 5		25 Jun 2024 09:02, 24 Jun 2024 12:15	26 Jun 2024 14:26, 25 Jun 2024 08:53	31 Aug 2024 13:16	03 Seo 2024 10:23	07-Seo-2024	01:04				
68	1119203	Aug - 2024	400kV Main Bay 403 of 400 kV AGE2SL SL_BHD2_PG-Bhadla_2(PG)-1 at AGE2SL SL_BHD2_PG	AGE2SL	400kV	403	Main Bay	AGE2SL SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meeting , Anne.V/Table 2/7 , 56		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:27	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37	07-Sep-2024	22:36			07-09-2024 - 22:20 to 07-09-2024 - 23:40	
69	1119203	Aug - 2024	400kV Tie Bay 402 of 400 kV AGE2SL SL_BHD2_PG-Bhadla_2 (PG)-1 and ICT -1 at AGE2SL SL_BHD2_PG	AGE2SL	400kV	402	Tie Bay	AGE2SL SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meetine . Anne.V/Table 2/7 . 56		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:27	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37	07-Seo-2024	23:24				
70	1119203	Aug - 2024	400kV Main Bay 401 of ICT -1 at AGE2SL SL_BHD2_PG	AGE2SL	400kV	401	Main Bay	AGE2SL SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meeting , Anne.V/Table 2/7 , 56		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:27	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37	07-Sep-2024	23:47				
71	1119203	Aug - 2024	400kV Main Bay 404 of ICT 2 at AGE2SL SL_BHD2_PG	AGE2SL	400kV	404	Main Bay	AGE2SL SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meeting , Anne.V/Table 2/7 , 56		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:27	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37	08-Sep-2024	00:16				
72	1119203	Aug - 2024	400kV Tie Bay 405 of Bus no. 01 and ICT 2 at AGE2SL SL_BHD2_PG	AGE2SL	400kV	405	Tie Bay	AGE2SL SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meetine . Anne.V/Table 2/7 . 56		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:27	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37	08-Sep-2024	00:34				

BUS Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Applicable Month	Name of element	Owner	Voltage Level (in kV)	Bus No	Bus Type	Bus Scheme	Fault Level	Normal Current Capacity	Substation	State	Approved in SCM/Status Bodi	Remark	Intimation request for charging of new element (Format.6	Acknowledgment sent by NRLDC (Format 6)	Request for test charging and trial run (Format.8	Provisional Approval for Test Charging/Trial operation(Format.9)	Actual date & time of charging		Request for Trial Operation Certificate(Format.C)	Trial Run Operation Certificate Details	
															Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
1	111613	Jun - 2024	400kV Main Bus 2 at Roper(PSTCL)	PSTCL	400kV	2	Main Bus	One & Half Breaker	NA	2456 A	Roper(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0 .BS		05 Jul 2024 15:23, 04 Jul 2024 16:36, 30 Jun 2024 14:24, 27 Jun 2024 12:31	06 Jul 2024 10:37, 05 Jul 2024 11:50, 03 Jul 2024 10:22, 27 Jun 2024 14:38	19 Jul 2024 19:22, 16 Jul 2024 23:52	20 Jul 2024 10:11, 19 Jul 2024 10:48	10-Aug-2024	13:59			
2	111615	Jun - 2024	220kV Main Bus 1 at Roper(PSTCL)	PSTCL	220kV	1	Main Bus	Double Main & Transfer	40 KA	2500 A	Roper(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0 .BS		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56	10-Aug-2024	14:23			
3	111615	Jun - 2024	220kV Main Bus 2 at Roper(PSTCL)	PSTCL	220kV	2	Main Bus	Double Main & Transfer	40 KA	2500 A	Roper(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0 .BS		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56	10-Aug-2024	14:51			

Bus Coupler Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Owner	Voltage Level (in kV)	Associated Transmission Element1	Associated Transmission Element2	Substation	State	Approved in SCM/Statuty Body	Remark	Intimation request for charging of new element (FormatA)	Acknowledment sent by NRLDC (Format II)	Request for test charging and trial run (FormatB)	Provisional Approval for Test Charging/Trial operation(Format IV)	Actual date & time of charging		Request for Trial Operation Certificate(Format C)	Trial Run Operation Certificate Details	
												Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
1	1119209	Aug - 2024	400kV Bus Coupler Bay 405 of 400 KV BUS-I and 400 KV BUS -II at Sham(UP)	UPPTCL	400kV	400 KV BUS -II	400 KV BUS-I	Sham(UP)	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE)(7), 55		24 Aug 2024 15:41	28 Aug 2024 12:39	04 Sep 2024 15:09, 31 Aug 2024 11:47	05 Sep 2024 10:01, 02 Sep 2024 12:11	06-Sep-2024	17:22			

BUS REACTOR Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Applicatio n Month	Name of element	Owner	Voltage Level	MVAR Capacity	Substation	Make	Configuration	Serial No	State	Approved in SCM/Statury Body	Remark	Bus Reactor Details	OLD MVAR Capacity	Intimation request for charging of new element (Format-I)	Acknowledment sent by NRLDC (Format-II)	Request for test charging and trial run (Format-III)	Provisional Approval for Test Charging/Trial operation(Format-IV)	Actual date & time of charging		Request for Trial Operation Certificate(Format-C)	Trial Run Operation Certificate Details	
																Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
1	1119171	Jul - 2024	400kV, 125 MVAr Bus Reactor at Shamli(UP)	UPPTCL	400kV	125 MVAr	Shamli(UP)	BHEL	3-Phase	6007896	UTTAR PRADESH	19-02-2021 - 00-00, 326 (UNKNOUNREC)(TLSS		New		23 Jul 2024 11:15	24 Jul 2024 16:36	13 Aug 2024 16:30, 12 Aug 2024 17:00, 01 Aug 2024 15:48	14 Aug 2024 12:13, 13 Aug 2024 16:14, 06 Aug 2024 09:45	14-Aug-2024	21:19			
2	1119170	Jul - 2024	400kV, 125 MVAr Bus Reactor at Jawaharpur_TPS(UP)	UPRVUNL	400kV	125 MVAr	Jawaharpur_TPS (UP)	GE	3-Phase	T-7154/01.B-31246	UTTAR PRADESH	27-10-2022 - 00-00, 243BU-0222- 2.501- 2		New		19 Jul 2024 17:03	23 Jul 2024 10:32	03 Sep 2024 15:29, 30 Aug 2024 16:21, 24 Aug 2024 15:43	04 Sep 2024 15:21, 02 Sep 2024 11:22, 28 Aug 2024 11:06	06-Sep-2024	18:30			

LILO Line Charging Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Voltage Level (in kV)	Name of Line to be LILOed	Line length of Line to be LILOed	Line Length of New Line after LILO (in Km)	LILO Portion Line Length (in Km)	Conductor Type	Circuit Type	Tower Configuration	Agency/Owner	Location	SCM/CEA/CTU/NRPC Meeting minutes	Remark	Intimation request for charging of new element (Format-I)	Acknowledgment sent by NR2DC (Format-II)	Request for test charging and trial run (Format-III)	Provisional Approval for Test Charging/Trial operation(Format-IV)	Actual date & time of charging		Request for Trial Operation Certificate(Format-C)	Trial Run Operation Certificate Details	
																Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
1	1119151	Jun - 2024	400kV Roper(PG)-Ludhiana(PG) 1)After LILO of 400 KV KOLDAM - 400 KV LUDHIANA(PG) at 400 KV ROPAR)	400kV	400 KV KOLDAM - 400 KV LUDHIANA(PG)		101.088 KMS	6.747 kms	Triople Snowbird		Double	PKTCL:PSTCL	PUNJAB to PUNJAB	24-05-2019 - 10:30, 3rd, 25.0. 85		05 Jul 2024 15:49, 04 Jul 2024 15:48, 01 Jul 2024 14:38, 29 Jun 2024 14:05, 28 Jun 2024 13:27	06 Jul 2024 10:32, 05 Jul 2024 11:51, 03 Jul 2024 10:19, 01 Jul 2024 09:28, 28 Jun 2024 16:01	19 Jul 2024 19:26, 16 Jul 2024 23:51	20 Jul 2024 10:08, 19 Jul 2024 10:56	20-Jul-2024	15:35			
2	1119151	Jun - 2024	400kV Koldam(NT)-Roper(PSTCL)-1)After LILO of 400 KV KOLDAM - 400 KV LUDHIANA(PG) at 400 KV ROPAR)	400kV	400 KV KOLDAM - 400 KV LUDHIANA(PG)		63.068 kms	6.747 kms	Triople Snowbird		Double	PKTCL:PSTCL	HIMACHAL PRADESH to PUNJAB	24-05-2019 - 10:30, 3rd, 25.0. 85		05 Jul 2024 15:49, 04 Jul 2024 15:48, 01 Jul 2024 14:37, 29 Jun 2024 14:02, 28 Jun 2024 13:26	06 Jul 2024 10:34, 05 Jul 2024 10:55, 03 Jul 2024 10:21, 01 Jul 2024 09:28, 28 Jun 2024 16:02	19 Jul 2024 19:25, 16 Jul 2024 23:51	20 Jul 2024 10:10, 19 Jul 2024 10:54	20-Jul-2024	16:31			

LINE REACTOR Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Owner	Voltage Level (in kV)	MVAR Capacity	Line Name	Substation	Make	Configuration	Serial No	State	Approved in SCM/Statuty Body	Remark	Line Reactor Details	OLD MVAR Capacity	Intimation request for charging of new element (Format-iv)	Acknowledment sent by NRLDC (Format iii)	Request for test charging and trial run (Format-ii)	Provisional Approval for Test Charging/Trial operation(Format iv)	Actual date & time of charging		Request for Trial Operation Certificate(Format-C)	Trial Run Operation Certificate Details	
																	Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
3	1119312	May - 2024	50 Non-Switchable Non-Convertable LINE_REACTOR of 400 KV ALIGARH- SHAMLI CKT-I at Shamli(UP)	UPPTCL	400kV	50	400 KV ALIGARH-SHAMLI CKT-I	Shamli(UP)	BHEL	3-Phase	6307898	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE C)(7), 55		New		11 May 2024 19:38	15 May 2024 17:18	29 Jun 2024 15:51, 24 Jun 2024 16:13	02 Jul 2024 15:02, 28 Jun 2024 09:38	03-Jul-2024	17:04			
4	1119315	May - 2024	50 MVAr Non-Switchable Non-Convertable LINE_REACTOR of 400 KV ALIGARH- SHAMLI CKT-II at Shamli(UP)	UPPTCL	400kV	50 MVAr	400 KV ALIGARH-SHAMLI CKT-II	Shamli(UP)	BHEL	3-Phase	6307897	UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE C)(7), 55		New		11 May 2024 19:41	15 May 2024 15:39	29 Jun 2024 15:51, 24 Jun 2024 16:14	02 Jul 2024 15:03, 28 Jun 2024 09:39	03-Jul-2024	18:15			
6	1119327	May - 2024	330 MVAr Switchable Non-Convertable LINE_REACTOR of 765 KV GHATAMPUR TPS - RAMPUR LINE at Ghatampur_TPS(UP)	GTL-PVTL	765kV	330 MVAr	765 KV GHATAMPUR TPS - RAMPUR LINE	Ghatampur_TPS(UP)	ABB	3x1-Phase	1SDA3-01,1SDA3-02,1SDA3-03	UTTAR PRADESH	13-11-2018 - 00:00, 2 & 37, 18 & 1.2.2.2(d), 42 &4		New		22 May 2024 15:18	28 May 2024 16:43	30 Aug 2024 15:56, 21 Aug 2024 12:21, 13 Aug 2024 14:06	02 Sep 2024 16:15, 23 Aug 2024 17:01, 16 Aug 2024 16:38	06-Sep-2024	21:13			

New AC Lines Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Owner	Voltage Level (in kV)	Circuit No	Line Length	Conductor Type	Tower Configuration	State	Approved in SCM/Staturo Body	Remark	Intimation request for charging of new element (FormatA)	Acknowledment sent by NRLDC (Format II)	Request for test charging and trial run (FormatIII	Provisional Approval for Test Charging/Trial operation(Format IV)	Actual date & time of charaine		Request for Trial Operation Certificate(Format C)	Trial Run Operation Certificate Details	
													Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
1	1119112	May - 2024	400kV Aliasrh(UP)-Shamli(UP)-1	UPPTCL	400kV		1 240 KM	Twin Moose	Double	UTTAR PRADESH to UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE C)(7), 55		11 May 2024 19:38	15 May 2024 17:18	29 Jun 2024 15:51, 24 Jun 2024 16:13	02 Jul 2024 15:02, 28 Jun 2024 09:38	03-Jul-2024	17:51			
2	1119115	May - 2024	400kV Aliasrh(UP)-Shamli(UP)-2	UPPTCL	400kV		2 240 KM	Twin Moose	Double	UTTAR PRADESH to UTTAR PRADESH	19-02-2021 - 00:00, 3, 29.1(ANNEXURE C)(7), 55		11 May 2024 19:41	15 May 2024 15:39	29 Jun 2024 15:51, 24 Jun 2024 16:14	02 Jul 2024 15:03, 28 Jun 2024 09:39	03-Jul-2024	18:36			
3	1119119	May - 2024	765kV Fatehgarh_II(PG)-Bhadla_2 (PG)-3	POWERGRID BHADLA TRANSMISSION LIMITED (PBTL)	765kV		3 202.23 KM	ALS9 Zebra	Double	RAJASTHAN to RAJASTHAN	30-09-2019 - 15:30, 6, 4.3.3. point2 2.3, 9		26 Jun 2024 09:09, 15 May 2024 23:06	27 Jun 2024 12:38, 22 May 2024 15:00	10 Jul 2024 15:39, 06 Jul 2024 22:31, 28 Jun 2024 20:10	11 Jul 2024 15:00, 09 Jul 2024 08:54, 03 Jul 2024 12:15	12-Jul-2024	01:25	06 Sep 2024 19:32	12-07-2024 - 01:25 to 13-07-2024 - 01:25	
4	1119177	Jul - 2024	400kV Jaisalmer(RS)-M/s Renew Nans urja pvt Ltd (RS)-1	RRVPNL,Renew Nans urja pvt Ltd	400kV		1 12.5 KM	Twin Moose	Double	RAJASTHAN to RAJASTHAN	01-08-2023 - 10:00, 1, 1		23 Jul 2024 21:36, 23 Jul 2024 17:43	23 Jul 2024 21:48, 23 Jul 2024 20:51	25 Jul 2024 17:41, 24 Jul 2024 15:07, 23 Jul 2024 22:30	26 Jul 2024 12:38, 25 Jul 2024 12:52, 24 Jul 2024 09:39	24-Jul-2024	15:33			
5	1119159	Jul - 2024	220kV Abdullapur(PG)-Rajokheri (HV)-2	HVPNL	220kV		2 22.35	MOOSE	Double	HARYANA to HARYANA	22-06-2018 - 10:30, 40th Meeting, 34.1, 95		10 Jul 2024 14:38, 09 Jul 2024 16:27, 08 Jul 2024 12:56	12 Jul 2024 16:28, 10 Jul 2024 12:06, 09 Jul 2024 09:48	03 Aug 2024 10:49, 27 Jul 2024 16:25, 23 Jul 2024 10:51, 16 Jul 2024 17:41	05 Aug 2024 17:09, 30 Jul 2024 08:52, 24 Jul 2024 17:20, 19 Jul 2024 15:02	05-Aue-2024	20:10			
6	1119159	Jul - 2024	220kV Abdullapur(PG)-Rajokheri (HV)-1	HVPNL	220kV		1 22.35	MOOSE	Double	HARYANA to HARYANA	22-06-2018 - 10:30, 40th Meeting, 34.1, 95		10 Jul 2024 14:38, 09 Jul 2024 16:27, 08 Jul 2024 12:56	12 Jul 2024 16:28, 10 Jul 2024 12:06, 09 Jul 2024 09:48	03 Aug 2024 10:49, 27 Jul 2024 16:25, 23 Jul 2024 10:51, 16 Jul 2024 17:41	05 Aug 2024 17:09, 30 Jul 2024 08:52, 24 Jul 2024 17:20, 19 Jul 2024 15:02	06-Aug-2024	16:13			
7	1119120	May - 2024	765kV Fatehgarh_II(PG)-Bhadla_2 (PG)-4	POWERGRID BHADLA TRANSMISSION LIMITED (PBTL)	765kV		4 202.23 KM	ALS9 Zebra	Double	RAJASTHAN to RAJASTHAN	30-09-2019 - 15:30, 6, 4.3.3. point2 2.3, 9		26 Jun 2024 09:11, 15 May 2024 23:07	27 Jun 2024 12:37, 22 May 2024 15:00	10 Jul 2024 15:39, 06 Jul 2024 22:31, 28 Jun 2024 20:10	11 Jul 2024 15:00, 09 Jul 2024 08:53, 03 Jul 2024 12:15	14-Aue-2024	01:08	06 Sep 2024 19:32	14-08-2024 - 01:10 to 15-08-2024 - 01:10	
8	1119207	Aue - 2024	400kV Tehri(THDC)-Koteshwar(PG)-3	POWERGRID	400kV		3 13.5 KM	Quad Moose	Single	UTTARAKHAND to UTTARAKHAND	30-05-2009 - 10:00, 27, 9.0 point-1, 10		21 Aue 2024 08:11	21 Aue 2024 16:58	26 Aug 2024 12:33, 24 Aug 2024 14:29, 22 Aug 2024 21:10	26 Aug 2024 16:51, 25 Aug 2024 15:30, 23 Aug 2024 18:01	28-Aue-2024	16:12			
9	1119127	May - 2024	765kV Ghatampur_TPS(UP)-Rampur PRSTL (UP)-1	GTL-PGITL	765kV		1 406.604 KM	Quad Bersimis	Single	UTTAR PRADESH to UTTAR PRADESH	13-11-2018 - 00:00, 2 & 37, 18 & 1.2.2.2(d), 42 &4		22 May 2024 15:18	28 May 2024 16:43	30 Aug 2024 15:54, 21 Aug 2024 12:21, 13 Aug 2024 14:06	02 Sep 2024 16:15, 23 Aug 2024 17:01, 16 Aug 2024 16:38	07-Sep-2024	19:57			
10	1119203	Aue - 2024	400kV AGE2SL SL_BHD2_PG-Bhadla_2 (PG)-1	AGE2SL	400kV		1 400 kV S/C line on D/C tower from 400/33 kV AGE2SL S/s at Badi Sid to 765/400/220 kV Bhadla-II S/s (Length: 11.038 km)	ALS9 Moose	Double,Multiple	RAJASTHAN to RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meeting , Anne.V/Table 2/7 , 56		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:27	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37	07-Sep-2024	22:05		07-09-2024 - 20:00 to 07-09-2024 - 23:50	

SOLAR ICR/BLOCK Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Plant Name	Capacity to be charged	Voltage Level	Total Installed Capacity of Plant	Type of RE	Feeder No	Solar ICR/Block No	IDT No	IDT Make	IDT MVA Rating	IDT Votage Rating(HV/LV)	Inverter Type	Inverter Make	Total No of Inverters	Inverter AC Rating	Agency/ Owner	Evacuation Path	Remark	Intimation request for charging of new element (FormatA)	Acknowledment sent by NRLDC (Format II)	Request for test charging and trial run (FormatB)	Provisional Approval for Test Charging/Trial operation(Format IV)	Actual date & time of charging		Power Flow Started		COD Declared by Transmission Licensee
																					Date	Date	Date	Date	Date	Date	Date	Date	
1	1119158	Jul - 2024	AYANA RENEWABLE POWER THREE PRIVATE LIMITED (ARP3PL)	58.3	33kV	272	Solar	302	27	27	Shilcher	12.5 MVA	33 kV/660 V	Central Inveter	Sungrow	4	2.812 MVA	Ayana_RP3PL			12 Jul 2024 16:43, 11 Jul 2024 16:15, 08 Jul 2024 12:01	16 Jul 2024 15:21, 12 Jul 2024 11:22, 09 Jul 2024 09:41	25 Jul 2024 12:45, 23 Jul 2024 17:01, 16 Jul 2024 19:25	25 Jul 2024 16:55, 24 Jul 2024 16:43, 22 Jul 2024 08:57	25-Jul-2024	21:02			
2	1119158	Jul - 2024	AYANA RENEWABLE POWER THREE PRIVATE LIMITED (ARP3PL)	58.3	33kV	272	Solar	305	20	20	Tesla	12.5 MVA	33 kV/660 V	Central Inveter	Sungrow	4	2.812 MVA	Ayana_RP3PL			12 Jul 2024 16:43, 11 Jul 2024 16:15, 08 Jul 2024 12:01	16 Jul 2024 15:21, 12 Jul 2024 11:22, 09 Jul 2024 09:41	25 Jul 2024 12:45, 23 Jul 2024 17:01, 16 Jul 2024 19:25	25 Jul 2024 16:55, 24 Jul 2024 16:43, 22 Jul 2024 08:57	25-Jul-2024	21:02			
3	1119158	Jul - 2024	AYANA RENEWABLE POWER THREE PRIVATE LIMITED (ARP3PL)	58.3	33kV	272	Solar	301	25	25	Shilcher	12.5 MVA	33 kV/660 V	Central Inveter	Sungrow	4	2.812 MVA	Ayana_RP3PL			12 Jul 2024 16:43, 11 Jul 2024 16:15, 08 Jul 2024 12:01	16 Jul 2024 15:21, 12 Jul 2024 11:22, 09 Jul 2024 09:41	25 Jul 2024 12:45, 23 Jul 2024 17:01, 16 Jul 2024 19:25	25 Jul 2024 16:55, 24 Jul 2024 16:43, 22 Jul 2024 08:57	25-Jul-2024	21:02			
4	1119158	Jul - 2024	AYANA RENEWABLE POWER THREE PRIVATE LIMITED (ARP3PL)	58.3	33kV	272	Solar	305	19	19	Tesla	12.5 MVA	33 kV/660 V	Central Inveter	Sungrow	4	2.812 MVA	Ayana_RP3PL			12 Jul 2024 16:43, 11 Jul 2024 16:15, 08 Jul 2024 12:01	16 Jul 2024 15:21, 12 Jul 2024 11:22, 09 Jul 2024 09:41	25 Jul 2024 12:45, 23 Jul 2024 17:01, 16 Jul 2024 19:25	25 Jul 2024 16:55, 24 Jul 2024 16:43, 22 Jul 2024 08:57	25-Jul-2024	21:02			
5	1119158	Jul - 2024	AYANA RENEWABLE POWER THREE PRIVATE LIMITED (ARP3PL)	58.3	33kV	272	Solar	301	26	26	Tesla	12.5 MVA	33 kV/660 V	Central Inveter	Sungrow	4	2.812 MVA	Ayana_RP3PL			12 Jul 2024 16:43, 11 Jul 2024 16:15, 08 Jul 2024 12:01	16 Jul 2024 15:21, 12 Jul 2024 11:22, 09 Jul 2024 09:41	25 Jul 2024 12:45, 23 Jul 2024 17:01, 16 Jul 2024 19:25	25 Jul 2024 16:55, 24 Jul 2024 16:43, 22 Jul 2024 08:57	25-Jul-2024	21:02			
6	1119158	Jul - 2024	AYANA RENEWABLE POWER THREE PRIVATE LIMITED (ARP3PL)	58.3	33kV	272	Solar	310	16	16	Shilcher	12.5 MVA	33 kV/660 V	Central Inveter	Sungrow	4	2.812 MVA	Ayana_RP3PL			12 Jul 2024 16:43, 11 Jul 2024 16:15, 08 Jul 2024 12:01	16 Jul 2024 15:21, 12 Jul 2024 11:22, 09 Jul 2024 09:41	25 Jul 2024 12:45, 23 Jul 2024 17:01, 16 Jul 2024 19:25	25 Jul 2024 16:55, 24 Jul 2024 16:43, 22 Jul 2024 08:57	25-Jul-2024	21:02			

Other Blocks

Transformer Report from 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Owner	Voltage Level (HV/LV/Tertiary)	MVA Capacity	Type of Transformer	Make	Configuration	Total Tap	Nominal Tap	Present Tap	Vector Group	% Impedance	HV Stattion	State	Approved in SCM/Statuary Body	Remark	Transformer Details	OLD MVA Capacity	Intimation request for charging of new element (FormatA)	Acknowledment sent by NRLDC (Format II)	Request for test charging and trial run (FormatB)	Provisional Approval for Test Charging/Trial operation(Format IV)	Actual date & time of charging (HV Side)		Actual date & time of charging (LV Side)		Power Flow Started	Request for Trial Operation Certificate(Format C)	Trial Run Operation Certificate Details		Actual date & time of charging	
																					Date	Date	Date	Date	Date	Time	Date	Time	Date	Date	Trial Run/Operation Period	Certificate No	Date	Time
2	1119122	May - 2024	765/22kV, 825 MVA, 3x1-Phase, GE, GT - 2 at Jawaharpur_TPS(UP)	UPRVUNL	765/22/na	825	GT	GE	3x1-Phase	5	3	3	YNd11, YNd11	15.24%	Jawaharpur_TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 78.8		New		14 May 2024 16:37	20 May 2024 12:13	02 Jul 2024 16:27	05 Jul 2024 16:57									12-Jul-2024	20:06
3	1119181	Jul - 2024	400/33kV, 200 MVA, 3-Phase, Meiden, ICT - 3 at M/s Renew Hans urja pvt ltd (RS)	Renew Hans urja pvt	400/33/na	200	ICT	Meiden	3-Phase	17	5	5	YNyn0yn0, YNyn0yn0	15%	M/s Renew Hans urja pvt ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1.1		New		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45									26-Jul-2024	16:48
4	1119181	Jul - 2024	400/33kV, 200 MVA, 3-Phase, Meiden, ICT - 2 at M/s Renew Hans urja pvt ltd (RS)	Renew Hans urja pvt	400/33/na	200	ICT	Meiden	3-Phase	17	5	5	YNyn0yn0, YNyn0yn0	15%	M/s Renew Hans urja pvt ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1.1		New		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45									26-Jul-2024	17:12
5	1119181	Jul - 2024	400/33kV, 200 MVA MVA, 3-Phase, Meiden, ICT - 1 at M/s Renew Hans urja pvt ltd (RS)	Renew Hans urja pvt	400/33/na	200 MVA	ICT	Meiden	3-Phase	17	5	5	YNyn0yn0, YNyn0yn0	15%	M/s Renew Hans urja pvt ltd (RS)	RAJASTHAN	01-08-2023 - 10:00, 1, 1.1		New		25 Jul 2024 14:38	25 Jul 2024 18:01	26 Jul 2024 12:11, 25 Jul 2024 20:11	26 Jul 2024 14:18, 26 Jul 2024 11:45									26-Jul-2024	17:33
6	1119182	Jul - 2024	765/400/33kV, 1500 MVA, 3x1-Phase, BHEL, ICT - 5 at Fatehgarh_II(PG)	POWERGRID	765/400/33kV	1500	ICT	BHEL	3x1-Phase	22	12	12	YNa0d11, YNa0d11	14%	Fatehgarh_II(PG)	RAJASTHAN	13-09-2019 - 10:30, 5, 2.2(iv), 4		New		26 Jul 2024 14:21	27 Jul 2024 12:14	27 Jul 2024 15:01	28 Jul 2024 14:33						16 Aug 2024 11:03, 03 Aug 2024 12:02	29-07-2024 - 23:40 to 30-07-2024 - 23:40	GRID-INDIA/NRLDC/SO/F30	29-Jul-2024	10:20
7	1119161	Jul - 2024	220/33kV, 125 MVA MVA, 3-Phase, Mahati industries PVT LTD, ICT - 2 at CS_Jodhpur SL_BHD_PG (Cleansolar_Jodhpur)	Cleansolar_Jodhpur	220/33/na	125 MVA	ICT	Mahati industries PVT LTD	3-Phase	17	9a	9b	NA, NA, NA	15 %	CS_Jodhpur SL_BHD_PG (Cleansolar_Jodhpur)	RAJASTHAN	18-07-2024 - 15:47, NA, NA, NA		Replacement	150 MVA	18 Jul 2024 15:15, 17 Jul 2024 16:14	18 Jul 2024 15:45, 18 Jul 2024 14:59	30 Jul 2024 00:08, 29 Jul 2024 15:28, 29 Jul 2024 12:24, 23 Jul 2024 10:53	30 Jul 2024 12:57, 29 Jul 2024 17:23, 29 Jul 2024 14:28, 23 Jul 2024 11:30									31-Jul-2024	19:34
9	1119153	Jun - 2024	400/220/33kV, 500 MVA, 3-Phase, Crompton, ICT - 1 at Ropar(PSTCL)	PSTCL	400/220/33kV	500	ICT	Crompton	3-Phase	17	9B	9B	delta, YNA0d11, NA	NA	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		New		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56									10-Aug-2024	14:05
10	1119153	Jun - 2024	400/220/33kV, 500 MVA, 3-Phase, Crompton, ICT - 2 at Ropar(PSTCL)	PSTCL	400/220/33kV	500	ICT	Crompton	3-Phase	17	9B	9B	YNa0d11, NA	NA	Ropar(PSTCL)	PUNJAB	24-05-2019 - 10:30, 3rd, 25.0, 85		New		05 Jul 2024 15:25, 04 Jul 2024 16:36, 01 Jul 2024 16:13, 30 Jun 2024 14:22	06 Jul 2024 10:36, 05 Jul 2024 10:51, 03 Jul 2024 10:18, 01 Jul 2024 09:08	09 Aug 2024 10:22	09 Aug 2024 17:56									10-Aug-2024	14:39
11	1119122	May - 2024	400/220/33kV, 500 MVA, 3x1-Phase, GE T& D, ICT - 3 at Jawaharpur_TPS(UP)	UPRVUNL	400/220/33kV	500	ICT	GE T& D	3x1-Phase	17	9b	9b	YNa0d11, YNa0d11	12.5%	Jawaharpur_TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		New		22 May 2024 15:14	25 May 2024 12:22	18 Jul 2024 12:24, 08 Jul 2024 11:27	19 Jul 2024 16:53, 10 Jul 2024 09:16									14-Aug-2024	17:16
12	1119128	May - 2024	400/220/33kV, 500 MVA, 3x1-Phase, GE T&D, ICT - 4 at Jawaharpur_TPS(UP)	UPRVUNL	400/220/33kV	500	ICT	GE T&D	3x1-Phase	17	9b	9b	Yna0d11, Yna0d11	12.5 %	Jawaharpur_TPS(UP)	UTTAR PRADESH	30-05-2016 - 00:00, 38, 3.9.1(D), 7		New		22 May 2024 15:17	25 May 2024 12:22	18 Jul 2024 12:25, 08 Jul 2024 11:27	19 Jul 2024 16:52, 10 Jul 2024 09:18									22-Aug-2024	18:09
13	1119141	Jun - 2024	400/220/33kV, 500 MVA, 3-Phase, TOSHIBA, ICT - 3 at Bikaner(PG)	POWERGRID	400/220/33kV	500	ICT	TOSHIBA	3-Phase	17	09b	09b	YNa0d11, YNa0d11	12.03	Bikaner(PG)	RAJASTHAN	30-06-2022 - 10:30, 8, SL no 02, 22		New		15 Jun 2024 12:21	17 Jun 2024 15:51	29 Aug 2024 21:30, 28 Aug 2024 14:54, 28 Aug 2024 14:38	30 Aug 2024 10:03, 29 Aug 2024 21:00							01-09-2024 - 03:10 to 02-09-2024 - 03:10		30-Aug-2024	23:40
14	1119206	Aug - 2024	420 KV/15.75kV, 306 MVA, 3-Phase, M/s GE, GT - 5 at Tehri(THDC)	Tehri PSP	420 KV/15.75/na	306	GT	M/s GE	3-Phase	05	03	03	YN, d11	14.5	Tehri(THDC)	UTTARAKHAND	30-05-2009 - 10:00, 27th, 9.9, 40 of 41		New		20 Aug 2024 10:58, 17 Aug 2024 09:25	21 Aug 2024 09:30, 19 Aug 2024 14:20	22 Aug 2024 16:35, 21 Aug 2024 11:57	22 Aug 2024 17:13, 22 Aug 2024 14:24									31-Aug-2024	11:30
15	1119144	Jun - 2024	765/400/33kV, 1500 MVA, 3x1-Phase, GE, ICT - 4 at Bhadla_2 (PG)	POWERGRID	765/400/33kV	1500	ICT	GE	3x1-Phase	22	12	12	YNa0d11, YNa0d11	12.5 %	Bhadla_2 (PG)	RAJASTHAN	30-09-2019 - 10:30, 6, Point no. (xiv), 5		New		25 Jun 2024 09:02, 24 Jun 2024 12:15	26 Jun 2024 14:26, 25 Jun 2024 08:53	31 Aug 2024 13:26	03 Sep 2024 10:23									07-Sep-2024	01:04
16	1119202	Aug - 2024	400/33kV, 330 MVA, 3-Phase, TBEA, Power Transformer - 1 at AGE25L SL_BHD2_PG	AGE25L	400/33/na	330	Power Transformer	TBEA	3-Phase	17	9	9	NA, YN, yn0	17.6	AGE25L SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meeting , Anne.V/Table 2/7 , 56		New		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:22	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37									07-Sep-2024	23:34
17	1119202	Aug - 2024	400/33kV, 330 MVA, 3-Phase, TBEA, Power Transformer - 2 at AGE25L SL_BHD2_PG	AGE25L	400/33/na	330	Power Transformer	TBEA	3-Phase	17	9	9	NA, YN, yn0	17.6	AGE25L SL_BHD2_PG	RAJASTHAN	01-09-2020 - 11:00, 2nd NRPCTP Meeting , Anne.V/Table 2/7 , 56		New		20 Aug 2024 12:18, 16 Aug 2024 13:27, 14 Aug 2024 20:22	20 Aug 2024 15:54, 20 Aug 2024 10:50, 16 Aug 2024 11:00	05 Sep 2024 12:30, 04 Sep 2024 17:01, 04 Sep 2024 16:51, 02 Sep 2024 17:13	06 Sep 2024 17:40, 05 Sep 2024 12:19, 04 Sep 2024 14:37									08-Sep-2024	00:16

AC Transmission line Shifting Reportfrom 01-07-2024 to 10-09-2024

S.No	CASE ID	Application Month	Name of element	Owner	Voltage Level (in kV)	Circuit No	Line Length	Conductor Type	Tower Configuration	State	Approved in SCM/Staturo Body	Remark	Intimation request for charging of new element (formatA)	Acknowledment sent by NRLDC (format II)	Request for test charging and trial run (formatIII	Provisional Approval for Test Charging/Trial operation(Format IV)	Actual date & time of charaine		Request for Trial Operation Certificate(Format C)	Trial Run Operation Certificate Details	
													Date	Date	Date	Date	Date	Time	Date	Trial Run/Operation Period	Certificate No.
1	1119165	Jul - 2024	220kV Faridabad(NT)-Samaypur(SB) 1	POWERGRID	220kV	1	17.545 KM	ZEBRA	Double	HARYANA to HARYANA	03-06-2024 - 11:00, MOM of NRPC_1_All		17 Jul 2024 11:44	18 Jul 2024 15:45	29 Jul 2024 21:01, 29 Jul 2024 14:05	30 Jul 2024 15:20, 29 Jul 2024 20:25	30-Jul-2024	17:30			