भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

उत्तर क्षेत्रीय विद्युत समिति

Northern Regional Power Committee

संख्या: उ.क्षे.वि.स./ प्रचालन/106/01/2022/ दिनांक: 05.04.2022

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 193वीं बैठक का कार्यवृत |

Subject: Minutes of 193rd OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 193वीं बैठक दिनांक 22.03.2022 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है। यदि कार्यवृत पर कोई टिप्पणी हो तो कार्यवृत जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें |

193rd meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 22.03.2022. The Minutes of this meeting has been uploaded on the NRPC website http://164.100.60.165. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

05/04/2022.

(सौमित्र मजूमदार)

अधीक्षण अभियंता (प्रचालन)

सेवा में,

उ.क्षे.वि.स. के प्रचालन समन्वय उप-समिति के सभी सदस्य

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26513265 ई-मेल: seo-nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e- mail: seo-nrpc@nic.in Website: www.nrpc.gov.in

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की **193**वीं बैठक का कार्यवृत्त

193rd meeting of OCC of NRPC was held on 22.03.2022 through video conferencing.

खण्ड-क: उ.क्षे.वि.स. **PART-A:NRPC**

1. Confirmation of Minutes

Minutes of 192nd OCC meeting was issued on 07.03.2022. OCC confirmed the minutes.

NRLDC agreed to rectify the discrepancy in regard to the request of NR-III, POWERGRID to remove following elements from NR-III element availability list and incorporate the same in Minutes of 192nd OCC meeting of NRPC under "Long Outages Report as on 07.03.22 part D-Line Reactor Sl. No. 2 & 3 "

1. Line Reactor of 400 KV Allahabad-Fatehpur- I at Allahabad out of service since 1326 hrs dt.10.12.21

2. Line Reactor of 400 KV Allahabad-Fatehpur- II at Allahabad out of service since 1025 hrs dt 12.12.21

2. Review of Grid operations of February 2022

2.1. Anticipated vis-à-vis Actual Power Supply Position (Provisional) for February 2022

Reasons submitted by states for significant deviation of actual demand from anticipated figures during the month of February 2022 are as under:

- **Delhi**

In Feb-22, the variation between actual and anticipated peak demand is (+) 8.36 % and the variation between actual and anticipated Energy consumption is (-) 3.95%. The positive variation in demand is mainly due to weather conditions. The negative variation in energy consumption is mainly due to partial covid-third wave restrictions.

- **Rajasthan**

The Energy consumption & Peak Demand increased by 0.9 % & 3.2 % respectively w.r.t. Anticipated Energy requirement & Anticipated Peak Demand is within permissible limit.

- **Punjab**

Actual maximum demand and actual energy requirement are less as compared to anticipated maximum demand and anticipated energy requirement respectively because of scattered storms in the state of Punjab during month of February 2022.

- **Haryana**

The variation between the anticipated demand and energy consumption for Feb-2022 is due to Agriculture demand dip by 18.39% due to unusual weather conditions during the month of Feb 2022.

- **Uttarakhand**

The Anticipation in Energy requirement and Peak Demand in respect of Himachal Pradesh for the month of February, 2022 came on the higher side due to the heavy snowfall and low temperature (increased heating load).

2.2. **Power Supply Position for NCR:**

The Sub-Committee was informed that the NCR Planning Board (NCRPB) is closely monitoring the power supply position of National Capital Region. Monthly power supply position for NCR till the month of February, 2022 was enclosed in the agenda and same was discussed in the meeting.

No significant deviation in any of the states was observed.

3. Maintenance Programme of Generating Units and Transmission Lines

3.1. The maintenance programme of generating units and transmission lines for the month of April 2022 was deliberated in the meeting on 21.03.2022.

3.2. Following shutdown request was also approved/denied in the OCC meeting:

Element Name	Owner	Reason	Requested From	Requested To	Decision of OCC
NAPS Narora Unit-I	NAPS	NAPS-1 BSD FOR 45 DAYS	24-Apr-2022 00:00 Hrs	06-Jun-2022 23:59 Hrs	In LGBR meeting outage was proposed from 1-Apr-22 to 15-May-22
400kV Talwandi Sabo-Muktsar Ckt-1 & Ckt-2	PSTCL	OPGW installation work	01-Apr-22 07:00 Hrs	30-Apr-22 19:00 Hrs	To disable Auto re Closure to manual Mode

4. Planning of Grid Operation

4.1. **Anticipated Power Supply Position in Northern Region for April 2022**

The updated anticipated Power Supply Position for April 2022 is as below:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	120	320	Revision not submitted
	Requirement	100	290	
	Surplus / Shortfall	20	30	
	% Surplus / Shortfall	20.0%	10.3%	
DELHI	Availability	3785	6100	21-Mar-22
	Requirement	2900	6100	
	Surplus / Shortfall	885	0	
	% Surplus / Shortfall	30.5%	0.0%	
HARYANA	Availability	4930	10730	10-Mar-22
	Requirement	4175	9000	
	Surplus / Shortfall	755	1730	
	% Surplus / Shortfall	18.1%	19.2%	
HIMACHAL PRADESH	Availability	920	1630	14-Mar-22
	Requirement	908	1635	
	Surplus / Shortfall	12	-5	
	% Surplus / Shortfall	1.4%	-0.3%	
J&K and LADAKH	Availability	1270	3000	Revision not submitted
	Requirement	1830	3110	
	Surplus / Shortfall	-560	-110	
	% Surplus / Shortfall	-30.6%	-3.5%	
PUNJAB	Availability	5140	8370	21-Mar-22
	Requirement	4150	8410	
	Surplus / Shortfall	990	-40	
	% Surplus / Shortfall	23.9%	-0.5%	
RAJASTHAN	Availability	7940	17980	21-Mar-22
	Requirement	7760	13000	
	Surplus / Shortfall	180	4980	
	% Surplus / Shortfall	2.3%	38.3%	
UTTAR PRADESH	Availability	10800	21500	15-Mar-22
	Requirement	10350	21500	
	Surplus / Shortfall	450	0	
	% Surplus / Shortfall	4.3%	0.0%	
UTTARAKHAND	Availability	1077	1920	05-Mar-22

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Requirement	1098	1950	
	Surplus / Shortfall	-21	-30	
	% Surplus / Shortfall	-1.9%	-1.5%	
NORTHERN REGION	Availability	35982	65900	
	Requirement	33270	59900	
	Surplus / Shortfall	2711	6000	
	% Surplus / Shortfall	8.1%	10.0%	

5. Submission of breakup of Energy Consumption by the states

5.1. The updated status on the submission of energy consumption breakup is presented below:

State / UT	From	To
Delhi	Apr-2018	Sep-2021
Haryana	Apr-2018	Nov-2021
Himachal Pradesh	Apr-2018	Dec-2021
Punjab	Apr-2018	Jan-2022
Rajasthan	Apr-2018	Jan-2022
Uttar Pradesh	Apr-2018	Oct-2021
Uttarakhand	Apr-2018	Sep-2021

5.2. OCC forum again raised expressed concern on non-submission of energy breakup data by UTs of J&K & Ladakh, and Chandigarh despite repeated reminders.

5.3. Graphical representation of break up figures of energy consumption for NR states was presented by NRPC Sectt. Himachal Pradesh and Rajasthan were requested to clarify if there is any anomaly in data regarding the energy consumption under 'others' category and communicate the same to NRPC Sectt.

6. System Study for Capacitor requirement in NR for the year 2019-20

6.1. OCC forum was intimated that NRPC in its 48th meeting decided that the study report for 2019-20 along with the guidelines for finding the capacitor requirement at 11/33 kV level in NR would be submitted by CPRI. Accordingly, CPRI have submitted the system study report on 24.02.2021 and thereafter same was shared with the constituent states. The recommended capacitor compensation, additionally required as per the report is 352MVAr. The report has brought out the additional requirement of 137MVar and 215MVar compensation for Punjab and J&K respectively. Moreover, empirical relationship for capacitor requirement

against voltage profile at 11 kV, based on two configurations has been worked out in the report.

6.2. In the 45th TCC / 48th NRPC meeting, it was decided after the submission of report for 2019-20 and the guidelines, the same would be studied by the same sub-group who had earlier recommended for guidelines and foreclosure of the contract. Based on Committee's recommendations, NRPC Sectt. can process the pending bills of Rs. 14 lakhs (Rs. 2 + 12 Lakhs), excluding taxes along with foreclosure of the contract. Accordingly, submitted report needs to be examined by the Committee.

6.3. In 181st OCC, forum decided that sub-group comprising of following officers would study the report and submit the recommendation report within two weeks:

6.4. NRPC Sectt. sought comments/observations on the CPRI report from all the states via e-mail. Comment from Delhi was received. Rajasthan, HP, Punjab, Haryana submitted NIL comment. Comment from rest of the members was not received.

6.5. In the 182nd OCC meeting, forum decided that a video-conferencing meeting may be held by members of sub-group to finalize the comments, latest by 30th April, 2021 and compiled comments may be sent to CPRI for necessary correction in the report.

6.6. The meeting of sub-group was held on 03.05.21. In the meeting, sub-group members decided to get PSSE file from CPRI for better understanding, which was later shared with them.

6.7. In 183rd OCC meeting, NRPC representative requested for any other comments on the CPRI report, if remaining, from any of the members. Sub-group committee member from Rajasthan stated that since the CPRI report is for the year 2019-20, old data needs to be collected and then values in the CPRI report would be checked. It was further intimated that around 2-3 days' time would be required for this task. Forum decided that after receiving observations/comments from Rajasthan, the compiled observations / comments may be sent to CPRI so that necessary corrections may be done in the draft report.

6.8. In 184th OCC, forum was apprised that compiled comments have been mailed to CPRI vide email dated 28th May'21 with a request to submit the corrected report within two weeks' time.

6.9. CPRI vide email dated 31st May'21 communicated that majority of comments are on the modeling of base case PSSE file. Since the file is given by NRPC and CPRI has not modeled it; so, they are not in position to make any comment on the accuracy & modeling of file.

6.10. In the 185th OCC, NRPC stated that CPRI has submitted on 28th June 2021 its point-wise reply on the observations of sub-group along with updated report. OCC forum decided that a video-conferencing meeting may be held within sub-group members and CPRI for further discussion on reply of CPRI.

6.11. In the 186th OCC meeting, NRPC representative apprised the forum that in line with decisions of 185th OCC, a meeting was held on 06.08.2021 under the chairmanship of MS, NRPC through Video Conferencing. It was attended by members of the sub-group, CPRI representatives, and officials from NRPC Sectt & NRLDC.

6.12. It was also stated that in the meeting dt. 06.08.2021, comments of the sub-group on the latest version of CPRI report were deliberated in detail. After weighing the merits of the original & revisions of the report, following were decided:

- First Report submitted by CPRI in September, 2020 shall be considered as the reference report. CPRI confirmed that the base-case of 11.07.2018 at 00:45 hrs. received from NRPC Sectt has been used for preparing September, 2020 report.
- Comments from all utilities and NRLDC on September 2020 report must be submitted to NRPC Sectt, latest by 24.08.2021.
- NRPC Sectt, after examination, shall share with CPRI the compiled comments of the utilities and NRLDC, latest by 31.08.2021.
- Thereafter, CPRI shall submit its reply on the compiled comments sent by NRPC Sectt, latest by 15.09.2021.

6.13. It was further intimated that base case file (11.07.2018 00:45 hrs) and CPRI's Sep'2020 report, were e-mailed to all sub-group members on 10.08.2021 along with the request to submit comments/observations thereon, latest by 24.08.2021.

6.14. In the meeting (187th OCC), forum was apprised that although last date for submission of comments was 24.08.2021, NRPC Sectt. received comments from Himachal Pradesh, Punjab, Rajasthan, Delhi, and NRLDC vide mails dtd. 24.08.2021, 25.08.2021, 26.08.2021, 31.08.2021, and 03.09.2021 respectively. As the received comments were also on the base-case data, a meeting was held on 06.09.2021 among officers of NRPC Sectt, NRLDC and above four states for discussing comments before sending to CPRI. After detailed discussions, following were decided:

A. Himachal Pradesh:

a) It was apprised by NRLDC that generation data of micro IPPs has not been modelled by them in base-case due to their small quantity. Further, Capacitor at Baddi needs to be removed from base-case.

b) HP was requested to submit within 3 days data regarding (11.07.2018 00:45 HRS):

i. Generation break-up along with details of micro IPPs.

ii. Capacitors at 132 kV level.

iii. Nodes of major voltage profile mismatch

iv. Load factor of state (current scenario if data of past is not available)

c) It was decided that after getting above data from HP, base-case will be tuned by NRLDC before sending to CPRI.

B. Punjab:

a) All switched reactors/capacitors to be converted into fixed & net shunt capacitor value in the base-case to be corrected as per Punjab's comment.

b) Punjab was requested to submit low voltage nodes (11.07.2018 00:45 HRS) within 3 days.

c) Based on data from Punjab, initial tuning to be done by NRLDC for Q values of generators. CPRI may be required to do further tuning.

C. Rajasthan:

a) Except low voltage points, power factor needs to be upgraded in the base-case.

b) Rajasthan representative confirmed that most of the capacitors were off during the time for which modelling is done, so lumped capacitor at 132kV needs to be deleted.

c) Rajasthan was requested to submit

i. List of bus-wise capacitors and their status (OFF/ON condition) on 11.07.2018 00:45 HRS.

ii. Voltage profile of generator buses.

D. Delhi:

a) Delhi was requested to submit voltage profile of generator buses.

6.15. It was decided that after receiving data from above four states, NRLDC will tune the basecase initially and will also ensure that regional generators shall not absorb reactive power in the base-case and then base case will be sent to CPRI along with compiled comments.

6.16. In 188th OCC, it was apprised that CPRI vide e-mail dtd. 23.09.2021, requested to send comments at the earliest.

6.17. NRPC Sectt. vide e-mail dtd. 23.09.2021 apprised the CPRI that as per decisions of meeting dtd. 06.09.2021, tuning of base-case file is being done by NRLDC so that no new issue arises in future.

6.18. CPRI vide e-mail dtd. 24.09.2021 has requested that any change in loading & generation profile will be a new base case and this will be a fresh study for new base case. It will require an extensive time and efforts. CPRI has requested to ensure that load/generation profile in tuned PSSE should be same as was given to CPRI for PSSE base 11.7.2018 at 00.45.

6.19. In view of CPRI's request, NRLDC was requested vide e-mail dtd. 24.09.2021 to halt tuning of base-case till further discussion.

6.20. A meeting was held between NRPC Sectt. and NRLDC on 04.10.2021, wherein

it was decided that without incorporating corrective comments of states, the report is not acceptable w.r.t drawing any conclusion on requirement of capacitor. Accordingly, NRLDC was requested vide e-mail dtd. 08.10.2021 to complete tuning of base-case at the earliest.

6.21. NRLDC representative informed that tuned base-case will be submitted by NRLDC by 28.10.2021. It was decided that the same will be sent to CPRI for necessary correction in report.

6.22. Tuned base-case has been received from NRLDC vide mail dtd 10.11.2021.

6.23. In 189th OCC, NRPC representative apprised that tuned base-case received from NRLDC is under examination in NRPC Sectt. After examination, the same will be sent to CPRI for correction in the report along with the comments submitted by states.

6.24. In 190th OCC, NRPC representative informed that tuned base-case along with comments of states has been sent to CPRI vide mail dated 30.11.2021 for correction in the report.

6.25. In 191st OCC, NRPC representative apprised the forum that a meeting was held between members of the sub-group, CPRI representatives, and officials from NRPC Sectt & NRLDC on 05.01.2022, wherein it was decided that CPRI shall tune the Q_{gen} value by taking help of NRLDC. Tuning may be done for some machines of Punjab (such as Talwandi Sabo), Uttarakhand (such as Shravanti), Himachal Pradesh, and Jammu. CPRI shall also tune Q_{gen} of Central Sector machines such as Salal, Rampur, Bhakra, Dehar etc. These Q_{gen} tunings shall be done in spirit to relieve machines from absorbing MVARs and to avoid over compensation in system due to recommended capacitors. CPRI has intimated 20th Jan'22 as target date for the activity.

6.26. In 192nd OCC, NRPC representative apprised the forum that report has been received from CPRI vide mail dtd. 14.02.2022. However, some grammatical and typographical error were observed in the report and CPRI has been requested to resolve the same. After resolution of same, report shall be shared with sub-group members tentatively in next week. After final acceptance, payment to CPRI may be processed.

6.27. In the meeting (193rd OCC), NRPC representative informed that final study report of CPRI has been shared with all states of NR region vide mail dated 02.03.2022. Further, matter regarding the payment will be taken as agenda in the next NRPC meeting.

7. Automatic Demand Management System

7.1. Forum was informed that as decided in the 175th OCC meeting, to conduct separate meeting with states, nominations are pending from PuVVNL, PVVNL, MVVNL, DVVNL, UPPTCL, UPCL, PTCUL, SLDC Uttarakhand, and J&K. They were requested on 01.03.2021 to submit nominations for the meeting.

7.2. Meetings on ADMS implementation roadmap have been held with the officers of

Haryana, HP, Punjab and UP on 05.02.2021, 19.02.2021, 05.03.2021 and 14.07.2021 respectively. In these meetings, issues and apprehensions on ADMS were discussed along with vital aspects like addressing the commercial issues, basic architecture for scheme and funding possibilities for the scheme.

7.3. As per the request of states for DPR of any state that has got PSDF support for ADMS, website link of PSDF Sectt. has been shared with Haryana, Himachal Pradesh, Punjab and Uttar Pradesh for accessing DPR. SLDCs were also requested to expedite the submission of pending nominations.

7.4. In 186th OCC, In-charge, NRLDC stated that as per IEGC, implementation of ADMS is mandatory. It helps in reducing DSM charges also. States must take it seriously.

7.5. MS, NRPC stated that non-implementation of ADMS by states is indistinguishably non-adherence to directions of CERC. He enquired from NRLDC whether POSOCO has made any communication with CERC regarding non-adherence of its deadline i.e., 31.06.2016. NRLDC representative stated that he would look into and inform in next meeting.

7.6. NRPC representative added that initial deadline for ADMS implementation was 1st January 2011 as per para 5.4.2 (d) of IEGC. Later, CERC has taken suo-motu cognizance of non-implementation of ADMS by states and given 31.06.2016 as deadline vide its order dt. 31.12.2015 in petition no. 5/SM/2014. Implementation deadline given by the statutory and regulatory body need to complied by concerned SLDC / SEB / distribution licensee as per regulation no. 5.4.2 (a) & (b) of IEGC. Moreover, hand holding process for project proposal preparation in respect of four NR states has already been done by NRPC

7.7. Forum decided that NRLDC may file a report to CERC based on compiled status of ADMS implementation in states of Northern Region.

7.8. In 187th OCC, NRLDC representative quoted the texts of CERC order dt. 31.12.2015 in petition no. 5/SM/2014. He apprised the status of ADMS implementation till 2015. Further, he requested the states to update the status so that NRLDC may file petition in CERC on the basis of compiled status.

7.9. In 188th OCC, NRLDC informed that it has not received comments from states in this matter. Accordingly, all SLDC/DISCOMs are requested to furnish the latest status of ADMS implementation in their respective control areas latest by 31st October 2021 to NRLDC. Status as received till 31.10.2021 would be reported to CERC by NRLDC.

7.10. In the 189th OCC, NRLDC informed that status of ADMS has been sent to CERC twice (Aug'16 and Sep'16) in the past. The same is recorded in MoM of 127th OCC also.

7.11. NRLDC representative informed that CERC will be apprised again within next 10 days about the latest status of ADMS as per the updated information available with them.

7.12. In the 190th OCC, NRLDC representative informed that vide letter dated 09.12.2021 (enclosed as Annexure-A.0 of minutes of 190th OCC), CERC has been apprised about the latest status of ADMS as per the updated information available with them.

7.13. In 192nd OCC, forum was intimated that no further update has been received on this matter. Rajasthan representative intimated that ADMS implementation schedule in their state has been extended till Dec'22 and this agenda may be continued in OCC meetings for monitoring the ADMS implementation schedule.

7.14. In the meeting (193rd OCC), Rajasthan representative informed that first trail is tentatively scheduled in May 2022.

8. Follow-up of issues from various OCC Meetings - Status update

8.1. The updated status of agenda items is enclosed at ***Annexure-A.I.***

8.2. In 193nd OCC, SLDC's were requested to coordinate with respective Transmission utilities of states/UT's and submit details about the updated status of Down Stream network by State utilities from ISTS Station (***enclosed as Annexure-A-I.I)*** before every OCC meeting.

9. NR Islanding scheme

9.1. Based on the decisions taken in the meeting taken by Hon'ble Minister of State (IC) for Power and New & Renewable Energy on 28.12.2020, Islanding Schemes for NR have been continuously reviewed/discussed in various forums.

9.2. In 187th OCC, it was decided that states shall submit MIS report before every OCC meeting so that same may be discussed. Format was circulated vide agenda of 187th OCC.

9.3. It was also highlighted that MoP has agreed for PSDF funding for implementation of islanding schemes and states were requested to prepare and submit DPR for the same. Further, a sample DPR on implementation of Islanding scheme for PSDF funding has been already circulated vide email dated 07.10.2021 and requested to expedite the preparation of DPR.

9.4. Utilities were requested to refer and submit SOP for every Islanding scheme in their control area.

9.5. A meeting was also taken by Honorable Cabinet Minister (Power, New & Renewable Energy) on 07.10.2021 wherein emphasis was given on PSDF funding for Islanding schemes and DPR submission for the same. MoM has been issued and copy of the same was enclosed as Annexure-A.II of 189th OCC agenda.

9.6. In the 189th OCC, NRPC representative highlighted no progress from states of Punjab, Uttarakhand, Himachal, J&K, Ladakh.

9.7. UP and Punjab representatives stated that they have sent the offer along with data to CPRI for study of Islanding Schemes. HP intimated that system study is under process at DISCOM end. Rajasthan SLDC assured the submission of RAPS SCADA display on the same day.

9.8. NRLDC submitted that they use PSSE software for system study but Rajasthan has submitted details of Islands in MI Power Software, therefore, they are exploring whether they can use that file.

9.9. MS, NRPC desired to know the reason for sending data to CPRI for system study. He stated that it may be done at state level itself.

9.10. UP representative stated that they are not able to perform dynamic system study as it involves parameters like rotor inertia, hunting, etc.

9.11. MS, NRPC expressed concern regarding apathy of states in implementation of Islanding Schemes. He stated that all SLDCs will intimate the names of Islands for which system study from CPRI is required along with justification for the same by 30th Nov, 2021. He also set timeline of 30th Nov, 2021 for Delhi to submit SOP data. He stated that communication may be sent to RAPS for submission of SOP data at the earliest.

9.12. In 190th OCC, NRPC representative informed that SOP data in respect of Delhi and RAPS have been received.

9.13. UPSLDC vide letter dated 01.12.2021 has submitted the names of islands for which system study from CPRI is required. UPSLDC has highlighted, inter-alia, that involvement of long length 765kV line and high number of buses necessitates them to go for system study by CPRI. It has mentioned that SLDC/STU has no expertise in such studies and before doing any investment on the project, proper study is must for successful implementation and operation of Islands.

9.14. HPSLDC vide lett er dtd. 18.12.2021 has intimated that a meeting was held on 26.11.2021 between HPSLDC and HPSEBL wherein a team of officers from HPSLDC and HPSEBL has been formed to carry out transient study of all islands within a month.

9.15. UPSLDC representative informed that CPRI has asked for some additional details and technical commercial offer would be provided to them by CPRI by 15th Jan 22.

9.16. NRLDC representative informed that report received from Rajasthan regarding the Jodhpur-Barmer-Rajwest islanding scheme is in order and Rajasthan SLDC can proceed ahead. Further, NRLDC submitted that they use PSSE software for system study but Rajasthan has submitted details of Islands in MI Power Software, therefore, they are not able to access the file.

9.17. Rajasthan SLDC representative informed that they have given the details in the hard copy of the load and generation to be considered for islanding scheme, and based on that have requested NRLDC to simulate it in PSSE software for validation. NRLDC representative agreed to the request of the Rajasthan SLDC.

9.18. Uttarakhand SLDC representative informed that hydro stations near Dehradun are peaking stations and the proposed Dehradun islanding scheme appears to be infeasible. NRPC representative informed that some schemes in NR have been proposed by considering Hydro stations and Dehradun islanding scheme was proposed by the state SLDC itself in view of all factors. Thus, Uttarakhand SLDC shall immediately conduct study on the proposed Islanding Scheme having Khodri & Chibro units and provide status on the feasibility of scheme with supporting data so that same may be communicated to the Ministry.

9.19. In the meeting (191st OCC), HPSLDC representative informed that they need further two weeks to submit the outcome of transient study of all islands.

9.20. Uttarakhand representative informed that major hydro stations e.g. Chibro, Khodri etc at Dehradun Region in Yamuna valley are non-must run and peaking stations. Therefore, it is technically not feasible to implement Dehradun as an islanding scheme. However, nominations of nodal officers from various utilities (PTCUL, UJVN Ltd & UPCL) are being sought for the formation of internal committee for accessing the possibility of Dehradun as Islanding scheme and the report shall be submitted to NRPC Secretariat subsequently.

9.21. NRPC representative asked Uttarakhand to expedite the submission regarding the status on feasibility of the proposed Islanding scheme.

9.22. MS, NRPC stated that all constituents that have given their information about the planning of islanding scheme shall take up the work on top priority and submit the progress in time bound manner by submitting the updated MIS format every month.

9.23. NRLDC representative informed that Rajasthan SLDC is modelling data on PSSE software and it is expected to be completed within one week. Thereafter, NRLDC will submit its comments on the same. Rajasthan representative consented for the same.

9.24. UP and Punjab were asked to update the status of their study being done by CPRI. Both informed that there is no progress since last OCC and they are waiting for response from CPRI.

9.25. In 192nd OCC, UPSLDC informed that they have received techno-commercial offer from CPRI for both the islanding schemes of UP and accessing the inputs from CPRI they will be conveying a meeting in last week of February 2022.

9.26. NRLDC representative informed modelling data on PSSE software received from Rajasthan has not been modelled for islanding scheme. Further, NRLDC representative asked Rajasthan SLDC to send their team next week for modelling the data on PSSE software.

9.27. MS, NRPC asked Uttarakhand SLDC to expedite the study they are conducting to access the feasibility of Dehradun islanding scheme.

9.28. NRPC representative informed that a meeting was convened by HPSLDC with officials of NRPC Sectt., NRLDC, HPSEBL, & HPPTCL on 11.02.2022. It was observed that system study work has been pending due to pre-occupation of the concerned resource. Therefore, it was decided that HPSLDC shall write letters to MDs of HPSEBL & HPPTCL. It was decided to review the status in another meeting in the first week of March 22. It was intimated that HPSLDC has written letter dt. 14.02.2022 to HPSEBL, & HPPTCL.

9.29. Punjab SLDC also informed that they will be convening a meeting with STU within a week to track the progress.

9.30. In meeting (193rd OCC), NRPC representative informed forum that HPSLDC convened a meeting on 4th March 2022 wherein they presented the results of static and dynamic study conducted by them. NRLDC suggested that dynamic data used by HPSLDC is common data and it was decided that they will use data of particular generators and then apprise about the same.

9.31. UPSLDC also convened a meeting on 7th March 2022 wherein they informed that CPRI has submitted the offer with a completion target of 5 months. It was also discussed that as there are two islanding schemes in UP control area hence it was suggested that CPRI may be asked to do it in 2 parts preferably 2.5 months each for both the islanding scheme.

9.32. UPSLDC representative informed that CPRI would not be able to bifurcate the time separately for both the islanding scheme and acceptance is under consideration by the management.

9.33. HPSLDC representative informed that they have communicated to all generators for providing dynamic data, and only reply from Karcham Wangtoo has been received from till date.

9.34. Rajasthan representative informed that next week they will send their team to NRLDC for modelling the data on PSSE software.

9.35. J&K representative informed that load has been identified and no further update. MS, NRPC asked J&K representative expedite the study work.

9.36. Further, MS NRPC suggested that states shall coordinate with NRPC and NRLDC officials for carrying out the study.

9.37. Further, Punjab and J&K representative were requested to convene a meeting in the last week of March with the officials of NRPC and NRLDC to deliberate about the updated status of the islanding scheme in their control area.

10. Coal Supply Position of Thermal Plants in Northern Region

10.1. In the meeting, NRPC representative apprised the forum about the coal stock position of generating stations in northern region during current month (till 09th March 2022).

11. Renovation and up-gradation of the protection system of substations of UJVN Ltd. under PSDF Scheme (Agenda by UJVNL)

11.1. UJVN Ltd. vide mail dated 11.03.2022 (Copy of the letter is attached as Annexure-A.III. of agenda) has intimated that they have submitted a DPR for renovation and up gradation of the protection system of 132kV & above substation under PSDF scheme to PSDF - NLDC secretariat through PUTCUL, nodal agency under PSDF scheme of Uttarakhand state vide mail dated 30.09.2021.

11.2. UJVNL representative mentioned that PSDF-NLDC secretariat has now desired third party audit and clearance from NRPC prior to its approval under PSDF.

11.3. UJVNL also requested Protection Audit team may be constituted for carrying out Third Party Protection Audit for 10 nos. of 132kV / 220kV S/s or Switchyards of UJVNL.

11.4. NRPC representative informed that Training Programme/Workshop on Protection Audit for Protection System Engineers was conducted in two batches (details of the participants is attached as Annexure.II) and suggested to constitute a team amongst them.

11.5. Forum was of view that two officers from PTCUL and one officer from NRLDC shall be nominated for protection audit. PTCUL and NRLC were requested to confirm the nomination for the same.

12. Water requirement by Jal Shakti Vibhag, Himachal Pradesh from Chamera-1 Dam (Agenda by NHPC)

12.1. NHPC has intimated vide letter dated 14.03.2022 that Jal Shakti Vibhag, Himachal Pradesh vide their letter dated 22/12/2021 (Copy of the letter is attached as Annexure-A.IV of agenda) informed that various Water Supply System (WSS) to the villages in Tehsil Dalhousie and Bhattiyat, Distt.: Chamba (HP) have been sanctioned by the competent authority for which the water has been proposed to be lifted from Channi Lahar, downstream of Village Parihar which is 2 KM upstream of Dam. The total quantity of water required on daily basis is 3.56 ML for the various habitations.

12.2. Further, NHPC representative also mentioned that due to lifting of water from Dam, there will be very minor energy loss (0.28 MU approx. per year) from Chamera-1 Power Station. As the energy loss is negligible in comparison to Generation from Chamera-1 Power Station in a year, it is suggested to allow the Jal Shakti Vibhag, HP, to lift said quantum of water from upstream of Chamera-1 Dam.

12.3. MS, NRPC opined that as there will be energy loss (0.28 MU approx. per year) from Chamera-1 Power Station and with regard to energy loss as there is a departure from PPA, so matter needs to be communicated to GM Division, CEA.

13. Planned shut down for overhaul of NTPC NR/NCR Station Generating Units (Agenda by NTPC)

13.1. This NTPC representative presented the matter to the forum and communicated the major constraints faced by them in overhaul Execution.

13.2. Further, the NTPC representative mentioned that Generating Units overhaul for FY 2022-23 have been planned based on guidelines issued by last LGBR Sub Committee meeting held on 27.10.2021.

13.3. OCC forum asked NTPC to adhere to the planned LGBR schedule for FY 2022-23.

खण्ड-ख: उ.क्षे.भा.प्रे.के. **Part-B: NRLDC**

14. Grid Highlights for February 2022

NRLDC representative monthly grid highlights for the month of Feb'2022:

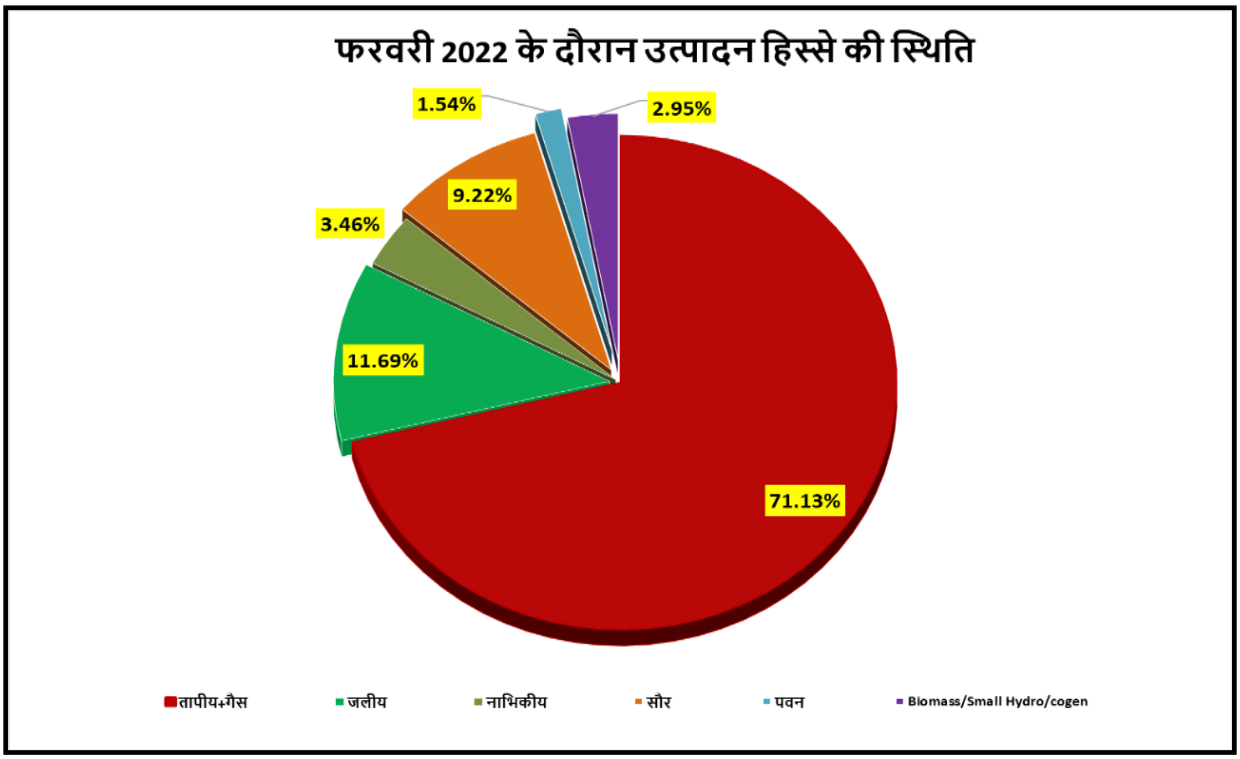
- Maximum energy consumption of Northern Region was 1074.74 Mus on 02nd Feb'2022 and it was 1.32 % higher than Feb' 2021 (1060.73 MUs 02nd Feb'21)
- Average energy consumption per day of Northern Region was 1033 Mus and it was 2.89 % higher than Feb'21 (1004 Mus per day)
- Maximum Demand met of Northern Region was 54996 MW on 04th Feb'22@ 11:00 hours (based on data submitted by constituents) as compared to 56379 MW met on 01st Feb'21 @ 10:00 hours
- Northern Region all time high value recorded in February'22:

Max Demand Met	All Time High Record		Previous Record (upto Jan-22)	
	Value (MW)	Achieved on	Value (MW)	Achieved on
J&K (UT) and Ladakh (UT)	2826	03.02.2022 19:00 hrs	2787	30.01.2022 19:00 hrs

Solar Generation	All Time High Record		Previous Record (upto Jan-22)	
	Value (MU)	Achieved on	Value (MU)	Achieved on
	91.5	12.02.22	82.5	28.01.22

Generation Share

- Total average per day energy production by Northern region was 929.73 Mus in the month of Feb'22 in comparison to 803.55Mus in Feb'21.
- The fuel wise share of generation is shown below:



Frequency Data Comparison

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
Feb'22	50.00	50.26	49.54	6.0	76.8	17.2
Feb'21	50.00	50.31	49.60	6.9	76.4	16.7

NRLDC representative stated that in Feb'22, frequency remained within IEGC band for 76.8 % of the time. It was further added that we should strive for frequency band in the range of 80%. Over drawals below 49.90 Hz must be controlled quickly in order to keep system secure. All utilities were requested to follow all the measures described in subsequent agenda points.

15. Summer preparedness 2022

NRLDC representative stated that with the increase in temperature, demand of Northern Region starts increasing from March onwards every year. Summer of Northern region are typically hot and demand is also high during this time, therefore advance actions help in better grid operation. As per the forecasts issued by IMD for summer-2022, northern parts of India will soon have to embrace warm weather after experiencing prolonged winter days and active wet spells as a result of multiple western disturbances. Along with the country's northwest and northernmost regions, West and Central India are expected to see above-average daytime temperatures.

As a result, states and territories such as Jammu and Kashmir, Ladakh, Himachal Pradesh and Rajasthan may experience more intense summer heat than normal.

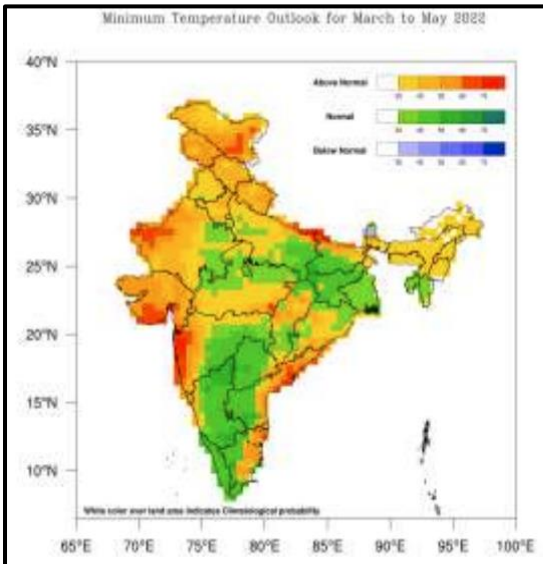


Fig.1a. Probability forecast of Minimum Temperature for March to May 2022.

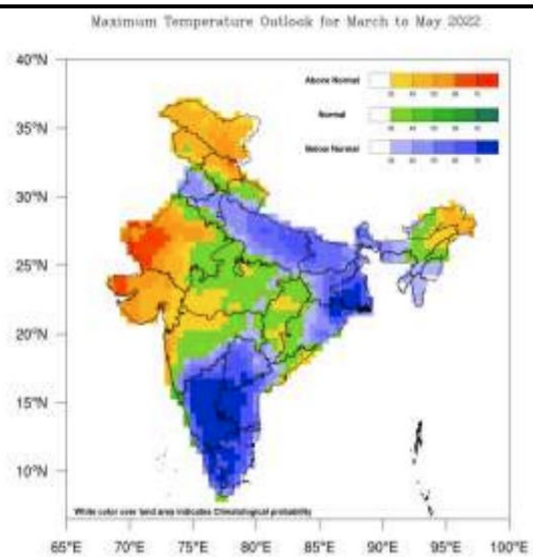


Fig.1b. Probability forecast of Maximum Temperature for March to May 2022.

Due to extreme weather conditions, high demand is observed during summer/monsoon months in Northern region. Along with high demand, high loadings of lines and transformers and low voltages especially at distribution level are big challenge to safe and secure grid operation. To overcome the commonly encountered challenges during summer months and ensuring smooth grid operation, following are few points which have been discussed on many occasions in previous OCC and TCC/ NRPC meetings and are required to be followed by all:

S. No.	Issues	Action plan	Action by
1	**Maintenance of reserves** During summer, in anticipation of increasing demand, adequate reserves shall be maintained. During summer, sudden outage of hydro units on silt or other major generation outage affects frequency/voltage, line loading, reliability and security of the corridor/control area/Generation complex etc. In events of sudden load crash, ISGS generators are being instructed to back down to 55% of their installed capacity.	In such cases, apart from portfolio management based on proper forecast as discussed above, re-starting of units under reserve shutdown at state as well as Inter-state level through appropriate transactions is required. Moreover, display window showing reserve available in ISGS generators has been developed at NRLDC. SLDCs were also requested to arrange for such display window at their control centers so that system operators readily know quantum of reserve available and hence better real-time actions can be taken.	NRLDC, SLDCs, Generators

	However, amongst states only UP state-controlled generators are seen to be backing down upto 55%, which ensures that sufficient reserves are available to cater any variation in demand.	Other states were also requested to take actions to ensure backing down of generators to 55% of their capacity in case of critical situations. This would ensure reserves in the system and also make us prepared for extreme situations.	
2	**Furnishing of coal stock position** Advance information of coal stock of thermal plants ensures generating units availability and it is very important during high demand season.	It has been observed in past years that sudden information of outage of thermal units on coal unavailability poses challenges to meet high demand. It was requested to update & share coal stock position of thermal plants at least a week in advance as agreed earlier in TCC/NRPC meeting. Presently, only IGSTPP Jhajjar and Rajasthan are sharing the data with NRLDC.	Generators, SLDCs
3	**Portfolio Management, load staggering** As discussed in previous OCC meetings states such as UP, Rajasthan and Haryana continue to connect/ disconnect large quantum of load at hourly boundaries resulting in frequency spikes and instantaneous over voltages. This has also resulted in tripping of lines on overvoltage in recent past. In view of high/increasing demand & transmission constraints (if any) in importing the power or in case of any contingency in the system, states are requested to maximize their internal generation to avoid low frequency/low voltage operation or other related issues.	Apart from LTA/MTOA/STOA/Market arrangements based on forecast, other short-term arrangements should also be planned for real time imbalances. For example, ensuring adequate margin while scheduling own thermal generation, units on bar, maintenance of reserves, technical minimum operation of thermal units in case of load crash, tie up with neighbor states or hydro rich states and utilization of real-time market etc. to bridge the load-generation gap in real time.	SLDCs
4	**Tower Strengthening and availability of ERS** There have been number of instances of tower collapse & damage in the past during thunder storms which resulted in	All utilities were advised to ensure availability of Emergency Restoration System (ERS) for early restoration of supply. Each utility shall work on plan for tower repairing work before April.	**STUs and POWERGRID**

	constraints in supply power for extended duration of time. Number of tower collapse incidents occurred during last summer also in May/Jun 2020 & 2021 in which many EHV lines including 765kV lines were out on tower collapse.	Extra precautions need to be taken care for important lines which have history of tripping during thunderstorm/ windstorm. All transmission utilities were requested to share latest status regarding availability of ERS. On enquiry, none of the STUs/ transmission licenses highlighted any issues regarding ERS availability.	
5	**Reactive power management** Over the years during summer months, it has been observed that voltage profile during summer has improved. However, it is always essential to remain alert and take all necessary precautions to avoid any issues arising due to low voltages during summer months.	To maintain the voltage profile of Grid within IEGC band during summer, following known actions are suggested: i. Switching ON Capacitor/Switching OFF reactor as per system requirement ii. Tap Optimization at 400/220kV by NRLDC and 220/132kV by respective state control area based on scatter plots of ICTs, offline studies, NRPC RE account etc. iii. Dynamic reactive support from Generator as per their capability curve. iv. SCADA Displays for better visualization during real-time	NRLDC, SLDCs
6	**Defense Mechanism** Several defense mechanism schemes have been recommended by various committees and advantages of such defense schemes have been discussed in many fora too. Majority of defense mechanism are to cover protection for under voltage, under frequency, rate of change of frequency, SPS for line/ICTs loading/generator complex evacuation etc. It is pertinent to mention here that SPS is only for operational defense and should not be considered as long-term solution.	Till date it has been observed that performance of SPS is considerably low. Accurate operation of SPS is very essential and hence, mapping of SPS in SCADA is also being done. It was suggested that all state control area/Users shall ensure before start of summer that their protection and defense system are in working conditions and settings are as per the recommendations of NRPC. In addition, all states/user need to provide update for changes or modifications carried out if any. Mock-testing of all critical SPS may be carried out before summer 2022.	Transmission utilities (STU/ISTS) and SLDCs
7	**Telemetry**	All were requested to ensure the telemetry of all analog & digital points of	SLDCs

	It has been observed number of times, that telemetry of large nos of stations is affected during contingency, inclement weather, or in day to day switching operations etc.	all stations at respective control centers. Large number of telemetry issues are also encountered with newly commissioned elements.	STUs, Generators, Transmission licensees

In the meeting, it was highlighted that as per CERC committee report on spinning reserves (2015):

"Each region should maintain secondary reserve corresponding to the largest unit size in the region and Tertiary reserves should be maintained in a de-centralized fashion by each state control area for at least 50% of the largest generating unit available in the state control area."

All members agreed to follow the above mentioned measures to ensure safe and secure operation of grid.

Due to unfavourable weather conditions during summer months, All India demand is on the higher side. On several days, it is observed that frequency is below the band for most of the time. In order to maintain the Grid security all SLDCs were requested to take proactive steps as follows:

- Ensure that ADMS is in service and expedite its implementation if not commissioned.
- Ensure healthiness and availability of AUFLS and df/dt load shedding.
- Ensure revival of intra-state generators under economic shutdown/RSD
- Ensure portfolio balancing through STOA/RTM market segments
- Ensure no under injection by the generators from schedule
- In case of inadequate margins in intrastate generators measures for emergency load regulation measures may be taken in interest of grid security.
- Pursue generators to expedite revival of thermal units under forced outage wherever feasible.

In this case, the list of radial feeders become very important. Utilities have been requested number of times to update list of radial feeders which can be opened on the directions of NRLDC to regulate the demand. List of such radial feeders has been provided by respective utilities and is part of 'Operating Procedure of Northern Region'. Latest list of radial feeders is also attached as Annexure-B.I of agenda. Following are the attributes for such feeders:

- Feeders shall be radial in nature
- They should usually have substantial load flow so that reduction of drawal can be prominently noticed on opening of such lines.

The opening of feeders is generally an extreme step which shall be required in case of threat to grid security and non-adherence to RLDC instructions to manage over

drawl by SLDCs/ DISCOMs. In such a case, every utility needs to take actions to support RLDC by following their instructions including opening of feeders.

SLDCs were once again requested to review and share the list of the following:

- Intrastate 132kV feeders and 220/132 kV and 132kV / 33 kV transformers which supply load radially within the state and can be disconnected at the instruction of SLDC
- Tie lines which supply load radially within the state, which can be switched off from the substation belonging to a different entity, at the instruction of RLDC
- 400/220kV and 220/132kV ICTs at state boundary, which cater load radially and can be switched off from the substation belonging to ISTS or other entity

SLDCs were once again requested to verify that

- list of feeders is actually radial in nature and are likely to provide the expected relief
- such feeders are not part of any other scheme such as any SPS, UFR or df/dt actuated shedding

Utilities may also intimate in case no radial feeders are available to disconnect. In such a case, NRLDC along with constituent will study the grid connected feeders /ICTs for disconnection which has low impact in the NR Grid. For such states, it is requested to nominate one nodal officer from SLDC which shall coordinate with NRLDC and study about such feeders.

Telemetry is to be ensured for all such feeders for monitoring in real time by SLDC/ NRLDC. States were also advised to take necessary remedial measures for minimizing sustained over drawal at low frequencies as per the IEGC.

16. Sharing of hourly Load shedding under different categories on NRLDC Reporting Software

As discussed in 189th OCC meeting, recently, Secretary, Ministry of Power, emphasized the importance of ensuring accuracy of the hourly load shedding (MW) and energy not met (MU) figures being received from various SLDCs on daily basis in respect of their own states, and classifying them under different heads like low availability, transmission constraints, financial constraints, planned maintenance of transmission / distribution system within state, etc.

Although SLDCs are uploading the hourly load shedding figures of the previous day on the web-based reporting software of NRLDC the next day, but reason for the shedding or unserved demand at any hour is not segregated into the possible different categories.

UP, Haryana, Rajasthan, Punjab, Uttarakhand and HP are providing reasons whereas some other states such as Delhi, J&K and Chandigarh are not furnishing the reasons for load shedding. In view of the above, it is once again requested to kindly classify the reason of shedding in the detail sheet of hourly load shedding, in the daily power supply report, before uploading it to the web-based reporting software on daily basis.

In 192 OCC meeting, Delhi, J&K and Chandigarh SLDC representative was not available for comments. NRLDC representative expressed concern and stated all SLDCs should immediately take necessary actions as the same is pending since long. As discussed in last OCC meeting, Delhi SLDC should communicate with DISCOMs to timely furnish the data as the same further needs to be shared with MoP. Delhi SLDC was also asked to share their communication to DISCOMs with POSOCO and MoP for taking further actions if DISCOMs are not ready to timely share the details as per the format.

In 193OCC meeting, Delhi SLDC representative stated they have started sharing the load shedding details are required from 20th March 2022 onwards. However, due to delay in receiving the data from DISCOMs, there might be some delay in reporting the data to NRLDC.

Uploading of Daily Power Supply Position Report of J&K(UT) on NRLDC Reporting Software:

Regulation 5.5.1(b) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010, regarding the preparation of periodic reports by NLDC/RLDC/SLDC states that

"A daily report covering the performance of the regional grid shall be prepared by each RLDC based on the inputs received from SLDCs/Users and shall be put on its website. This report shall also cover wind and solar power generation and injection into the grid."

In compliance with the above regulation, a daily power supply position report for Northern Region is being prepared by the Northern Regional Load Despatch Centre based on the inputs received from SLDCs/ Users of the Northern Region.

Presently the Power supply position in respect of J&K (UT) is received through email with a delay of 24 hrs to 72 hrs. Due to receipt of delayed input from J&K(UT), Northern Region Power supply position report is prepared considering ISTS end SCADA data of J&K(UT) and Ladakh (UT) as this report is time critical, and required to be submitted to NLDC by 06:00 Hrs every day. However, at a later date when the power supply position is actually received from J&K(UT) it is seen that there is a significant difference between the power supply position report prepared by NRLDC and J&K (UT). This issue was also communicated with SLDC Jammu vide NRLDC letter dated 20.10.2021 (Annexure-B.II of agenda)

Power supply position report is one of the key reports of the region and sanity and integrity of its data is of paramount importance. The report is also scrutinized by Hon'ble Minister of Power and New & Renewable Energy and based on it, many other reports are prepared and shared with MoP, CEA, NLDC and other power sector utilities.

In view of the above, it is requested to kindly ensure that the daily power supply report in respect of J&K(UT) and Ladakh (UT) is positively submitted to the web-based reporting software by 03:00 AM on daily basis.

J&K SLDC representative stated that they would be ensuring sharing of data with NRLDC timely so that they are able to incorporate all the values in their report which is to be submitted to MoP. However, regarding daily reporting of accurate load shedding data, they shall take up the matter with their STUs.

17. TTC/ATC of state control areas for summer 2022

NRLDC representative stated that from last several OCC meetings, it has been discussed that most of the NR states except J&K, Ladakh and Chandigarh U/Ts are sharing basecase and ATC/TTC assessment with NRLDC. SLDCs are once again requested to go through the tentative ATC/TTC limits for April 2022 (Annexure-B.III of agenda) and provide comments. If no comments are received, these limits will be assumed confirmed and uploaded on NLDC website. SLDCs are also requested to upload these limits in their respective websites.

It is observed that some states are still not declaring the TTA/ATC for the import and export of power. *OCC advised all states to timely declare TTC/ATC for prospective months and revise the figures as per requirement. States were also requested to regularly provide update regarding the upcoming transmission elements which would improve import capability of respective state control area.*

Punjab

Punjab was requested to provide update on the following works which are likely to enhance ATC/TTC of Punjab state control area:

- Augmentation of 1 No. 315 MVA ICT with 500 MVA ICT at Ludhiana by shifting of 500 MVA ICT lying spare at Malerkotla to Ludhiana
- Commissioning of new 500MVA ICT at Rajpura
- Augmentation of Kartarpur-Jalandhar PGCIL line with HTLS conductor to make 2 No. 315 MVA ICTs N-1 complaint at Nakodar.the loading of these ICTs to be controlled by shifting of Kartarpur load to Jalandhar PGCIL (presently running from Nakodar ICTs)

In the meeting, it was discussed that all these elements are expected before paddy 2022. NRLDC representative stated that the period from June-Sep is associated with very high demand in Punjab state control area and Northern region. The import capability of state is also limited due to major transmission constraints such as 400/220kV ICTs at Rajpura, Nakodar, Ludhiana and several 220kV lines.

As per latest NRPC LGBR 2022-23

	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
Availability (MW)	10870	12030	12220	12220	12150	12150
Requirement (MW)	8370	8930	**15500**	15320	14700	14340
Surplus/Shortfall (MW)	2500	3100	-3280	-3100	-2550	-2190
Surplus/Shortfall (%)	29.90%	34.70%	-21.20%	-20.20%	-17.30%	-15.30%

At the time of this very high demand, maximum internal generation should be available to help state in meeting demand safely. However, due to forced outage of generating units especially at Talwandi Saboo generating units, there is major issue in meeting demand in safe and secure manner. In 2021, there were numerous forced outages of Talwandi Saboo units (each 660MW capacity). Even in the lean season during Jan-Mar2022, there have been numerous outage of Talwandi Saboo units including those due to coal shortage issues.

In 191 OCC meeting, Punjab SLDC was asked to take up the matter on top priority with TSPL and try and ensure maximum generation capacity availability during peak demand season. In

192 OCC meeting, Punjab SLDC representative stated that the matter has been taken up on priority with TSPL with written communication, however problems are still persisting with TSPL units. NRLDC representative also highlighted that due to frequent outages of TalwandiSaboo units, frequent ATC/TTC revisions need to be carried out, moreover since the revisions only become effective after some time blocks, it leads to a situation when Punjab faces big challenge in safely meeting the demand without over drawing. To overcome these issues, along with ensuring availability of TalwandiSaboo units, other generating units should also be available along with sufficient fuel stock and it is also essential that Punjab takes necessary steps to enhance their ATC/TTC limits before paddy 2022

Punjab SLDC to share the revised ATC/TTC limits for summer/paddy 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest. Punjab SLDC agreed to share the computations with in one week.

UP

SPS for Sohawal and Lucknow to be expedited.

In 191 OCC meeting, UP SLDC representative stated that :

- Exploring possibility of shifting SPS from Bareilly(UP) to Sohawal.
- Constraint at 400/220kV Lucknow(PG) is likely to be relieved with full commissioning of 400/220kV Jehta S/s.

In 192 OCC meeting, *UP SLDC informed the following:*

- *No progress on works for SPS of Sohawal(PG). NRPC and NRLDC expressed concern on the same.*
- *Mock-testing would be carried out in Anpara-Unnao complex.*

In 193 OCC meeting, *UP SLDC informed the following:*

- *No progress on works for SPS of Sohawal(PG). NRPC and NRLDC expressed concern on the same (UP-STU).*
- *Loading of 400/220kV Sohawal ICTs is expected to be lower this year due to commissioning of nearby substations such as Basti and outage of 220kV lines.*

UP SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest. UP SLDC agreed to share the computations with in one-two week.

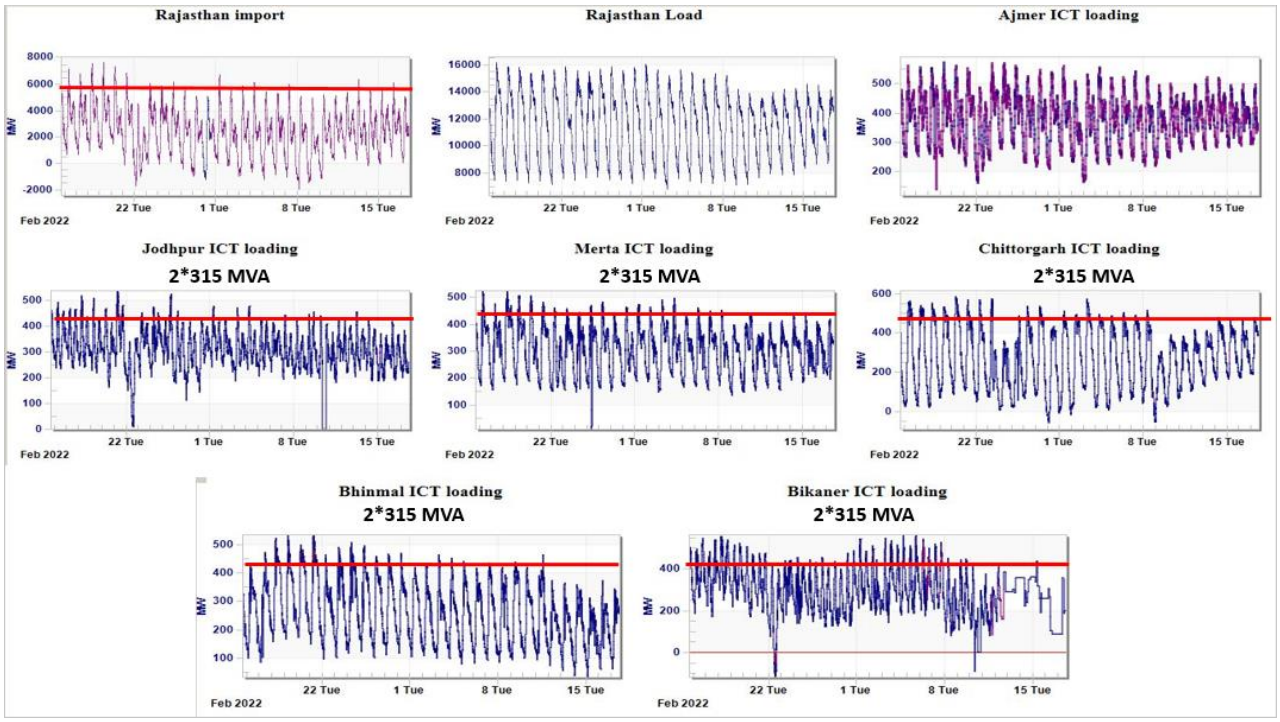
Rajasthan

Rajasthan had shared ATC/TTC calculations with NRLDC on 22.10.2021. On 28.10.2021, NRLDC has shared their observations on basecase as well as simulation studies carried out by Rajasthan.

Rajasthan was requested to share the revised simulation studies with NRLDC alongwith details of bus-split, other operational changes in system. Rajasthan SLDC was asked to take up the matter for implementation of SPS at Jodhpur and other stations with STU and ensure loading below N-1 contingency limit at constrained 400/220kV ICTs.

Rajasthan SLDC had shared latest basecase & ATC/TTC assessment with NRLDC on 18.02.2022. Bus split has been done at 220kV Dholpur and Raps-C. NRLDC had shared their observations on 23.02.2022.

In 193 OCC meeting, Rajasthan SLDC representative informed there were some changes yet to be incorporated in basecase shared by NRLDC. NRLDC representative stated same may be carried out by Rajasthan before assessment of ATC in basecase shared. It was also informed by Rajasthan that proposal for SPS at constrained locations is under approval and would be brought for discussion in next OCC meeting. ICT Loadings observed above N-1 contingency limits were also discussed in the meeting.



Delhi

ATC is not being uploaded in website, only violation of ATC is being shown.

In 190th OCC meeting, Delhi SLDC representative stated that the limits would be reassessed for next summer season shortly with commissioning of 400/220kV Dwarka substation and accordingly revised ATC/TTC limits would be uploaded on website. NRLDC representative suggested that present ATC/TTC limits may be uploaded on SLDC website and with commissioning of 400/220kV Dwarka substation, revised ATC/TTC may be uploaded.

Delhi representative was not present in 192 OCC meeting for comments.

In 193 OCC meeting, Delhi SLDC was asked to implement SPS at Mundka and Bamnoli to save supercritical loads under N-1 contingency of one ICT. Delhi representative stated SPS at Mundka would be implemented before summer season. However, same is yet to be confirmed by DTL. NRLDC asked DTL and Delhi SLDC to coordinate and expedite shifting of ICT from Bamnauli to Mundka and implementation of SPS at 400/220kV Mundka. Delhi SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest.

Haryana

Haryana SLDC was once again requested to expedite implementation of SPS and ICT capacity augmentation at 400/220kV Deepalpur and Kurukshetra (PG) to enhance their ATC/TTC limits at the earliest**.** Haryana SLDC informed SPS would be implemented at Deepalpur by Apr'2022. For Kurukshetra, they will take up the matter with POWERGRID, however loading is expected to be much lower this year.

Haryana SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest.

HP

HP has started sharing its ATC assessment since last 3 months in consultation with NRLDC. It was discussed that mostly intrastate constraints were highlighted by HP and the studies were done for lesser import values. HP was advised to assess possible tie-line/ICT constraints with import close to real-time values. One to one meeting was organized on 03.12.2021 between NRLDC and HP SLDC officials to overcome the challenges being faced by SLDC in ATC/TTC assessment and other issues in PSSe.

It was discussed that ATC for summer 2022 may be shared at the earliest.

Uttarakhand

Uttarakhand has also shared its ATC assessment with NRLDC for winter 2021-22. It was discussed that ATC for summer 2022 may be shared at the earliest.

J&K

Not assessing its ATC. J&K representatives had intimated during 47th TCC and 49th NRPC meeting that they would be sharing ATC/TTC assessment with NRLDC from October 2021, however the same is still awaited. J&K and Ladakh U/Ts are once again requested to advise the concerned officers to evaluate their ATC/TTC limits in coordination with NRLDC and share latest assessment with NRLDC and NRPC after procurement of PSSe software.

As discussed in last several OCC meetings, all SLDCs need to furnish ATC/TTC details of their control area at respective SLDC websites. Now, it is being observed that most of the SLDCs except J&K and Delhi are uploading ATC/TTC limits on their websites.

SLDC	Link for ATC on website
UP	https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde
Punjab	https://www.punjabsldc.org/downloads/ATC-TTC0321.pdf
Haryana	https://hvpn.org.in/#/atcttc
Delhi	**NA**
Rajasthan	https://sldc.rajasthan.gov.in/rrvpnl/scheduling/downloads
HP	https://hpsldc.com/mrm_category/ttc-atc-report/
Uttarakhand	http://uksldc.in/transfer-capability
J&K and Ladakh U/T	**NA**

Since from March onwards, demand of most of the NR states starts increasing, it was requested that the revised ATC/TTC limits for summer 2022 along with anticipated generation scenario may be shared with NRLDC at the earliest.

It is again requested that SLDCs may ensure that loading of ICTs and lines are below their N-1 contingency limits. While requisitioning power from various sources, states should take care to limit their scheduled drawl as well as actual drawl in real time within the Available Transfer Capability (ATC) limits assessed by SLDC and NRLDC.

18. Grid operation related issues

(i) Generation assessment for opening of bus coupler at Dadri TPS

400 kV bus at Dadri is split into two portions in order to contain the short circuit level. Split bus operation is not the desirable solution. It reduces reliability of the power station as a whole and also causes heavy loading of the connected lines & ICTs on one section and skewed power distribution. In addition, the section with lesser short circuit level experiences high voltage during off-peak periods, with no means for voltage control.

On one section (I):

• Thermal units of stage-I connected via 3*500MVA ICTs

• 400kV lines such as Panipat ckt1 and ckt 2, Muradnagar New and Harshvihar ckt1

On other section (II):

• Gas Plant units connected via 2*500MVA ICTs and thermal units of stage-II

• HVDC interconnectors

• 400kV lines such as Mandola ckt 1 and 2 having series line reactors at Mandola end

• 400kV lines such as Kaithal, Gr. Noida, Maharani bagh, Harshvihar ckt2

Almost similar results were observed in All India March 2022 peak basecase. Following are major observations:

- Since section-II is connected with Dadri gas, Dadri Stage-II and HVDC, it has much higher fault level than section-I.
- Generally, when total generation at Dadri is greater than 500-600MW, 3-phase fault current is more than 40kA.
- To ensure limited fault current levels, it is suggested that bus sectionaliser at Dadri TPS may be opened when generation at Dadri generating station (including Stg. I, Stg.II and Gas) is higher than 500MW.
- Upon discussion and agreement in OCC meeting, same would be shared with NRLDC and Dadri control rooms and followed in real-time.

In 192 OCC meeting, MS NRPC enquired whether bus coupler needs to be closed/opened as per real-time condition. NRLDC representative informed that generally if more than one unit of 490MW is on bar, then bus coupler would be opened. NTPC representative stated they would respond after consulting the generating station. POWERGRID representative informed that commissioning of series reactors is planned only in Bhiwani(PG) in Delhi/NCR area to limit the fault current in Delhi ring.

NTPC representative agreed with the study results and assured the same would be followed in real-time operation.

(ii) Long outage of transmission elements/ generating units

Reasons and revival date for elements and generating units under long outage are being discussed regularly in OCC meetings. Any update on the status of these elements and generating units from last OCC meeting may be shared with the forum (Annexure-B.IV of agenda).

All utilities were requested to make it a practice to update status of elements under long outage in the NRLDC outage software portal. Utilities are requested to take necessary actions to revive elements which are under long outage. Following information was received from UP SLDC:

S. No.	Element Name	Date of Outage	Tentative date of revival	Outage reason
1	220kV Gonda - Sohawal (PG)	12-08-2021	30 May 2022	tower no. 34 is affected by flood
2	220kV Bahraich - Sohawal (PG)	12-08-2021	30 May 2022	tower no. 34 is affected by flood
3	400/220 kV 315 MVA ICT 1 at Muradnagar old	13-03-2020	30 Dec 2022	Damaged. TWC approved on 09.12.2021 for replacement with 500MVA new ICT .
4	400/220 kV 500 MVA ICT 2 at Noida Sec 148(UP)	19-08-2020	30 June 2022	Damaged
5	220kV Agra(PG) - Firozabad	27-11-2021	30 Apr 2022	Jumpering work for making Lilo point of 220 kv Firozabad(400)- Agra(765) PG line at 220 kv Tundla. FTC process completed but yet to be charged due to PLCC issue at Tundla end.
6	1500 MVA ICT 2 at 765/400 kV Gr.Noida	12-11-2021	30 Apr 2022	PRV- 1 & 2 Trip, Differential protection and Buchholz Trip. inspected our 1500 MVA ICT-2 (R-Ph), During inspection it is found that the IV Bushing got damaged and oil flowed out from the bushing. During complete internal inspection by OEM M/s BHEL winding found faulty
7	50 MVAR Non-Switchable LR on 400kV Agra-Unnao at 400kV Agra end	28-10-2021		Bushing damaged , concerned written to OEM for inspection of reactor.
8	240 MVA ICT - III at 400kV Moradabad	13-12-2021	30 Dec 2022	It has been informed that 315MVA ICT has been approved
9	50 MVAR Bus Reactor No 1 at 400KV Moradabad	03-12-2021	30 Dec 2022	Bushing Damaged, not available in UPPTCL. Written to designated circle.
10	400kV Bus - I at Vishnuprayag HEP		30 Sep 2022	
11	765kV Anpara D-Unnao line		26 April 2022	

In some cases, it was observed that the shutdown was extended beyond the approved outage hours. Utilities were asked to avoid such instances in future.

Sr.N	Element Name	Purpose of shutdown	Shutdown taken by	Delayed charging (Hours)
1	765 KV BARA-MAINPURI (UP) CKT-2	Circuit Breaker maintenance, testing	SLDC-UP	06:49
2	765 KV KOTESHWAR-MEERUT (PG) CKT-2	for Annual maintenance work.	CPCC1	02:22
3	765 KV AGRA FATEHBAD(UP)-LALITPUR(LPG) (UP) CKT-1	Routine Maintenance of line like jumper nut bolt tightening and other work. Testing of associated Line reactor and relays at Fatehabad end	SLDC-UP	01:43
4	765 KV AGRA FATEHBAD(UP)-LALITPUR(LPG) (UP) CKT-1	Routine Maintenance of line like jumper nut bolt tightening and other work. Testing of associated Line reactor and relays at Fatehabad end	SLDC-UP	02:17
5	765 KV AGRA FATEHBAD(UP)-LALITPUR(LPG) (UP) CKT-1	Routine Maintenance of line like jumper nut bolt tightening and other work. Testing of associated Line reactor and relays at Fatehabad end	SLDC-UP	02:14
6	765 KV VARANASI(PG)-VINDHYACHALPOOL(PG) (PVTSL) CKT-2	On Line CSD commissioning work.	CPCC3	02:47
7	400 KV LUCKNOW_1(PG)-LUCKNOW(UP) (PG) CKT-1	Transmission Line Diversion work due to construction of Outer Ring Road by NHAI.	CPCC3	04:26
8	400 KV SULTANPUR(UP)-LUCKNOW_1(PG) (PG) CKT-1	Transmission Line Diversion work due to construction of Outer Ring Road by NHAI.	CPCC3	04:27
9	400 KV LUCKNOW_1(PG)-BASTI(UP) (PG) CKT-1	Transmission Line Diversion work due to construction of Outer Ring Road by NHAI	CPCC3	74:19:00
10	400 KV ALLAHABAD-FATEHPUR (PG) CKT-2	for replacement of porcelain insulator string with CLRI in substation	CPCC3	03:59

Sr.N	Element Name	Purpose of shutdown	Shutdown taken by	Delayed charging (Hours)
		gantry tower as well as in Transmission line under Fatehpur		
11	400 KV BAMNOLI(DV)-JHATIKARA(PG) (DTL) CKT-2	For connecting LILO Line with Ckt1 of 400KV D/C Bamnauli-Jhatikala Line	CPCC1	02:22
12	400 KV BAMNOLI(DV)-JHATIKARA(PG) (DTL) CKT-2	For Line CVT Tan Delta Testing as per PMS Schedule.	CPCC1	01:53
13	400 KV SARNATH(UP)-VARANASI(PG) (PG) CKT-1	OVERHEAD CROSSING OF UNDERCONSTRUCTION 400 KV DC TWIN MOOSE VARANASI (PGCIL)-JAUNPUR LINE BETWEEN LOCATION NO 06 & 07	CPCC3	03:44
14	400 KV SARNATH(UP)-VARANASI(PG) (PG) CKT-2	OVERHEAD CROSSING OF UNDERCONSTRUCTION 400 KV DC TWIN MOOSE VARANASI (PGCIL)-JAUNPUR LINE BETWEEN LOCATION NO 06 & 07	CPCC3	03:44
15	400 KV ALWAR(ATIL)-HINDAUN(RS) (ATIL) CKT-1	for Annual maintenance of transmission line.	SLDC-RS	03:49

Information about new transmission elements/ generating units to be commissioned in next 45 days

In 176th OCC meeting, it was discussed that first time charging procedure is not being diligently followed by some entities. The documents are being submitted at the last minute and thereafter it is being urged to NRLDC to give the code for charging. In the meeting it was also requested that utilities should inform about elements expected for first time charging in the next one month in advance in OCC meeting. This information would be helpful in carrying out studies, SPS requirement/modification etc in time.

Utilities are also requested to make sure that list of 220kV and underlying intra-state lines and ICTs is readily available with them, so that the same can be shared with NRLDC/NRPC as and when required. This data is to be shared with NRLDC/NRPC for timely updation of Power maps, PSSe basecase, Protection analysis etc.

Following information was received from UP SLDC:

- LILO of 765 kv Mainpuri- Greater noida Line at Jawaharpur TPS.
- LILO of 220 kv Sohawal (pg) - New tanda line at 220 kv Ayodhaya.
- LILO of 220 kv Gorakhpur (pg)- Bansi line at 220 kv Dulhipar.
- 765 kv s/c Ghatampur TPS - Hapur line (including 330 MVAr line reactor at Hapur end)
- 125 MVAR bus reactor at 400 kv mau.
- LILO of 220 kv Fatehpur- Unchahar ckt-II at 220 KV malwan
- 125 MVAr bus reactor at 400 KV Panki
- 500 MVA ICT-I at 400 KV Rasra along with bay no 402,408,409 at 400 kv Rasra.
- 400 KV Badaun- Sambhal D/C line.
- 400 KV Sambhal substation.
- 400 KV Sambhal -Rampur D/C Line

In line with the above decisions, all utilities were requested to share the information about transmission elements/ generating units which are expected to be first time charged in the next 45 days. It was also discussed that as 31March is approaching, utilities shall ensure timely submission of FTC documents to avoid issues during last days of March and facilitating charging of transmission elements.

(iii) Calculation of Drawal points based on SLDC end data

As discussed in the 6thTeST meeting all SLDCs shall maintain its own drawal calculation (alternate calculation based on the SLDC drawal points) for proper monitoring and SLDC also shall be responsible for calculation of its own drawl based on their drawal points at their respective feeders/ICTS. SLDC shall use its own calculated value of monitoring real-time drawal from the grid along with ISTS drawal to ensure the correctness and corrective measures shall be taken accordingly. UP and Delhi are using their end calculation as primary calculation for monitoring of drawal whereas Rajasthan is entirely dependent on STU data.

However, Punjab, Haryana, Jammu and Kashmir, Uttarakhand are dependent on RLDC end drawal values. All concerned are requested to please compute drawal values at SLDC end also, so that same can be verified with NRLDC end value and any discrepancy can be rectified immediately.

In 188th OCC meeting, MS NRPC expressed concern and asked all the states which are only dependent on RLDC end data to take necessary actions and compute drawl values at SLDC end also. It was also suggested that the agenda be continued in OCC meeting till resolution of issue by all states.

In 189th OCC meeting, MS NRPC stated that NRLDC may request all SLDCs to confirm the status via email. Based on the feedback received, issue may be discussed in next OCC meeting.

Accordingly, an email was circulated to respective SLDCs on 10.12.2021. However, response from SLDCs is yet to be received.

In 190th OCC meeting, Punjab SLDC representative informed that data calculation from SLDC end data is complete and display for difference between the values from NRLDC end and Punjab SLDC end data is also available at SLDC control room. Punjab SLDC will share screen shot of display available at their control centre with NRLDC.

Haryana SLDC representative stated that data from some stations such as 220kV Bawal is not available at SLDC. It was also informed that drawl data is being monitored from both NRLDC and HVPN end data. Data from 56 points out of 101 points of Haryana end data is telemetered while for remaining data they are using NRLDC end data only due to telemetry issues and other issues such as 220/66kV station being BBMB station, 66kV data is not available.

Uttarakhand SLDC representative stated that at 2-3 stations, RTU is faulty and replacement work is being carried out which would ensure availability of SLDC end data for drawl calculation. Till the replacement work, they are relying on NRLDC end data. NRLDC representative asked Uttarakhand to expedite replacement of faulty RTUs and ensure drawl data availability from SLDC end data also.

CGM(SO) NRLDC had stated that SLDCs should maintain separate lists of points from which both end or single end data is available and regularly monitor all these points. They should also take necessary actions for the points for which telemetry issues are observed.

SLDCs were requested to provide update on the agenda point.

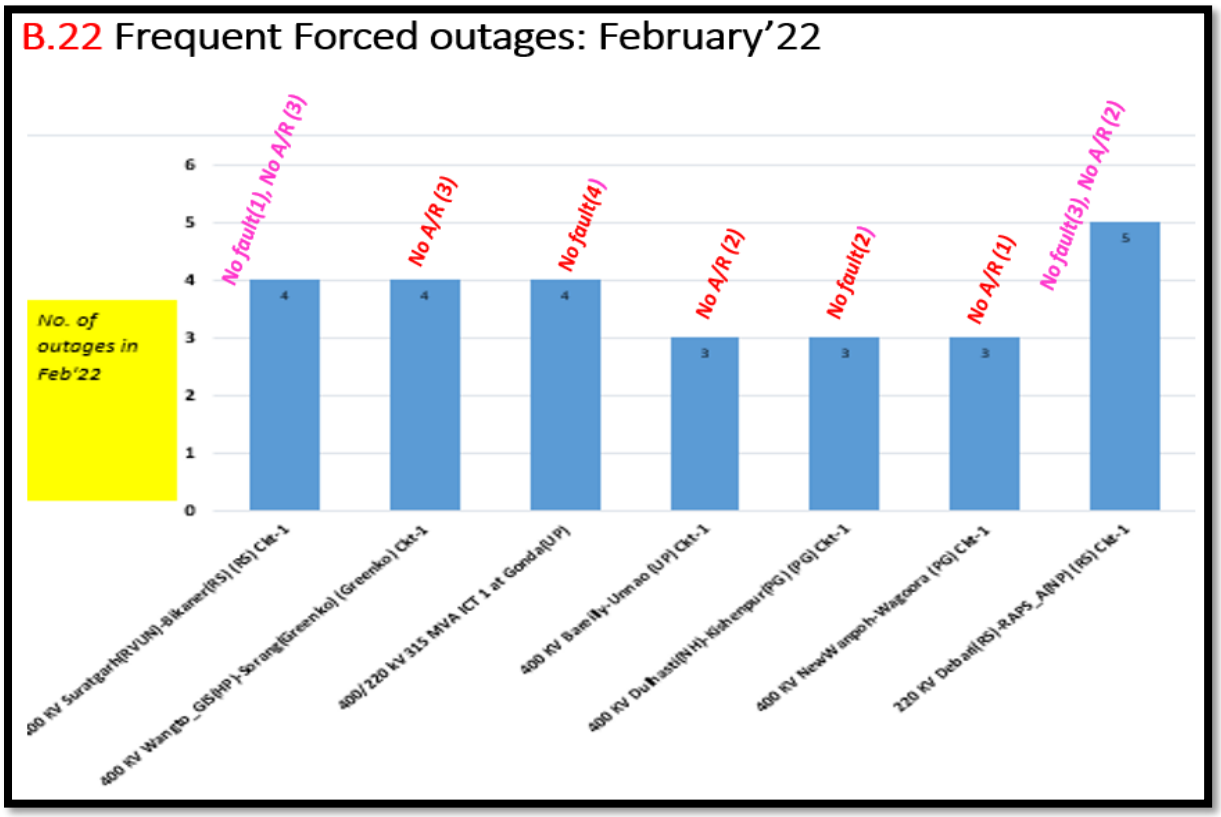
HP SLDC vide their letter dated 8th March 2022 has intimated that:

- For calculation purpose, interstate drawl points have been mapped in SCADA from both ends keeping in view healthiness of communication media at both ends and other end has been mapped for redundancy, which seems to be more purposeful.
- DISCOMs of HP is in process of installation of new RTUs at 48no.s locations and providing fibre optic communication media on 66kV and above stations. It is anticipated that with these installations, reliability of SCADA data at various drawl points shall be maintained. Till such time the work is completed, it is proposed to utilise the SCADA end data of other end for calculation purpose. The existing work of installation of RTUs and Fibre Optic is likely to be completed within three months as confirmed from HPSEBL.

19. Frequent forced outages of transmission elements in the month of Feb’22

The following transmission elements were frequently under forced outages during the month of **Feb’22**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	400 KV Suratgarh(RVUN)-Bikaner(RS) (RS) Ckt-1	4	Rajasthan
2	400 KV Wangto_GIS(HP)-Sorang(Greenko) (Greenko) Ckt-1	4	HP/Greenko
3	400/220 kV 315 MVA ICT 1 at Gonda(UP)	4	UP
4	400 KV Bareilly-Unnao (UP) Ckt-1	3	UP
5	400 KV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1	3	POWERGRID/NHPC
6	400 KV NewWanpoh-Wagoora (PG) Ckt-1	3	POWERGRID
7	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	5	Rajasthan/NPCIL



The complete details are attached at **Annexure-B.V of the Agenda.**

Discussion during the meeting:

400 KV Suratgarh (RVUN)-Bikaner (RS) (RS) Ckt-1: *Rajasthan representative informed that multiple times tripping occurred in this line due to transient fault and*

A/R was in off condition in this line. NRLDC representative suggested to ensure healthiness/ in service of A/R in all 220 kV and above transmission lines in compliance to CEA Grid Standards. Rajasthan representative agreed for the same.

400/220 kV 315 MVA ICT 1 at Gonda (UP): *UPPTCL representative informed that frequent tripping of ICT occurred due to over fluxing. He further informed that loading is expected to increase in coming months thereby reducing tripping on Overflux.*

400 KV Bareilly-Unnao (UP) Ckt-1: *UPPTCL representative informed that issues like non-functioning of A/R at Bareilly end were found in trippings of this line. He further informed that issue has already been taken and now A/R will operate in this line.*

400 KV Dulhasti (NH)-Kishenpur (PG) (PG) Ckt-1: *POWERGRID representative informed that tripping occurred due to transient fault in the line.*

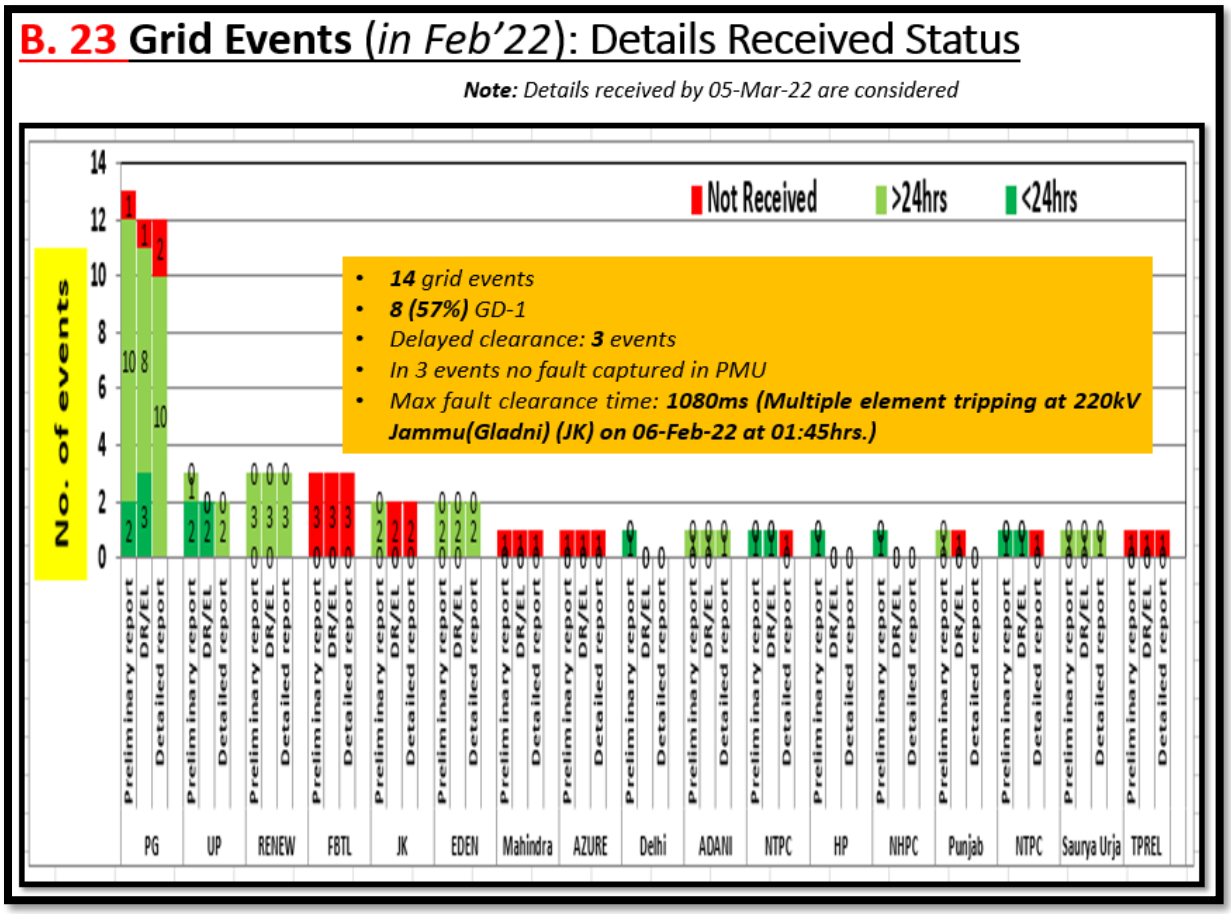
220 KV Debari (RS)-RAPS_A (NP) (RS) Ckt-1: *Rajasthan representative informed that tripping occurred due to transient fault. He further informed that A/R was in off condition in this line due to connection of RAPS generation. He said that RAPS informed that line CVT is not available at their end and due to limitation of Generator it is not possible to enable A/R operation at RAPS end. RAPS representative was not available in the meeting for any comment. NRLDC representative suggested to ensure healthiness/ in service of A/R in all 220 kV and above transmission lines in compliance to CEA Grid Standards. Rajasthan representative agreed for the same.*

NRLDC representative emphasized that A/R (auto reclosure) issue was found in many of these tripping. He further sensitized all the utilities to ensure healthiness/ in service of A/R in 220 kV and above transmission lines in compliance to CEA Grid Standards. He further informed that most of the tripping are transient in nature but due to non-operation of A/R, it resulted into tripping of the transmission element thus and reducing the reliability of the grid. All the utilities shall endeavour to keep auto reclosure in service and in healthy condition for 220 kV and above voltage level transmission line.

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

20. Multiple elements tripping events in Northern region in the month of Feb'22

A total of **14** grid events occurred in the month of Feb'22 of which **08** are of GD-1 category. The preliminary report of all the events have been issued from NRLDC. A list of all these events along with the status of detailed report received by NRLDC till 05-March-2022 is attached at **Annexure-B.VI of the Agenda.**



Further, despite persistent discussions/follow-up in various OCC/PCC meetings, it is observed that provisions 5.2(r) and 5.9.4(d) of the IEGC, pertaining to reporting of events / tripping to RLDC, is not being complied with by many utilities.

Maximum Fault Duration observed is **1080ms** in the event of multiple element tripping at 220kV Jammu(Gladni) (JK) on 06-Feb-22 at 01:45hrs.)

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **3** events out of **14** grid events occurred in the month. In 3 number of events, fault signature couldn't be captured from PMU data.

NRLDC representative stated that in the event of tripping at 220kV Jammu (Gladni) (JK) on 06-Feb-22 at 01:45hrs delayed clearance of around 1080ms is observed in the system. He further informed that as per report received from POWERGRID, R-N phase to earth fault occurred due to 132kV Bus-1 CVT blasted at Jammu(Gladni) (JKPTCL) S/S. 220 KV Salal(NH)-Jammu(PDD) (PG) Ckt-1 & Ckt-2 both tripped on this fault. At the same time, 220 KV Samba (PG)-Jammu (PDD) (PG) Ckt-1 also tripped on fault in Z-3 (60.93km). POWERGRID representative told that tripping occurred at Jammu (Gladni) end and they will look into the tripping in detail and discuss with J&K SLDC to find the reason of delayed clearance of fault. Jammu representative was not present in the meeting for any comment.

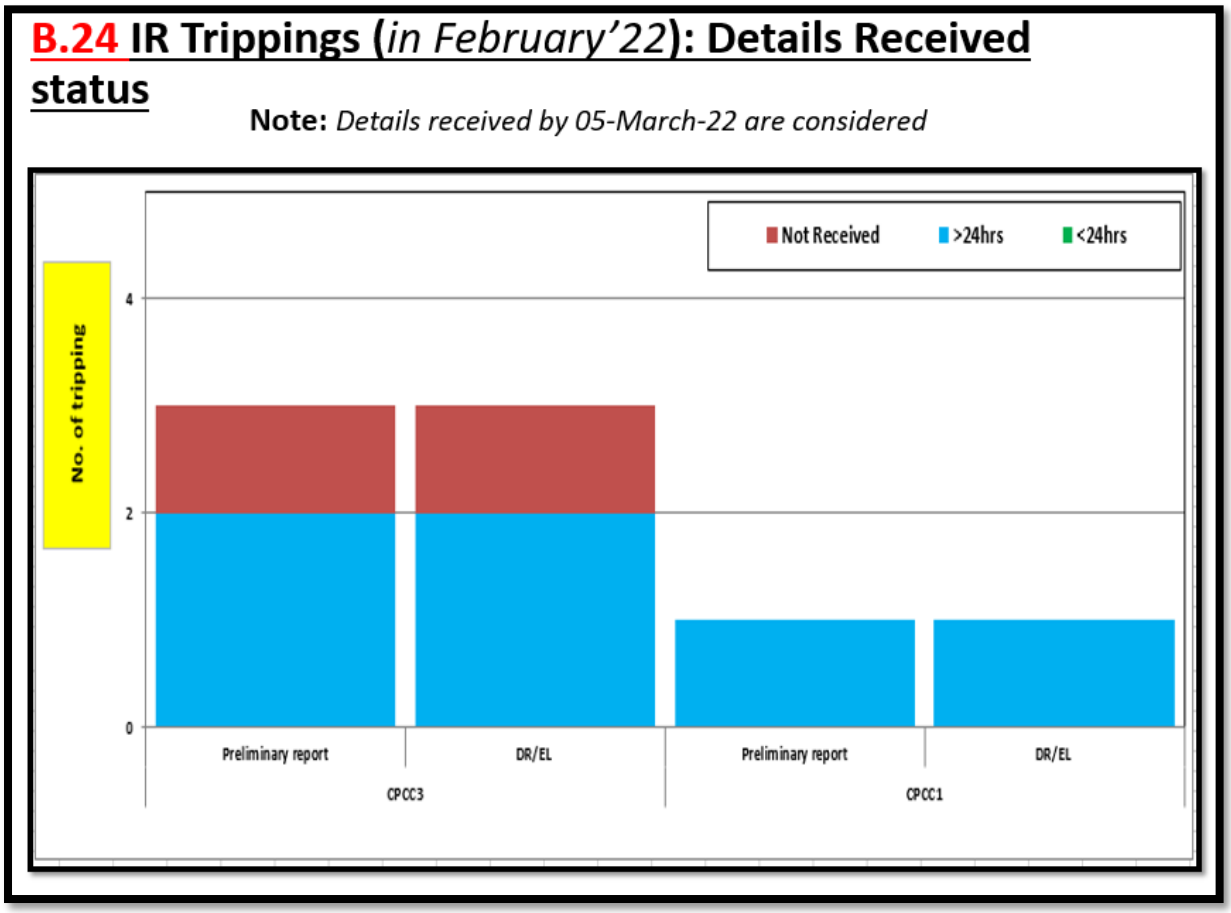
NRLDC representative raised concern about poor status of report updation by Solar Plants like MAHINDRA, AZURE, FBTL & TPREL on the tripping portal. He further stated that timely report submission is an important activity and all constituents are advised to take this on priority and upload the reports.

OCC suggested all the NR constituents to update the information on tripping portal developed by NRLDC. All the constituents agreed to take proactive actions in this regard to minimize the tripping.

Members were asked to take expeditious actions to avoid such tripping in future, Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events in line with the regulations. ***Members agreed to take action in this regard.***

21. Details of tripping of Inter-Regional lines from Northern Region for Feb'22

A total of 4 inter-regional lines tripping occurred in the month of Feb'22. The list is attached at **Annexure-B. VII of the Agenda.**



The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event from SLDCs / ISTS licensees / ISGSs is in violation of regulation 5.2(r) of IEGC and regulation 15(3) of CEA Grid

Standards. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than that mandated by CEA (Grid Standard) Regulations.

NRLDC representative raised concern about poor status of report updation by POWERGRID CPCC3 on the tripping portal. He further stated that timely report submission is an important activity and all constituents are advised to take this on priority and upload the reports.

Members may please note and advise the concerned for taking corrective action to avoid such tripping as well as timely submission of the information.

22. Status of submission of DR/EL and tripping report of utilities for the month of Feb'22.

NRLDC representative informed the current status (as on 05th March 2021) of DR/EL and tripping report of utilities for the month of February 2022. Consolidated information is tabulated below:

S. No.	Utility	1st Feb 2022 - 28th Feb 2022											
		Total No. of tripping	First Information Report (Not Received)		Disturbance Recorder (Not Received)	Disturbance Recorder (NA) as informed by utility	Disturbance Recorder (Not Received)	Event Logger (Not Received)	Event Logger (NA) as informed by utility	Event Logger (Not Received)	Tripping Report (Not Received)	Tripping Report (NA) as informed by utility	Tripping Report (Not Received)
			Value	%	Value		%	Value		%	Value		%
1	AHEJ3L	3	2	67	2	0	67	2	0	67	2	0	67
2	AP43L	2	2	100	2	0	100	2	0	100	2	0	100
3	APFOL	1	0	0	0	1	0	0	1	0	0	1	0
4	ASEPL	1	1	100	1	0	100	1	0	100	1	0	100
5	AURAIYA-NT	1	0	0	0	0	0	0	0	0	0	0	0
6	BAIRASUIL-NH	1	1	100	1	0	100	1	0	100	1	0	100
7	BBMB	9	3	33	3	4	60	3	5	75	3	0	33
8	CHAMERA-II-NH	1	0	0	0	0	0	0	0	0	0	0	0
9	CPCC1	60	15	25	17	8	33	22	6	41	16	3	28
10	CPCC2	67	5	7	7	9	12	6	8	10	27	0	40
11	CPCC3	37	19	51	20	1	56	20	1	56	20	1	56
12	DADRI-NT	2	0	0	0	0	0	0	0	0	0	0	0
13	DHAULIGANGA-NH	1	1	100	1	0	100	1	0	100	1	0	100
14	DULHASTI-NH	5	4	80	4	0	80	4	0	80	4	0	80
15	EDEN (ERCPL)	2	0	0	0	0	0	0	0	0	0	0	0
16	FBTL	3	3	100	3	0	100	3	0	100	3	0	100
17	KARCHAM	3	2	67	3	0	100	3	0	100	3	0	100
18	KISHENGANGA-NH	3	0	0	0	0	0	0	0	0	2	0	67
19	MAHINDRA	2	2	100	2	0	100	2	0	100	2	0	100
20	NJPC	2	1	50	1	0	50	1	0	50	2	0	100
21	PKTSL	1	1	100	1	0	100	1	0	100	1	0	100
22	RAILWAYS	1	1	100	1	0	100	1	0	100	1	0	100
23	RAPPA	7	4	57	7	0	100	7	0	100	7	0	100
24	RAPPB	1	1	100	1	0	100	1	0	100	1	0	100
25	RENEW SUN WAVES(RSWP	2	0	0	0	0	0	0	0	0	0	0	0

S. No.	Utility	1st Feb 2022 - 28th Feb 2022											
		Total No. of tripping	First Information Report (Not Received)		Disturbance Recorder (Not Received)	Disturbance Recorder (NA) as informed by utility	Disturbance Recorder (Not Received)	Event Logger (Not Received)	Event Logger (NA) as informed by utility	Event Logger (Not Received)	Tripping Report (Not Received)	Tripping Report (NA) as informed by utility	Tripping Report (Not Received)
			Value	%	Value		%	Value		%	Value		%
26	RIHAND-NT	3	3	100	3	0	100	3	0	100	3	0	100
27	RSEJ3PL	1	0	0	0	0	0	0	0	0	0	0	0
28	SALAL-NH	7	1	14	1	2	20	1	2	20	1	0	14
29	SAURYA	1	0	0	0	0	0	0	0	0	0	0	0
30	SEWA-2-NH	1	0	0	0	0	0	0	0	0	0	0	0
31	SINGRAULI-NT	3	0	0	1	0	33	1	0	33	1	0	33
32	SLDC-DV	8	4	50	4	4	100	4	4	100	5	0	63
33	SLDC-HP	11	0	0	0	7	0	0	7	0	0	0	0
34	SLDC-HR	2	0	0	0	1	0	0	1	0	1	0	50
35	SLDC-JK	16	0	0	16	0	100	16	0	100	16	0	100
36	SLDC-PS	26	8	31	11	10	69	11	10	69	26	0	100
37	SLDC-RS	36	0	0	7	0	19	7	0	19	10	0	28
38	SLDC-UK	7	5	71	5	0	71	7	0	100	5	0	71
39	SLDC-UP	98	23	23	28	9	31	27	10	31	25	1	26
40	SORANG	6	6	100	6	0	100	6	0	100	6	0	100
41	STERLITE	5	2	40	2	0	40	2	0	40	2	0	40
42	TANDA-NT	2	0	0	0	0	0	0	0	0	0	0	0
43	TATAPOWER	1	1	100	1	0	100	1	0	100	1	0	100
44	UNCHAHAR-NT	3	1	33	1	0	33	1	0	33	1	0	33
45	URI-II-NH	2	2	100	2	0	100	2	0	100	2	0	100
46	URI-I-NH	2	2	100	2	0	100	2	0	100	2	0	100

It is to be noted that as per the IEGC provision under clause 5.2 (r), detailed tripping report along with DR & EL has to be furnished within 24 hrs of the occurrence of the event. However, it is evident from the submitted data that reporting status is not satisfactory and needs improvement. Also, it is observed that reporting status has been improved from CPCC1, CPCC 2, Haryana and Himachal Pradesh in Feb, 2022 compared to the previous month.

NRLDC representative raised concern about poor status of report updation by CPCC3, Delhi, Punjab & Uttarakhand on the tripping portal.

All the members were once again requested to provide timely details of the grid events, detailed report in desired format along with remedial measure report. DR/EL of all the tripping needs to be uploaded on Web Based Tripping Monitoring System “http://103.7.128.184/Account/Login.aspx” within 24 hours of the events as per IEGC clause 5.2.r and clause 15.3 of CEA grid standard.

Members agreed for the same.

23. Frequency response characteristic

Three FRC based event occurred in the month of **Feb-2022**. Description of the event is as given below:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	End Frequency (in Hz)	*Δf*
1	04-Feb-22	13:21hrs	On 04th February 2022 at 13:16 hrs, as reported, 765kV Fatehgarh2-Bhadla2 ckt-1 tripped on R-N phase to earth fault after unsuccessful A/R operation. At 13:22 Hrs, during charging of the line, sudden voltage rise led to the solar generation loss of approx. 1882MW (connected at Fatehgarh2). Hence, generation loss of 1882MW has been considered for FRC calculation.	50.04	49.92	-0.12
2	11-Feb-22	11:45hrs	On 11th February 2022 at 11:45 hrs, as reported, event of multiple element tripping occurred at 765/400/220kV Fatehgarh2 (PG) due to over voltage. Solar generation loss of around 2286MW (connected at Fatehgarh2 (PG)) is observed. Hence, generation loss of 2286 MW has been considered for FRC calculation.	50.00	49.87	-0.13
2	11-Feb-22	12:38hrs	On 11th February 2022 at 12:38 hrs, as reported, event of multiple element tripping occurred at 765/400/220kV Fatehgarh2 (PG) due to over voltage. Solar generation loss of around 2807MW (connected at Fatehgarh2 (PG) & Bhadla (PG)) is observed. Hence, generation loss of 2807 MW has been considered for FRC calculation.	49.95	49.79	-0.16

Status of Data received till date:

Status of Field Data received of FRC of Grid event occurred at Fatehgarh2(PG) on 04.02.2022			
Data Received from		Data Not Received from	
Singrauli NTPC	Tehri HEP	HP	Rihand NTPC
Tanda TPS	Koteshwar HEP	UK	APCPL Jhajjar
Dadri TPS	Unchahar TPS	Punjab	Others
		BBMB	
		Rajasthan	
		Delhi	
		Haryana	

Status of Field Data received of FRC of Grid event occurred at Fatehgarh2(PG) at 11:45 Hrs on 11.02.2022			
Data Received from		Data Not Received from	
Singrauli NTPC	Tehri HEP	HP	Rihand NTPC
Kawai (Adani)	Rosa Reliance	UK	APCPL Jhajjar
Dadri TPS		Punjab	Unchahar TPS
		BBMB	Others
		Rajasthan	
		Delhi	
		Haryana	

Status of Field Data received of FRC of Grid event occurred at Fatehgarh2(PG) at 12:38 Hrs on 11.02.2022			
Data Received from		Data Not Received from	
Singrauli NTPC	Tehri HEP	HP	Rihand NTPC
Kawai (Adani)	Rosa Reliance	UK	APCPL Jhajjar
Dadri TPS		Punjab	Unchahar TPS
		BBMB	Others
		Rajasthan	
		Delhi	
		Haryana	

PFR as per generators field data:

Primary Frequency Response by Generators during Grid Event at Fatehgarh2(PG) on 04th Feb 2022:

Sr. No	Generating stations	FRC as per generator data (in %)	Response category/Remark
1	**Dadri Stage-1 Unit-1**	109%	Satisfactory PFR Response
2	**Dadri Stage-1 Unit-2**	103%	
3	**Dadri Stage-1 Unit-3**	141%	
4	**Dadri Stage-1 Unit-4**	104%	
5	**Dadri Stage-2 Unit-1**	115%	
6	**Dadri Stage-2 Unit-2**	70.4%	
7	**Singrauli Unit-6**	15.3%	Unsatisfactory PFR Response
8	**Singrauli Unit-7**	33.8%	
9	**Koteshwar Unit-4**	33.54%	Unsatisfactory PFR Response
10	**Tanda Unit-1**	8.91%	Unsatisfactory PFR Response
11	**Tanda Unit-2**	-1.14%	Poor Response
12	**Unchahar Unit-1**	-25.6%	Poor Response
13	**Unchahar Unit-2**	-3.7%	Poor Response
14	**Unchahar Unit-3**	17.34%	Unsatisfactory PFR Response
15	**Unchahar Unit-4**	31.81%	
16	**Unchahar Unit-5**	19.9%	
17	**Unchahar Unit-6**	56.43%	

Primary Frequency Response by Generators during Grid Event at Fatehgarh2(PG) at 11:45 Hrs on 11th Feb 2022:

Sr. No	Generating stations	FRC as per generator data (in %)	Response category/Remark
1	Dadri Stage-1 Unit-1	50%	Unsatisfactory PFR Response
2	Dadri Stage-1 Unit-2	11%	Unsatisfactory/Poor PFR Response
3	Dadri Stage-1 Unit-3	-32%	Poor PFR Response
4	Dadri Stage-1 Unit-4	47%	Unsatisfactory PFR Response
5	Dadri Stage-2 Unit-1	49%	Unsatisfactory PFR Response
6	Dadri Stage-2 Unit-2	14%	Unsatisfactory/Poor PFR Response
7	Singrauli Unit-6	27%	Unsatisfactory PFR Response
8	Singrauli Unit-7	35%	
9	Kawai (Adani) Unit-2	0%	Poor PFR Response (Early die out of response)
10	Rosa TPS Unit-1	-37%	Poor PFR Response
11	Rosa TPS Unit-2	-29%	
11	Rosa TPS Unit-3	-41%	
13	Rosa TPS Unit-4	-45%	
14	Tehri HEP Unit-3	32%	Unsatisfactory PFR Response

Primary Frequency Response by Generators during Grid Event at Fatehgarh2(PG) at 12:38 Hrs on 11th Feb 2022:

Sr. No	Generating stations	FRC as per generator data (in %)	Response category/Remark
1	Dadri Stage-1 Unit-1	0%	Unsatisfactory/Poor PFR Response
2	Dadri Stage-1 Unit-2	12.7%	
3	Dadri Stage-1 Unit-3	13%	
4	Dadri Stage-1 Unit-4	0%	
5	Dadri Stage-2 Unit-1	0%	
6	Dadri Stage-2 Unit-2	0%	
7	Singrauli Unit-6	51.48%	Unsatisfactory PFR Response
8	Singrauli Unit-7	48.32%	
9	Kawai (Adani) Unit-2	0%	Poor PFR Response (Early die out of response)
10	Rosa TPS Unit-1	31%	Unsatisfactory PFR Response
11	Rosa TPS Unit-2	20%	Unsatisfactory PFR Response
11	Rosa TPS Unit-3	3%	Poor PFR Response
13	Rosa TPS Unit-4	-25%	Poor PFR Response
14	Tehri HEP Unit-3	30%	Unsatisfactory PFR Response

In line with the decisions taken during various OCC meetings, the time and date of the FRC events were e-mailed to respective utilities***. Constituents may submit the***

FRC of their control areas for the above event and reason of poor response, if observed.

NRLDC representative informed that during the event of 04th Feb.2022 satisfactory response has been observed from units of Dadri Plant. It was further added that units of Unchahar, Rosa, Lalitpur and Singrauli plant are showing poor/unsatisfactory response.

UP representative informed that they will further analyse the response of Rosa units and expedite the PFR testing of the Rosa units.

All the concerned utilities may please go through the details and share the detailed reply considering all the points and supporting plant wise data to check the FRC response of the generator within week time to RPC/ RLDC.

24. Status of PSS tuning/ re-tuning and Step Response Test of generator

In last 12 OCC meetings, this point was discussed and Utilities were requested to submit the present status of PSS tuning/re-tuning and Step Response Test of their respective generators as per the below mentioned format.

S. No.	Name of the Generating Station	Date of last PSS tuning / re-tuning performed (in DD/MM/YYYY format)	Date of last Step Response Test performed (in DD/MM/YYYY format)	Report submitted to NRLDC (Yes/ No)	Remarks (if any)

It is to be noted that as per regulation 5.2(k) of IEGC, Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the CTU/RPC from time to time.

In 192nd OCC meeting, Members were requested to update about their future plan for PSS tuning as there is only little progress despite including this agenda in every OCC meeting and a separate meeting may be call for detail discussion on this matter.

UP representative informed that Step response test of Rosa Unit#1 & Unit#4 done on 5th Oct, 2021, test of Lalitpur Unit#2 on 30th March 2021, unit#1 on 23rd February, 2022 & Unit#3 on 15th January 2022. Step response test of Bara Unit#2 done on 1st

February, 2022, Anpara A unit#1 & Unit#2 done on 27th September, 2021, Harduaganj Unit#7 & Unit#9 done on 16th July, 2021.

Rajasthan representative informed that Step response test of Unit#1, 3, 4, 5&6 of STPS, Suratgarh carried out on 05.02.22, 06.02.22 & 14.03.22 and step response test of Generators of Unit #1, 2,3,4,6 & 7 of KTPS, Kota carried out during the period 02.03.22 to 04.03.22.

NRLDC representative informed that all the units who have done Step response test before 2018 were requested to plan the exciter step-response test as soon as possible and submit the tentative schedule of step-response test on the units with NRPC/ NRLDC. He further informed that till date Schedule has been received from Rajasthan and UP Control area. He further requested that members may kindly Accord due priority in this regard and update about their future plan for PSS tuning as there is no progress despite including this agenda in every OCC meeting and a separate meeting may be call for detail discussion on this matter.

Members agreed for the same.

25. Mock black start exercises in NR

As per Indian Electricity Grid Code (IEGC) clause 5.8(b) “Mock trial runs of the procedure for different sub-systems shall be carried out by the Users/ CTU/ STU at least once every six months under intimation to the RLDC”.

Mock Black-start exercise of power stations therefore needs to be carried out in-order to ensure healthiness of black start facility. The winter months are lean hydro period and therefore appropriate time to carry out such exercises.

Therefore, the schedule of mock exercise dates for different hydro & Gas power station is proposed. The power stations may confirm and inform to all the concerned persons of control centre/ substations to facilitate the exercise.

The proposed schedule for the Mock Black start exercise is as follows:

Hydro Power Stations:

Date	Revised Schedule date	Name of stations	Comment and Remarks
26-Nov-21		* Uri-I, II HEP, Lower Jhelum HEP, Pampore GT’s, Upper Sindh and Kishanganga.	Yet to be carried out. No information has been received from J&K about URI-I, Uri-II. Integration of Mock black start exercise in SCADA system at Kishanganga power station yet to be done by BHEL (OEM). BHEL is being pursued for its expedition. Hence the Mock exercise at Kishanganga shall be possible only after completion of above by OEM.

Date	Revised Schedule date	Name of stations	Comment and Remarks
01-Dec-21	28-Dec-21	* Dhauliganga	Conducted successfully except a heavy jerk at Dhauliganga HEP is observed during synchronization at Bareilly end.
04-Dec-21	23-Dec-21	Bairasiul	To be carried out. As requested by HP SLDC.
08-Dec-21		*Sewa-2	Mock Black start exercise is not possible as Power Station is under complete shutdown due to HRT repair works..
10-Dec-21	During March 2022	* N. Jhakri and Rampur	Yet to be carried out. As requested by Jhakri HEP & HP SLDC.
15-Dec-21	29-Dec-21	Karcham and Baspa	Exercise unsuccessful due to tripping of Wangtoo-kala Amb line during island build up.
17-Dec-21	After Ist week of March, 2022	*Budhil	Yet to be carried out. As discussed with Budhil HEP the exercise is planned to be carried out after Ist week of March, 2022
22-Dec-21		Parbati-3 and Sainj	Yet to be carried out.
24-Dec-21		*Salal	Yet to be carried out. No information has been received from J&K for load management.
29-Dec-21	During March 2022	*Chamera-3	As requested by NHPC.
31-Dec-21	19th January, 2022	Koteshwar	Exercise carried out successfully.
05-Jan-22	After 25 Jan 2022.	Chamera-1 and Chamera-2	Considering the proposed complete s/d of CH-1 PS for HRT inspection w.e.f. 01st Dec. 2021, the mock black start exercise may be postponed and same may be scheduled after 25 Jan 2022.
08-Jan-22	Third week of January, 2022	Malana-2, AD Hydro and Phozal	Yet to be carried out.
12-Jan-22		Tehri	Exercise carried out successfully.
15-Jan-22	After 14 Feb 2022	Koldam	Yet to be carried out. As discussed with Punjab SLDC the exercise is planned to be carried out after 14th February, 2022 (due to election in Punjab).
9-March-22		GTPS (IPGCL)	As reported by Delhi SLDC Mock Black start exercise of GTPS (IPGCL) was carried out successfully on 9th March'22. GTPS, NDMC, TPDDL and Delhi SLDC witnessed the exercise. GT-1 was black

Date	Revised Schedule date	Name of stations	Comment and Remarks
			started using DG set and Island of GT-1 and School Lane ckt-II was synchronized with rest of the grid through 66kV I/C-II of 160MVA.

* Mock Black start exercise not carried out during Year 2020-21.

Mock Black start procedure circulated during last exercise/ previous year may be used. The unit to be selected for black start, may preferably be different from the one tested during last year exercise. Also **Constituents are requested to adhere to the finalized schedule of mock exercises during the current season**.

Gas Power Stations:

Date	Name of stations	Comment and Remarks
19-Jan-22	Anta GPS	Exercise carried out successfully.
21-Jan-22	*Auraiya GPS	Yet to be carried out.
28-Jan-22	*Dadri GPS	Exercise carried out successfully.

As informed by Bawana GPS, it does not have black start capability.

SLDC's may also carryout mock black-start of station in their respective control area & inform the tentative dates to the OCC as well as outcome of these exercises. The proposed Hydro Power Stations to undergo the exercise are as follows:

S. NO.	Utility	Hydro Power Station	Installed Capacity (MW)
1	J&K	Baglihar	3x150
2		Baglihar stage-2	3x150
3		Lower Jhelum	3x35
4		Upper Sindh	2x11+3x35
5		Larji	3x42
6		Bhabha	3x40
7		Malana -I	2x43
8		Baspa	3x100
9	Punjab	Anandpur Sahib	4x33.5
10		Ranjit Sagar	4x150
11		Mahi-I&II	2x25+2x45

S. NO.	Utility	Hydro Power Station	Installed Capacity (MW)
12	Rajasthan	Rana Pratap Sagar	4x43
13		Jawahar Sagar	3x33
14		Gandhi Sagar	5x23
15		Dholpur GPS	3x110
16		Ramgarh GPS	1x35.5+2x37.5+1x110
17	UP	Rihand	6x50
18		Obra	3x33
19		Vishnuprayag	4x100
20		Srinagar (Alaknanda)	4x82.5
21			
	Uttarakhand	Gamma Infra	2x76+1x73
22		Shravanti	6x75
23		Ramganga	3x66
24		Chibro	4x60
25		Khodri	4x30
26		Chilla	4x36
27		Maneri Bhali-I&II	3x30+4x76
28	Delhi	IP Extn GTs	6x30+3x30
29		Pragati GPS	2x104.6+1x121.2
30		Rithala	3x36
31	Haryana	Faridabad GPS	2x137.75+1x156.07

During last winter, SLDCs had been requested to carry out mock drills in respect of intra-state generators and share their reports. However, the report of such exercises was not received except for Rihand Hydro in Uttar Pradesh. The information may please be shared by SLDCs and program for this year's mock black start exercises may please be apprised to NRLDC.

SLDCs shall submit the reports of black start exercise in their respective control area. SLDCs may also identify further generating stations/unit for black start exercise.

NRLDC representative suggested to all the constituents to adhere with the planned schedule. State control area were again requested to conduct the mock black start

exercise in their respective area. All utilities were requested to share the schedule of mock exercise within 15 days to NRPC/NRLDC.

26. Mock-testing of 765kV Gwalior-Agra SPS

In the meeting, it was discussed that SPS at 765 kV Gwalior-Agra D/c is an important part of defence scheme and it is required that proper documentation, mapping and testing of SPS is carried out regularly. Details of implemented SPS scheme for 765 kV Gwalior-Agra D/c is attached as ***Annexure-B-I***. SPS scheme logic as enclosed may be validated by respective utilities after obtaining confirmation from site.

The SPS scheme was last tested during May 2019 and the report submitted by NRLDC to NRPC is enclosed (***Annexure-B-II***). There were certain findings in the report which were regularly taken up in NRPC-OCC meetings by NRLDC.

As 3 years have passed since last testing, it was suggested that SPS mock-testing be carried out in first week of April 2022 for checking signal generation and its end-to-end transmission.

All utilities were requested to take necessary action and coordinate with NRLDC in this regard.

Members agreed for the same.

27. Issues for RE generation connected at Fatehgarh complex:

2800MW effective RE capacity is being evacuated through 765kV Fatehgarh-II(PG) pooling station. On 15th Jan'22 voltage fluctuation along with tripping/dip of RE generation connected at Fatehgarh-II(PG) was observed and same was deliberated in 191st NRPC OCC meeting. Apart from this, several events of RE generation tripping/Dip down were reported on 30th Jan'22, 4th Feb'22 and 11th Feb'22. Moreover, there have been some other events wherein momentarily dip in RE generation has been observed. These tripping/Dip down of RE generation connected at Fatehgarh complex leads to significant excursion in frequency and become a threat to Grid security. In this regard a detailed report on event of 30th Jan'22 was prepared by NRLDC available at: ***https://drive.google.com/file/d/1nObynZoblnTYmO-FXbyKP-kJ9vS4XC0A/view?usp=sharing***

After detailed analysis, following issues were observed:

- Suspected HVRT failures
- Protection coordination issues
- Inverter terminal voltage in HVRT zone although voltage at POI is within 1.1pu
- Reduction in P(MW) in case of HVRT which is not desirable
- Inadequate MVAR absorption support in case of Overvoltage

- Plant model response submitted at the time of registration is not matching with actual plant response in real time during events.

In order to address these issues several communications were send from NRLDC to all the Renew Power RE plant (RSBPL, RSEJ3PL, RSUPL and RSWPL) and all the Adani Hybrid Plants (AHEJOL, AHEJ2L and AHEJ3L) connected at Fatehgarh-II (PG).

NRLDC communications to Renew Power and Adani Hybrid Plants were discussed in 192nd NRPC OCC meeting.

Reply received from Renew Power dated 3rd March'22 mentions that they *acknowledged the protection coordination issues and issue of HVRT Gradient (K Factor) setting, which were rectified by Renew Power in one of its Plant and it was observed that drop in power/tripping issue got resolved.* Action taken by Renew Power is appreciable and same actions may be taken by Renew Power for its other Solar Plants connected at Fatehgarh-II(PG).

However, no reply was received from Renew Power regarding mismatch of Plant model response submitted at the time of Registration with actual plant response in real time during events.

From the inverter HVRT settings shared by AGEL, it was observed that overvoltage setting of inverters is not meeting CEA compliance and setting was coordinated in such a way that it would not be able to meet CEA compliance at POI, same was shared by NRLDC via letter having Ref. No. NRLDC\ RES\TS-108\146 dated 25th Feb'22 (attached as ***Annexure-B-III***). Reply received from AGEL dated 11th March'22 is attached as ***Annexure-B-IV***.

It was mentioned that tap position of power transformer is lowered by one tap from nominal to immune plant from facing unwanted high voltages and inverter level settings have also been rechecked.

OCC noted the same.

Follow up issues from previous OCC meetings

<table>
<tr><td>1</td><td>Down Stream network by State utilities from ISTS Station</td><td>Augmentation of transformation capacity in various existing substations, addition of new substations along with line bays as well as requirement of line bays by STUs for downstream network are under implementation at various locations in Northern Region. Further, 220kV bays have already been commissioned at various substations in NR. For its utilization, downstream 220kV system needs to be commissioned.</td><td>List of downstream networks is enclosed in Annexure-A.I.I.</td></tr>
<tr><td>2</td><td>Progress of installing new capacitors and repair of defective capacitors</td><td>Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.</td><td>Data upto following months, received from various states / UTs:
◎ CHANDIGARH — Sep-2019
◎ DELHI — Dec-2021
◎ HARYANA — Aug-2021
◎ HP — Jan-2022
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Aug-2021
◎ RAJASTHAN — Feb-2022
◎ UP — Feb-2022
◎ UTTARAKHAND — Feb-2022
All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td>3</td><td>Healthiness of defence mechanism: Self-certification</td><td>Report of mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that “All the UFRs are checked and found functional”.</td><td>Data upto following months, received from various states / UTs:
◎ CHANDIGARH — Not Available
◎ DELHI — Dec-2021
◎ HARYANA — Dec-2021
◎ HP — Jan-2022
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Sep-2021
◎ RAJASTHAN — Dec-2021
◎ UP — Dec-2021
◎ UTTARAKHAND — Dec-2021
◎ BBMB — Dec-2021
All States/UTs are requested to update status for healthiness of UFRs on monthly basis for islanding schemes and on quartely basis for the rest .</td></tr>
<tr><td>4</td><td>Status of FGD installation vis-à-vis installation plan at identified TPS</td><td>List of FGDs to be installed in NR was finalized in the 36th TCC (special) meeting dt. 14.09.2017. All SLDCs were regularly requested since 144th OCC meeting to take up with the concerned generators where FGD was required to be installed.</td><td>Status of the information submission (month) from states / utilities is as under:
◎ HARYANA — Feb-2021
◎ PUNJAB — Nov-2021
◎ RAJASTHAN — Dec-2021
◎ UP — Nov-2021
◎ NTPC — Sep-2021</td></tr>
</table>

		to be installed. Further, progress of FGD installation work on monthly basis is monitored in OCC meetings.	FGD status details are enclosed as **Annexure-A.I.II.** All States/utilities are requested to update status of FGD installation progress on monthly basis.
5	Information about variable charges of all generating units in the Region	The variable charges detail for different generating units are available on the MERIT Order Portal.	All states/UTs are requested to submit daily data on MERIT Order Portal timely.

6	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVAr TCR	Anticipated commissioning: July 2022 (90% supplies received from GE and rest is expected by Feb'22)
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under stage inspection (delay due to pending supply of reactor bushings). GIS Bay is already available. Anticipated commisioning: July 2022
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under stage inspection (delay due to pending supply of reactor bushings). GIS Bay is already available. Anticipated commisioning: July 2022
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is completed. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is completed. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is completed. Reactor part tender is dropped and at present same is under revision.
vii	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
viii	PUNJAB	Dhuri	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	400kV Reactors - LOA issued on dated. 17.08.2021 and date of completion of project is 18 months from the date of LOA. 220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA.
ix	PUNJAB	Nakodar	1x25 MVAr at 220 kV	220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA.
x	PTCUL	Kashipur	1x125 MVAR at 400 kV	Tender has been invited in first week of Jan'22.

xi	RAJASTHAN	Akal	1x25 MVAr	LOA placed on dt. 4.1.2021. Agreement signed on dt. 8.02.2021. 2nd installment has been received on dt. 30.07.2021. The erection work is under progress and shall be commissioned by March/April' 2022.
xii	RAJASTHAN	Bikaner	1x25 MVAr	LOA placed on dt. 4.1.2021. Agreement signed on dt. 8.02.2021. 2nd installment has been received on dt. 30.07.2021. The erection work is under progress and shall be commissioned by March/April' 2022.
xiii	RAJASTHAN	Suratgarh	1x25 MVAr	LOA placed on dt. 4.1.2021. Agreement signed on dt. 8.02.2021. 2nd installment has been received on dt. 30.07.2021. The erection work is under progress and shall be commissioned by March/April' 2022.
xiv	RAJASTHAN	Barmer & others	13x25 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Installment received on dt.19.02.21 & technical bid opened on dt.22.10.2021. Price bid opened on dt. 10.01.2022 & order likely to be placed by March/April' 2022.
xv	RAJASTHAN	Jodhpur	1x125 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Installment received on dt.19.02.21 & technical bid opened on dt.22.10.2021. Price bid opened on dt. 10.01.2022 & order likely to be placed by March/April' 2022.

Annexure-A-I.I

1. Down Stream network by State utilities from ISTS Station:

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	-	PDD, J&K to update the status.
2	400/220kV, 2x315 MVA New Wanpoh	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV New Wanpoh - Alusteng D/c Line	-	PDD, J&K to update the status.
				• 220 kV New Wanpoh - Mattan D/c Line	-	PDD, J&K to update the status.
3	400/220kV, 2x315 MVA Amargarh	Commissioned: 6 Total: 6	Utilized: 6 Unutilized: 2	• 220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri	-	PDD, J&K to update the status.
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• 220kV Bhadson (Kurukshetra) – Ramana Ramani D/c line	-	HVPNL to update the status.
5	400/220 kV, 2x315 MVA Dehradun	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• Network to be planned for 4 bays	-	PTCUL to update the status.
6	Shahjahanpur, 2x315 MVA 400/220 kV	Commissioned: 6 Approved/Under Implementation:1 Total: 7	Utilized: 3 Unutilized: 3 (2 bays to be utilized shortly) Approved/Under Implementation:1	• 220 kV D/C Shahajahanpur (PG) - Gola line	-	UPPTCL to update the status.
				• LILO of Sitapur – Shahjahanpur 220 kV SC line at Shahjahanpur (PG) – under commissioning	21.02.2022	Updated in 192nd OCC by UPPTCL
7	Hamirpur 400/220 kV Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4 (2 bays to be utilized shortly)	• 220 kV Hamirpur-Dehan D/c line	Mar'22	Updated in 192nd OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
8	Sikar 400/220kV, 1x 315 MVA S/s	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• LILO of 220 kV Sikar (220 kV GSS)-Dhod S/c line at Sikar (PG)	Mar'22	Forest Cleareance issue has been resolved as Updated in 192nd OCC by RRVPNL
				• Network to be planned for 2 bays.	-	RRVPNL to update the status.
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	-	Issue related to ROW as intimated in 192nd OCC.HVPNL to update the status.
				• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	-	Issue related to ROW as intimated in 192nd OCC.HVPNL to update the status.
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	-	Issue related to ROW as intimated in 192nd OCC.HVPNL to update the status.
10	Jind 400/220kV S/s	Commissioned: 4 Approved:4 Total: 8	Utilized: 4 Unutilized: 0 Approved:4	• LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind) with 0.5 sq inch ACSR conductor	-	HVPNL to update the status.
11	400/220kV Tughlakabad GIS	Commissioned: 6 Under Implementation: 4 Total: 10	Utilized: 6 Unutilized: 0 Under Implementation:4	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	-	DTL to update the status.
				• Masjid Mor – Tughlakabad 220kV D/c line.	-	DTL to update the status.
12	400/220kV Kala Amb GIS (TBCB)	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s	Jan'23	Updated in 192nd OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
13	400/220kV Kadarpur Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• LILO of both circuits of 220 KV Pali - Sector 56 D/C line at Kadarpur along with augmentation of existing conductor from 220 KV Sector-56 to LILO point with 0.4 sq inch AL-59 conductor.	-	HVPNL to update the status.
				• LILO of both circuits of 220KV Sector 65 - Pali D/C line at Kadarpur along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 kV Kadarpur - Sector 65 D/C line with 0.4sq inch AL-59 conductor	-	HVPNL to update the status.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road	-	HVPNL to update the status.
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	-	HVPNL to update the status.
15	400/220kV Prithla Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	-	HVPNL to update the status.
				• 220kV D/C for Sector78, Faridabad	-	HVPNL to update the status.
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 2 Under Implementation:2	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat		HVPNL to update the status.
				• Sonepat - HSIISC Rai 220kV D/c line	Jul'22	Updated in 192nd OCC
17	400/220kV Neemrana Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• LILO of Bhiwadi - Neemrana 220kV S/c line at Neemrana (PG)	Oct'22	In Tendering stage as updated in 192nd OCC by RVPNL.
18	400/220kV Kotputli Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Kotputli - Pathreda 220kV D/c line	-	RVPNL to update the status.
19	400/220kV Jallandhar Sub-station	Commissioned: 10 Total: 10	Utilized: 8 Unutilized: 2	• Network to be planned for 2 bays	-	PSTCL to update the status.
20	400/220kV Roorkee Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Roorkee (PG)-Pirankaliyar 220kV D/c line	-	PTCUL to update the status.
21	400/220kV Lucknow Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 4 bays	-	UPPTCL to update the status.
22	400/220kV Gorakhpur Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	-	UPPTCL to update the status.
23	400/220kV Fatehpur Sub-station	Commissioned: 8 Under Implementation:2 Total: 10	Utilized: 6 Unutilized: 2 Under Implementation:2	• Network to be planned for 4 bays	-	UPPTCL to update the status.
24	400/220kV Abdullapur Sub-station	Commissioned: 10 Under Implementation:2 Total: 12	Utilized: 10 Unutilized: 0 Under Implementation:2	• Abdullapur – Rajokheri 220kV D/c line	Mar'22	Updated in 192nd OCC by HVPNL
25	400/220kV Pachkula Sub-station	Commissioned: 8 Under tender:2 Total: 10 Out of these 10 nos. 220kV Line Bays, 2 bays would be used by the lines being constructed by POWERGRID (Chandigarh-2) and balance 8 nos. bays would be used by HVPNL	Utilized: 2 Unutilized: 4 Under Implementation:2	• Panchkula – Pinjore 220kV D/c line	-	HVPNL to update the status.
				• Panchkula – Sector-32 220kV D/c line	-	HVPNL to update the status.
				• Panchkula – Raiwali 220kV D/c line	-	HVPNL to update the status.
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	-	HVPNL to update the status.
26	400/220kV Amritsar S/s	Commissioned:7 Approved in 50th NRPC- 1 no. Total: 8	Utilized: 6 Unutilized: 1 Approved in 50th NRPC- 1 no.	• Amritsar – Patti 220kV S/c line	-	PSTCL to update the status.
				• Amritsar – Rashiana 220kV S/c line (2 bays shall be required for above lines. However, 1 unutilized bay shall be used for Patti and requirement of one additional bay approved for Rashiana by NRPC)	-	PSTCL to update the status.
27	400/220kV Bagpat S/s	Commissioned: 8 Total: 8	Utilized:6 Unutilized: 2	·• Bagpat - Modipuram 220kV D/c line	-	UPPTCL to update the status.
28	400/220kV Bahardurgarh S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• Network to be planned for 2 bays.		HVPNL to update the status.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
29	400/220kV Jaipur (South) S/s	Commissioned: 4 Total: 4	Utilized:6 Unutilized: 2	• Network to be planned for 2 bays.	-	RVPNL to update the status.
30	400/220kV Sohawal S/s	Commissioned: 8 Total: 8	Utilized: 2 Unutilized: 6	• Sohawal - Barabanki 220kV D/c line	-	UPPTCL to update the status.
				• Sohawal - New Tanda 220kV D/c line	-	UPPTCL to update the status.
				• Network to be planned for 2 bays	-	UPPTCL to update the status.
31	400/220kV, Kankroli	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	-	RVPNL to update the status
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 4 bays	-	HVPNL to update the status
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	-	UPPTCL to update the status
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	-	PSTCL to update the status
36	400/220kV, Chamba (Chamera Pool)	Commissioned: 3 Under tender:1 Total: 4	Utilized:3 Unutilized: 0 Under tender:1	• Stringing of 2nd ckt of Chamera Pool – Karian 220kV D/c line	-	HPPTCL to update the status
37	400/220kV, Mainpuri	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	-	UPPTCL to update the status
38	400/220kV, Patiala	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays	-	PSTCL to update the status

2. Establishment of new 400/220kV substations in Northern Region:

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule		Downstream connectivity by States
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Mar'22		DTL to update the status.
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Apr'22		Chandigarh to update the status.
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. bays would be used by the lines being constructed by PTCUL.	2x315	Feb'22		• 220kV Almora-Jauljibi line • 220kV Brammah-Jauljibi line PTCUL to update the status of lines.

FGD Status

Updated status of FGD related data submission

NTPC (25.02.2022)
MEJA Stage-I
RIHAND STPS
SINGRAULI STPS
TANDA Stage-I
TANDA Stage-II
UNCHAHAR TPS
UPRVUNL (21.03.2022)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (21.03.2022)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (10.03.2022)
CHHABRA SCPP
CHHABRA TPP
KALISINDH TPS
KOTA TPS
SURATGARH SCTPS
SURATGARH TPS

Updated status of FGD related data submission

Lalitpur Power Gen. Co. Ltd. (15.02.2022)
Lalitpur TPS
Lanco Anpara Power Ltd. (15.02.2022)
ANPARA-C TPS

HGPCL (21.03.2022)
PANIPAT TPS
RAJIV GANDHI TPS
YAMUNA NAGAR TPS

Adani Power Ltd. (18.02.2022)
KAWAI TPS

Rosa Power Supply Company (15.02.2022)
Rosa TPP Phase-I
Prayagraj Power Generation Company Ltd. (15.02.2022)
Prayagraj TPP
APCPL (25.02.2022)
INDIRA GANDHI STPP

Pending submissions

GVK Power Ltd.
GOINDWAL SAHIB

NTPC
DADRI (NCTPP)
Talwandi Sabo Power Ltd.
TALWANDI SABO TPP
L&T Power Development Ltd.
Nabha TPP (Rajpura TPP)

Target Dates for FGD Commissioning (Utility-wise)

Adani Power Ltd.	KAWAI TPS U#1 (Target: 31-12-2024), KAWAI TPS U#2 (Target: 31-12-2024)
APCPL	INDIRA GANDHI STPP U#1 (Target: 30-09-2022), INDIRA GANDHI STPP U#2 (Target: 30-09-2022), INDIRA GANDHI STPP U#3 (Target: 30-09-2022)
GVK Power Ltd.	GOINDWAL SAHIB U#1 (Target: 30-04-2020), GOINDWAL SAHIB U#2 (Target: 29-02-2020)
HGPCL	PANIPAT TPS U#6 (Target: 30-04-2021), PANIPAT TPS U#7 (Target: 28-02-2021), PANIPAT TPS U#8 (Target: 31-12-2020), RAJIV GANDHI TPS U#1 (Target: 30-04-2022), RAJIV GANDHI TPS U#2 (Target: 28-02-2022), YAMUNA NAGAR TPS U#1 (Target: 31-12-2021), YAMUNA NAGAR TPS U#2 (Target: 31-10-2021)

NTPC	DADRI (NCTPP) U#1 (Target: 31-12-2020), DADRI (NCTPP) U#2 (Target: 31-10-2020), DADRI (NCTPP) U#3 (Target: 31-08-2020), DADRI (NCTPP) U#4 (Target: 30-06-2020), DADRI (NCTPP) U#5 (Target: 30-06-2022), DADRI (NCTPP) U#6 (Target: 30-06-2022), RIHAND STPS U#1 (Target: 30-06-2024), RIHAND STPS U#2 (Target: 30-06-2024), RIHAND STPS U#3 (Target: 31-12-2023), RIHAND STPS U#4 (Target: 31-12-2023), RIHAND STPS U#5 (Target: 30-06-2023), RIHAND STPS U#6 (Target: 30-06-2023), SINGRAULI STPS U#1 (Target: 30-06-2024), SINGRAULI STPS U#2 (Target: 30-06-2024), SINGRAULI STPS U#3 (Target: 30-06-2024), SINGRAULI STPS U#4 (Target: 30-06-2024), SINGRAULI STPS U#5 (Target: 30-06-2024), SINGRAULI STPS U#6 (Target: 31-03-2023), SINGRAULI STPS U#7 (Target: 31-03-2023), UNCHAHAR TPS U#1 (Target: 31-12-2023), UNCHAHAR TPS U#2 (Target: 31-12-2023), UNCHAHAR TPS U#3 (Target: 30-06-2024), UNCHAHAR TPS U#4 (Target: 30-06-2024), UNCHAHAR TPS U#5 (Target: 30-06-2024), UNCHAHAR TPS U#6 (Target: 30-06-2022), MEJA Stage-I U#1 (Target: 31-12-2022), MEJA Stage-I U#2 (Target: 31-12-2022), TANDA Stage-I U#3 (Target:), TANDA Stage-I U#4 (Target:), TANDA Stage-II U#3 (Target: 31-12-2022), TANDA Stage-II U#4 (Target: 31-12-2022)

L&T Power Development Ltd (Nabha)	Nabha TPP (Rajpura TPP) U#1 (Target: 30-04-2021), Nabha TPP (Rajpura TPP) U#2 (Target: 28-02-2021)
Lalitpur Power Gen. Company Ltd.	LALITPUR TPS U#1 (Target: 31-12-2024), LALITPUR TPS U#2 (Target: 30-09-2024), LALITPUR TPS U#3 (Target: 30-06-2024)
Lanco Anpara Power Ltd.	ANPARA C TPS U#1 (Target: 31-12-2023), ANPARA C TPS U#2 (Target: 31-12-2023)
Prayagraj Power Generation Company Ltd.	PRAYAGRAJ TPP U#1 (Target: 31-10-2024), PRAYAGRAJ TPP U#2 (Target: 31-10-2024), PRAYAGRAJ TPP U#3 (Target: 31-12-2024)
PSPCL	GH TPS (LEH.MOH.) U#1 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#2 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#3 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#4 (Target: 31-12-2024), GGSSTP, Ropar U#3 (Target: 31-03-2022), GGSSTP, Ropar U#4 (Target: 31-05-2022), GGSSTP, Ropar U#5 (Target: 31-07-2022), GGSSTP, Ropar U#6 (Target: 30-09-2022)

Rosa Power Supply Company	ROSA TPP Ph-I U#1 (Target: 31-12-2024), ROSA TPP Ph-I U#2 (Target: 31-12-2024), ROSA TPP Ph-I U#3 (Target: 31-12-2024), ROSA TPP Ph-I U#4 (Target: 31-12-2024)
RRVUNL	KOTA TPS U#5 (Target: 31-12-2022), KOTA TPS U#6 (Target: 31-12-2022), KOTA TPS U#7 (Target: 31-12-2022), SURATGARH TPS U#1 (Target: 31-12-2024), SURATGARH TPS U#2 (Target: 31-12-2024), SURATGARH TPS U#3 (Target: 31-12-2024), SURATGARH TPS U#4 (Target: 31-12-2024), SURATGARH TPS U#5 (Target: 31-12-2024), SURATGARH TPS U#6 (Target: 31-12-2024), SURATGARH SCTPS U#7 (Target: 31-12-2024), SURATGARH SCTPS U#8 (Target: 31-12-2024), CHHABRA TPP U#1 (Target: 31-12-2024), CHHABRA TPP U#2 (Target: 31-12-2024), CHHABRA TPP U#3 (Target: 31-12-2024), CHHABRA TPP U#4 (Target: 31-12-2024), CHHABRA SCPP U#5 (Target: 31-12-2024), CHHABRA SCPP U#6 (Target: 31-12-2024), KALISINDH TPS U#1 (Target: 31-12-2024), KALISINDH TPS U#2 (Target: 31-12-2024)
Talwandi Sabo Power Ltd.	TALWANDI SABO TPP U#1 (Target: 28-02-2021), TALWANDI SABO TPP U#2 (Target: 31-12-2020), TALWANDI SABO TPP U#3 (Target: 31-10-2020)
UPRVUNL	ANPARA TPS U#1 (Target: 31-12-2023), ANPARA TPS U#2 (Target: 31-12-2023), ANPARA TPS U#3 (Target: 31-12-2023), ANPARA TPS U#4 (Target: 31-12-2023), ANPARA TPS U#5 (Target: 31-12-2023), ANPARA TPS U#6 (Target: 31-12-2023), ANPARA TPS U#7 (Target: 31-12-2023), HARDUAGANJ TPS U#8 (Target: 31-12-2024), HARDUAGANJ TPS U#9 (Target: 31-12-2024), OBRA TPS U#9 (Target: 31-12-2024), OBRA TPS U#10 (Target: 31-12-2024), OBRA TPS U#11 (Target: 31-12-2024), OBRA TPS U#12 (Target: 31-12-2024), OBRA TPS U#13 (Target: 31-12-2024), PARICHHA TPS U#3 (Target: 30-04-2022), PARICHHA TPS U#4 (Target: 31-12-2024), PARICHHA TPS U#5 (Target: 31-12-2024), PARICHHA TPS U#6 (Target: 31-12-2024)

1st Batch for Training Programme/Workshop on Protection Audit for Protection System Engineers

Date : 28/03/2019

. No.	Name	DESIGNATION	ORGANIZATION
1	Mr. Sameer Sobti	Dy. Manager (Electrical)	ADHPL
2	Mr. M. A .Rafiq	Manager (Electrical)	ADHPL
3	Er. Ranbir Sharma	ADP& T Cell, BBMB, Panipat	BBMB
4	Er. Maninder Singh	ADP& T Cell, BBM B, Chandigarh	BBMB
5	Ms Ramneet Chanana	Asstt. Manager (Protection) Delhi Transco Ltd.	DELHI
6	Shri Parveen Kumar	Asstt. Manager (T) Delhi Transco Ltd.	DELHI
7	Shri Manoj Goyal	Deputy Manager(T)	IPGCL
8	Shri Ranjit Singh	Deputy Manager	IPGCL
9	Shri Irfan Ahmed	Director	NPC
10	Shri K.P Madhu	Dy.Director	NPC
11	Er. Aadil Hassan	JE DCP Office	J&K PDD
12	Er. Fayaz Wani	JE EM & RE Kashmir	J&K PDD
13	Er Rajbir Singh Walia	Addl S.E, Protection & OS Division	PSTCL

1st Batch for Training Programme/Workshop on Protection Audit for Protection System Engineers

14	Er Harvinder Singh	Sr XEN Protection Division	PSTCL
15	Er Sanjeeev Kumar	AEE Protection Division	PSTCL
16	Shri Ravindra Gupta	AEN-I(MPT&S)	RVPN
17	ShriSuresh Chand Garg	AEN(MPT&S)	RVPN
18	Shri Anil Raghuvashi	Manager (O&M)	THDC
19	Shri Ashutosh Gairola	Manager (O&M)	THDC
20	Er. Manoj Prasad	AHPARA EE, P. TPS,Sonebhadra	UPRVUNL
21	Er. Ramgyan Singh	EE, Parichha TPS, Jhansi	UPRVUNL
22	Shri Shrey Kumar	AEE Operation	NRPC
23	Shri Kaushik Panditrao	AE Protection	NRPC
24	Shri Jaganath ~~Padi~~ Pane	Dy. Manager	NHPC
25	Shri Nitin Yadav	Manager	NRLDC
26	Shri Gaurav Singh	Asst Manager	NRLDC
27	Shri Anshula Sharma	Astt. Manager	PGCIL NR-2
28	Shri Saurabh Kumar	Astt. Manager	PGCIL NR-3
29	Shri Pawan Purbia	~~Chief~~ Manager Asset.	PGCIL NR-1
30	Shri Y S Rana	Chief Manager	PGCIL NR-2
31	Er. Kanav Sandal	AE	HPPTCL
32	Er. Vikas Thakur	AE	HPPTCL
33	Er. Ashish Kumar	AE	HVPNL
34	Er. Kuldeep Singh Rana	AEE	HVPNL

2nd batch Training Programme/Workshop on Protection Audit for Protection System Engineers

Annexure

S. No	Name	Designation	Organization	Contact No
1	Er. Vikas Bangar	Dy. Director/PLC	BBMB, Chandigarh	9356079077
2	Er. Peyush Chaturvedi	AEE/Works	BBMB, Chandigarh	9992811777
3	Sh. Manoj Kumar Gupta	Sr. Manager-Electrical Maint. Dept.	JPL, Jhajjar	
4	Sh. Prabhat Mishra	Dy. Manager-Electrical Maint. Dept.	JPL, Jhajjar	
5	Sh. Rahul Bhushan Ambedkar	Sr. Manager (Electrical)	NHPC, Haryana	
6	Sh. Yogesh Jaiswal		POWERGRID NR-1	
7	Er. Rajbit Singh Walia	Addl. SE/Protection & OS Divn	PSTCL, Patiala	9646118223
8	Er. Harvinder Singh	Sr. XEN/Protection Divn	PSTCL, Jalandhar	9646118231
9	Er. Sanjeev Kumar	AEE/Protection Divn	PSTCL, Mohali	9646118275
10	Sh. Asim Baig	EE (T&C)	PTCUL, Rishikesh	
11	Sh. Jagbeer Singh	EE (T&C)	PTCUL, Haldwani	
12	Sh. Satyam Badala	Manager-Electrical	TSPL, Talwandi Sabo	
13	Sh. Manoj Kumar Gupta	Engineer-Electrical	TSPL, Talwandi Sabo	
14	Sh. Himanshu Pundir	Executive Engineer, Elect. Test& Commissioning Division	UPPTCL, Meerut	
15	Sh. Sushil Kumar Yadav	Executive Engineer, Elect. Test& Commissioning Division	UPPTCL, Gorakhpur	
16	Sh. Abu Zar	EE, HTPS	UPRVUNL, Harduaganj	9412753081
17	Sh. Manoj Yadav	AE, BTPS	UPRVUNL, Obra	9415903061
18	Sh. Mohsin Khan	Assistant Engineer (R&A)	UPSLDC	
19	Sh. Sunil Kumar Maurya	Assistant Engineer (R&A)	UPSLDC	
20	Sh. Avinash Sinha	Assistant Engineer (SO)	UPSLDC	
21	Sh. Abhishek Jain	Manager -EMD	APCPL -Jhajjar	9416212489
22	Sh. B. L. Yadav	AGM(OS-DBF)	NTPC	9650993044
23	Sh. Arun Kumar Thakur,	Manager	SJVNL	9418026922
24	Sh. Sanjeet Singh Parmar	Asstt. Manager	SJVNL	9418465432
25	Sh. Saumitra Mazumdar	SE (O)	NRPC	
26	Sh. B. Chandrasekhar	AE	NRPC	
27	Sh. Amit Gupta	Dy Manager	NRLDC	
28	Sh. Abhishek	Asst. Manager	NRLDC	
29	Sh. Manish Maurya	AEE (C)	NRPC	

SPS for WR-NR corridor - 765kV Agra-Gwalior D/C

Case	Contingency	Action
Case-1	When both ckts are in service and total steady state flow on 765 kV Gwalior to Agra is more than 4000 MW for a period of 10 seconds	Shed Loads in Groups C, D
Case-2	When only one ckt is in service and flow on 765 kV Gwalior to Agra is more than 3000MW for a period of 5 seconds	Shed load in Group C and D
Case-3	Steady state voltage at 400kV Agra less than 380 kV & more than 50kV for a period of 10secondsdirection of power flows is WR to NR)	Shed load in Group C and D
Case-4	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-1 & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW in load group H, I, J and K **Action at WR end:** Automatically back down 1000 MW generation in WR in the shortest possible time at Korba, Vindhyachal, Sasan and CGPL Mundra.

Load Groups

S. No.	Group	Delhi		UP		Rajasthan		Haryana		Punjab		
		Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	Load	Planned Load (MW)	Group Total
1	Group-A	**Mandola (PG)-** 220 kV Narela D/C **NSD-70D**	150	Feeders from **220/132 kV Muradnagar** old S/S 132 kV Niwai Road 132 kV Modi Steel 132 kV Morta 2*63 MVA X-Mer	100	**220/132 kV Alwar-** 132 kV GSS Pinan **400/220 kV Merta -** 132 kV GSS Roon	25			**220/66 kV Malerkotla** 66 kV Malerkotla ckt 66 kV Naudhrani ckt	35	310
2	Group-B	**Mandola (PG) -** 220 kV Gopalpur D/C	200			**220/132 kV Ratangarh -** 132 kV Sardar Sahar	25	**Panipat (BBMB)** 100 MVA, 220/33 kV ICT	50			275
3	Group-C			Feeders from **220/132 kV Modipuram** Sub-station. 132 KV Sardhana, Kankankhera, Kapsad, Kankankhera-2, 132/33kV 40MVA+ 63MVA ICT-2&3 33 kV Ladies Park, 33 kV Pallavpuram, 33 kV Siwaya	100	**400/220 kV Merta -** 132 kV GSS Merta City 132 kV GSS Lamba+ Gotan 132 kV GSS Kuchera	60	**220kV Dhanoda-** 220kV Lula Ahir Ckt-1 220kV Lula Ahir Ckt-2 (Load Relief: 220/132kV, 100MVA T/F + 220/33kV, 100MVA T/F) **220kV Charkhi Dadri-** 220kV Lula Ahir (Load Relief: 3*100MVA 220/132kV Rewari)	91	**220/66 kV Gobindgarh-1** 66 kV Chourwala ckt-1, 66 kV Chourwala ckt-2, 66 kV Talwara ckt-1, 66 kV Talwara ckt-2 66 kV Focal Point	71	322
4	Group-D					**220/132 kV Alwar-** 132 kV GSS Bansoor 132 kV GSS Malakheda 132 kV Ramgarh	60	**220kV Charkhi Dadri-** 220kV Mohindergarh Ckt-1 (Radial load- 49MW) 220kV Mohindergarh Ckt-2 (Radial load of Narnaul-38MW)	87	**220/66 kV Laltokalan-** 66kV Gill Road ckt-1 66kV Gill Road ckt-2 66kV Ferozpur 66 kV Sarinh	114.25	261.25
5	Group-E			**220 kV Mainpuri -** 2 x 132/33 kV , 63 MVA T/F (20 MW -60 MW)	50	**220/132kV Bhilwara-** 132 kV GSS Gangapur, 132 kV GSS Devgarh+Kareda, 132 kV GSS Danta **220/132 kV Merta-** **(Spare DTPC)**	105	**132kV PTPS-** 132kV Chandauli 132kV Munak **220kV Dhanoda-** *220/132 kV 100 MVA X-Mer*	88	**220 kV Jamsher-** 66 kV Nakodar Road-1 66 kV Nakodar Road-2	100	343
6	Group-F			**220 kV Nara-** 132/33 kV , 40 MVA T/F 132/33 kV, 2*63 MVA T/F (32 MW -52 MW)	50	**220/132 kV Alwar** 132 kV GSS Alwar (Local Load) **220/132kV Kota-** Kota local load (40/50MVA TF) 132 kV Nanta(Talera) **220/132 kV Beawar-** 132 kV GSS Ber Jaitaran	100	**Samaypur (BBMB) -** 220 kV Palwal D/C (MW) (35MW) **220kV Narwana-** 2*100MVA 220/132kV T/F at 220 kV Narwana	55	**220 Mohali-1-** 66 kV Mohali Phase-7 66 kV Mohali Phase-8B 66 kV Mohali Sector-71 66 kV Mohali Phase-1	100	305
7	Group-G					**220/132 kV Ratangarh -** 132 KV Ratangarh Inter-Connector 132 kV Fatehpur **220/132 kV Beawar-** 132 kV GSS Masuda, 132 KV GSS Asind, Beawar Local Load	100	**132kV Charkhi Dadri** 132kV Dadri city, 132kV Matenhail, 132kV Kalanaur, 132kV Bahu 132/33kV T/F 20/25MVA 132/133V T/F 16/20 MVA	75	**220 kV Ablowal-** 66 kV Rakhra-I & II, 66 kV Rakhra-III & IV	100	275
8	Group-H					**220/132kV Bhilwara-** 132 KV Bhilwara Local Load	12	**220kV Fatehabad(PGCIL)-** 220kV Fatehabad Ckt-1 220kV Fatehabad Ckt-2 220kV Sirsa	45	**220kV Ajitwal-** 66 kV Galib ckt 66 kV Doudhar 66 kV Chogawan ckt-1 66 kV Chogawan ckt-2	15	72
9	Group-I			**220kV Saharanpur-** 220/132kV, 40MVA T/F-1 220/132kV, 40MVA T/F- 132kV Ambala Road 132 kV Gagalheri ckt	100	**220/132 kV Ratangarh -** 132kV GSS Momasar+ Patlisar	35	**132kV Safidon-** 220/132kV, 100MVA T/F-1 220/132kV, 100MVA T/F-2	50	**220kV Dhandari-2-** 66/11kV T-2 66/11kV T-4 66kV Sherpur Ckt-1 66kV Sherpur Ckt-2	109	294
10	Group-J			**220kV Nanuta-** 132/33kV, 63MVA T/F-1 132/33kV, 63MVA T/F-2 132kV Deoband ckt 132 kV Gangoh ckt 132 kV Rampur-Maniharan 132 kV Shamli-Shyamla	155	**220/132 kV Debari-** 132kV GSS Mavli 132kV GSS Bhatewar 132 kV Debari local load	90	**220kV Hissar(PGCIL)-** 220kV Sangwan Ckt-1 220kV Sangwan Ckt-2	45	**Ablowal -** 66kV Bam 66kv passiana-1 **Bahadurgarh-** 66kV Bahadurgarh-1 66kV Ghanour 66kV Patiala 66kV Bam-1 66kV Bam-2	153.1	443.1
11	Group-K	**400/220kV Bamnauli-** 220kV Pappankala Ckt-1 220kV Pappankala Ckt-2	200			**220/132 kV Chittorgarh-** 132 kV GSS Ajolia ka khera+Bassi 132 kV Senthi Chittorgarh local load	65	**220kV Nunamajra-** 220/132kV, 100MVA T/F-1 220/132kV, 100MVA T/F-2 **220kV Prem Nagar Bhiwani (BBMB)-** Bapora Ckt-1 Bapora Ckt-2	57	**220 kV Mohali-1 (Sector-80)** 66kV CHD-1 66kV CHD-2 66kV CHD-3 66kV CHD-4 66kV Incoming-1 66kV Incoming-2 66kV Incoming-3 **220kV Gobindgarh-2 MGG** 66kV Khanna Ckt-1 66kV Khanna Ckt-2 66kV Badinpur 66kV Central 66kV Grain Market 66kV Bhari 66/11kV T-2 66/11kV T-4 66/11kV T-6	90	412
	TOTAL		550		555		677		643		887.35	3312.4

Annexure-VI

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)

उत्तरी क्षेत्रीय भार प्रेशण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली- 110016
OFFICE : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi- 110016
CIN : U40105DL2009GOI188682, Website : www.nrldc.org, www.nrldc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 26852747

संदर्भ: उक्षेभाप्रेके/संचालनप्रणाली-II/TS-16/ दिनांक: 09 मई 2019

सेवा में,

वितरण सूची के अनुसार

विषय: Report on the mock testing of 765 kV Agra-Gwalior SPS with revised logic at Agra (PG)
संदर्भ: NRPC letter No.-NRPC/ OPR/107/03/2019/4040-4049 dt 26.04.19

महोदय,

The mock testing of 765 kV Agra-Gwalior System Protection Scheme (SPS) was conducted on 01st May 2019 in line with the decision of Operation Coordination Committee (OCC) of Northern Region and above referred letter from NRPC. Before the testing as well during the testing a high level of support and coordination was extended by all the stakeholders. The testing of the scheme was by and large OK with few observations. A brief report on the SPS testing is attached as **Annex-I.**

धन्यवाद,

भवदीय

(राजीव पोरवाल)
महाप्रबंधक (प्रणाली प्रचालन) 09/05/19

प्रतिलिपि विनम्र सूचनार्थ:

1. सदस्य सचिव, उत्तर क्षेत्रीय विद्युत समिति, 18ए, कुतब इंस्टीट्यूशनल एरिया, नई दिल्ली- 110 016
2. निदेशक (SO), पोसोको, बी-9, कुतुब इन्स्टीट्यूशनल एरिया, नई दिल्ली -110 016
3. कार्यकारी निदेशक, पश्चिमी क्षेत्रीय भार प्रेषण केंद्र, F-3, सेंट्रल रोड, एमआईडीसी एरिया, मरोल, अंधेरी (ईस्ट), मुंबई- 400 093

वितरण सूची:

1. निदेशक (प्रचालन), सौदामनी, प्लॉट नंबर-2, सैक्टर-29, ईफको चौक के पास, गुड़गाँव (हरियाणा) - 122 001
2. प्रबंधक निदेशक (NR-1), पावर ग्रिड, बी-9, कुतुब इन्स्टीट्यूशनल एरिया, नई दिल्ली -110 016
3. प्रबंधक निदेशक (NR-2), पावर ग्रिड, ग्रिड भवन, रेल हैड कॉम्प्लेक्स, जम्मू- 180 012
4. प्रबंधक निदेशक (NR-3), पावर ग्रिड, 12, महाराणा प्रताप मार्ग, सिकंदर बाग चौराहा के पास, लखनऊ- 226 001
5. अध्यक्ष एवं प्रबंध निदेशक, पंजाब स्टेट ट्रांसमिशन कार्पोरेशन लिमिटेड, द मॉल, पटियाला (पंजाब)- 147 001
6. मुख्य अभियंता (SLDC), SLDC बिल्डिंग, 220 kV ग्रिड स्टेशन के पास, पंजाब स्टेट ट्रांसमिशन कार्पोरेशन लिमिटेड, अबलोवल, पटियाला- 147 001
7. प्रबंधक निदेशक, DTL, शक्ति सदन बिल्डिंग, कोटला रोड, नई दिल्ली-110002
8. महाप्रबंधक (SLDC), DTL, SLDC बिल्डिंग, 33 केवी सब-स्टेशन बिल्डिंग, मिन्टो रोड, नई दिल्ली-110002
9. प्रबंधक एवं अध्यक्ष निदेशक, RRVPNL (राजस्थान राज्य विद्युत प्रषारण निगम लिमिटेड), विद्युत भवन, जनपथ, जयपुर-302005
10. मुख्य अभियंता (LD), SLDC, RRVPNL (राजस्थान राज्य विद्युत प्रषारण निगम लिमिटेड), अजमेर रोड, हीरापुरा, जयपुर-302024
11. प्रबंधक एवं अध्यक्ष निदेशक, HVPNL, शक्ति भवन, सैक्टर-6, पंचकुला, अम्बाला-134109
12. मुख्य अभियंता (SO & SLDC), HVPNL, शक्ति भवन, सैक्टर6-, पंचकुला, अम्बाला-134109
13. प्रबंधक एवं अध्यक्ष निदेशक, UPPTCL, शक्ति भवन, 14-अशोक मार्ग, लखनऊ-226001
14. निदेशक (SLDC), विभूति खण्ड, फेज-2, गोमती नगर, लखनऊ-226010, उत्तर प्रदेश
15. मुख्य अभियंता (पावर सिस्टम), 5th फ्लोर, UPPTCL, शक्ति भवन, 14-अशोक मार्ग, लखनऊ- 226001, उत्तर प्रदेश

Annex-I

NRLDC report on mock testing of Agra-Gwalior SPS held on 01st May 2019

As per letter No. NRPC/OPR/107/03/2019/4040-4049 dt 26.04.2019 from SE (O) NRPC, a mock testing of SPS for 765 kV Agra-Gwalior was proposed on 30th Apr 2019. However, it was postponed to 01st May 2019 in view of requirement of shutdown of 765 kV Gwalior bays at Agra end by POWERGRID for affecting changes in the logic (CT input to PLC controller were required to be changed) as per revised scheme.

The logic of the revised scheme tested is enclosed as **Annex-A**. The utility wise detailed observations are enclosed as **Annex-B.** The observations for generation backing down in WR generating units as informed by WRLDC is enclosed as **Annex-C**.

Mock testing of 765 kV Agra-Gwalior SPS was conducted for all four condition and signal was sent to all the location except 220 kV Nara (UP). Consolidated detail is tabulated below:

Condition	Time of mock testing	Logic	Action in revised SPS	Outcome after SPS testing
1	**13:07hrs**	When both ckts are in service and total steady state flow on 765 kV Gwalior to Agra is more than 4000 MW for a period of 10 seconds	Shed loads in load group C&D	Signal sent to all the location comes under load group C&D
2	**13:38hrs**	When only one ckt is in service and flow on 765 kV Gwalior to Agra is more than 3000MW for a period of 5 seconds	Shed loads in load group C&D	Signal sent to all the location comes under load group C&D
3	**14:20hrs**	Steady state voltage at 400kV Agra less than 380 kV & more than 50kV for a period of 10secondsdirection of power flows is WR to NR)	Shed loads in load group C&D	Signal sent to all the location comes under load group C&D

5	**15:30hrs**	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-1 & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 1000 MW (in H,I,J&K load group). Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.	Signal sent to all the location except for 220 kV Nara (UP) due to communication problem, however issue has been resolved on the same date at 16:07hrs. SPS signal also sent to generators in Western Region

Mock testing report has been received from most of the utilities except from some location like Bhiwani (BBMB), Charkhi Dadri (BBMB) and Hisar (PG) etc.

Following are the observations based on input reports from the different utilities:

- Actions to be taken by POWERGRID:
  - Communication issue resulting in major DTPC alarm at Nara. (However, communication issue was reportedly resolved in the evening of the same day at 1607hrs).
  - Counter at 220 kV Nara (UP), Narwana (Haryana) and Jamsher (Punjab) did not increase and therefore to be checked and corrected.
  - 66 kV Sarinh feeder is yet to be wired (Cable is yet to be laid for 66 kV feeder at 220 kV Laltokalan station).
  - Two DTPC are installed at Beawar (Rajasthan) station but one DTPC did not receive the signal, therefore 132 kV GSS Ber Jaitaran and 132 KV GSS Asind feeders connected to this DTPC would not trip. (DTPC is to be wired for input signal)
  - 220/132 kV Ratangarh (Sardar Sahar ckt): It's mapped for load Group-B but DTPC is not found at Ratangarh site. DTPC location to be checked and reported.

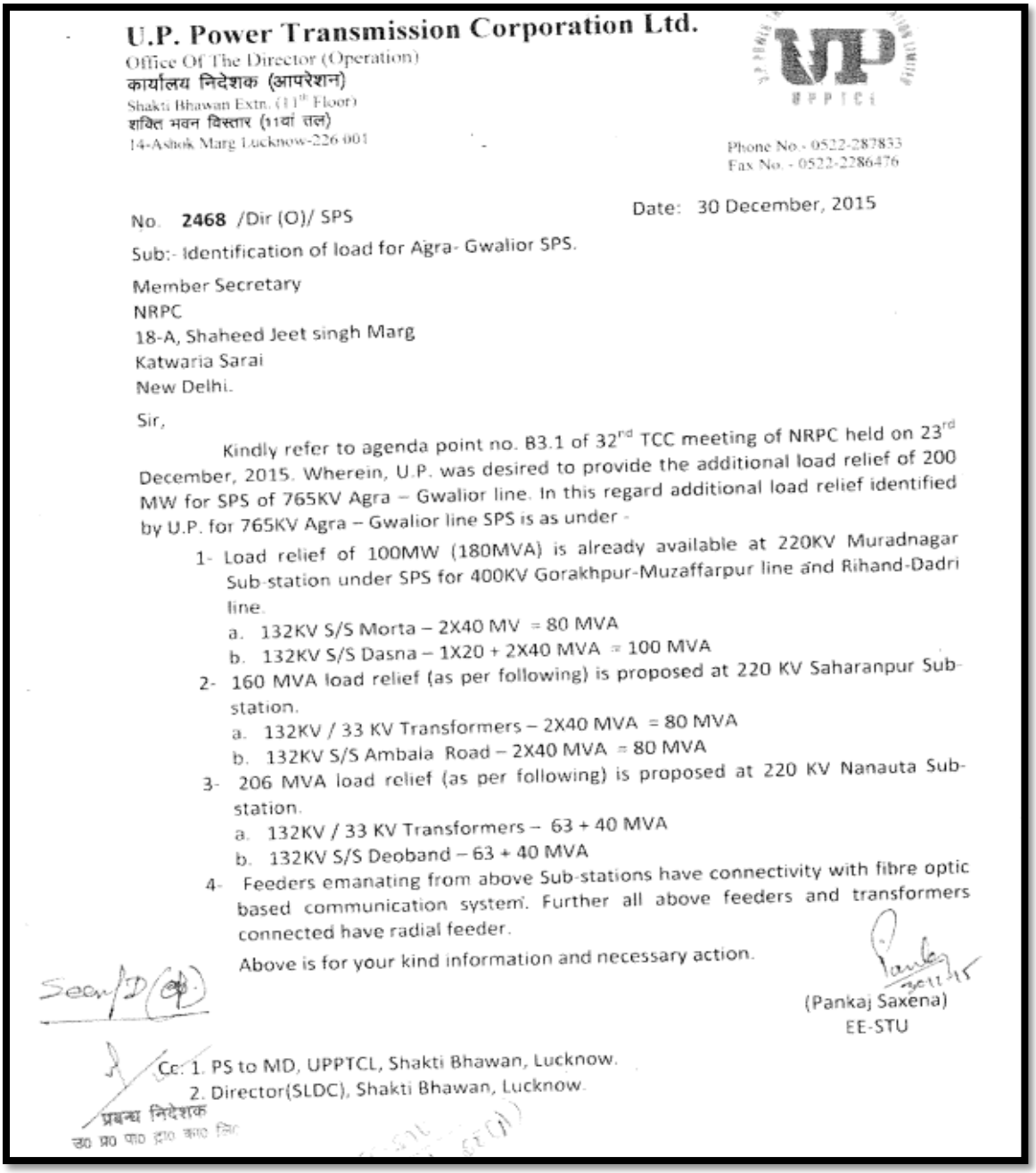
- Punjab:
  - At 220 kV Dhandhari-2: Failure of DC supply at 220 kV Dhandhari-2 before the testing resulted into DTPC major alarm, however DC supply to DTPC was restored before testing of condition-5 in which signal extended to Dhandhari-2
  - At 220 kV Jamsher:
    - 66 kV Nakodar ckt-1 & 2 was non-radial feeder
    - At the time of mock testing, load on 66kV Nakodar ckt-1 & 2 was nil against planned load relief of 100MW (minimum).
    - Display of DTPC Counter was faulty.
  - At 220 kV Ablowal: At the time of mock testing, load on 66 kV Barn, Passiana-1 was nil against planned load relief of 18MW (minimum).
  - At 220 kV Bahadurgarh (Bhateri):
    - 66 kV Ghanour feeder was non-radial feeder.

        - 66kV Patiala feeders was not wired for tripping.
        - At the time of mock testing, total load wired under SPS scheme at Bahadurgarh station was ~43MW against planned load relief of 135MW (minimum).
    - At Mandi Gobindgarh2:
        - 66kV Grain market feeder was not wired for tripping.
        - At the time of mock testing, total load on the feeders wired under SPS scheme at Mandi Gobindgarh 2 station was ~61MW against planned load relief of 90MW (minimum).
    - At Mandi Gobindgarh1: Is 66kV Chourwala ckt-2 and Focal Point ckt is wired in old SPS scheme of Agra-Gwalior?
    - At Mohali-I:
        - Clarity require from Punjab for feeders connected at Mohali-I in old scheme and new scheme.
        - Feeders connected on DTPC under DIP-5000 scheme are non-radial in nature.
    - Planned load relief of Ajitwal station is still pending (at the time of mock testing load was around 15MW)

- <u>Haryana</u>:
    - Details pending from BBMB (except Samaypur) and POWERGRID station (Hisar). It's responsibility of Haryana to collect the information and share the details with NRLDC/ NRPC.
    - 220 kV Fatehabad (PG): 220 kV Fatehabad (PG)-Fatehabad (HVPNL) ckt-1 &2 were non-radial in nature.
    - 132 kV PTPS: Feeders were non-radial in nature.
    - Narwana: Display of DTPC Counter was faulty.
    - What is the status of feeders & ICTs (132kV Dadri city, 132kV Matenhail, 132kV Kalanaur, 132kV Bahu, 132/33kV T/F 20/25MVA, 132/133V T/F 16/20 MVA) from Charkhi Dadri connected in load Group-G, which is used in Balia-Bhiwadi SPS scheme?

- <u>Rajasthan</u>:
    - Total 362 MW load shedding is planned under Agra-Gwalior SPS scheme against target of 550MW. It seems Rajasthan has taken lower load relief in planning itself than how target load relief will be achieved.
    - 220/132 kV Ratangarh (Sardar Sahar ckt):
        - It's mapped for load Group-B but DTPC is not found at Ratangarh site.
        - 132 kV sardar Sahar ckt was non-radial in nature.
    - 220kV Ratangarh: 132 kV Fatehpur ckt was non-radial in nature.
    - 220 kV Merta: 132 kV Lamba+Gotan and Kuchera needs to be wired from DTPC NSD-70D at Merta, so that these feeders will also be tripped in case of tripping operation of load group C&D.
    - 220 kV Alwar: 132 kV Bansur feeder was non-radial in nature.
    - 220 kV Debari: 132kV Bhatewar feeder was non-radial in nature (132kV Bhatewar fed from 220 kV GSS Nimbahera due to system constraints).

- Uttar Pradesh:
    - 220 kV Modipuram:
        - 132kV Kankankhera feeder was non-radial in nature.
        - Lower load relief during actual operation on 25th Mar 2019.
    - 220 kV Mainpuri: At the time of mock testing, total load on the feeders wired under SPS scheme at Mainpuri (UP) station was ~33MW against planned load relief of 50MW (minimum).
    - 220 kV Nara:
        - Communication issue resulting in major DTPC alarm at Nara. (This issue related to POWERGRID)
        - Display of DTPC Counter was faulty
    - 220 kV Nanauta:
        - 132kV Deoband line was non-radial in nature.
        - At the time of mock testing, total load on the feeders wired under SPS scheme at Nanauta (UP) station was ~60MW against planned load relief of 195MW (minimum).
    - 220 kV Saharanpur:
        - 132kV Ambala Road was non-radial in nature.
        - At the time of mock testing, total load on the feeders wired under SPS scheme at Saharanpur (UP) station was ~86MW against planned load relief of 152MW (minimum).
    - Feeders name from 220/132 kV Muradnagar old station to be informed to NRLDC/ NRPC.
    - As per UPPTCL details of additional load shedding of 200MW, load relief figure was calculated on the basis of summation of ICT MVA capacity but actual load flow on these feeders/ ICTs are well below these values. UPPTCL shall provide feeder/ICT wise details of minimum load on the feeders or ICT mapped in SPS scheme. UPPTCL letter submitted to NRPC is as below:



U.P. Power Transmission Corporation Ltd.

Office Of The Director (Operation)
कार्यालय निदेशक (आपरेशन)
Shakti Bhawan Extn. (11th Floor)
शक्ति भवन विस्तार (११वां तल)
14-Ashok Marg Lucknow-226 001

UPPTCL

Phone No.- 0522-287833
Fax No. - 0522-2286476

No. **2468** /Dir (O)/ SPS

Date: 30 December, 2015

Sub:- Identification of load for Agra- Gwalior SPS.

Member Secretary
NRPC
18-A, Shaheed Jeet singh Marg
Katwaria Sarai
New Delhi.

Sir,

Kindly refer to agenda point no. B3.1 of 32rd TCC meeting of NRPC held on 23rd December, 2015. Wherein, U.P. was desired to provide the additional load relief of 200 MW for SPS of 765KV Agra – Gwalior line. In this regard additional load relief identified by U.P. for 765KV Agra – Gwalior line SPS is as under -

1- Load relief of 100MW (180MVA) is already available at 220KV Muradnagar Sub-station under SPS for 400KV Gorakhpur-Muzaffarpur line and Rihand-Dadri line.
   a. 132KV S/S Morta – 2X40 MV = 80 MVA
   b. 132KV S/S Dasna – 1X20 + 2X40 MVA = 100 MVA
2- 160 MVA load relief (as per following) is proposed at 220 KV Saharanpur Sub-station.
   a. 132KV / 33 KV Transformers – 2X40 MVA = 80 MVA
   b. 132KV S/S Ambala Road – 2X40 MVA = 80 MVA
3- 206 MVA load relief (as per following) is proposed at 220 KV Nanauta Sub-station.
   a. 132KV / 33 KV Transformers – 63 + 40 MVA
   b. 132KV S/S Deoband – 63 + 40 MVA
4- Feeders emanating from above Sub-stations have connectivity with fibre optic based communication system. Further all above feeders and transformers connected have radial feeder.

Above is for your kind information and necessary action.

(Pankaj Saxena)
EE-STU

Cc: 1. PS to MD, UPPTCL, Shakti Bhawan, Lucknow.
2. Director(SLDC), Shakti Bhawan, Lucknow.

प्रबन्ध निदेशक
उ0 प्र0 पा0 ट्रा0 कार्प लि0

- Delhi:
  - Bamnauli (DTL): 220 kV Bamnauli-Pappankalan ckt-1 & 2 were non-radial in nature.

The aforesaid points need to be deliberated in next OCC meeting and SPS load groups also to be finalized with the input of all the concerned utilities.

Annex-A

Revised Logic of SPS for 765 kV Agra-Gwalior (As approved in 32nd TCC/36th NRPC meetings)

Sr. No	Revised Logic	Action in revised SPS
1	When both ckts are in service and total steady state flow on 765 kV Gwalior to Agra is more than 4000 MW for a period of 10 seconds	Shed loads in Group C, D.
2	When only one ckt is in service and flow on 765 kV Gwalior to Agra is more than 3000MW for a period of 5 seconds	Shed loads in Group C, D.
3	Steady state voltage at 400kV Agra less than 380 kV & more than 50kV for a period of 10secondsdirection of power flows is WR to NR)	Shed loads in Group C, D.
5	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-1 & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW. Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.

Annex-II

Format for submission of Information regarding load shedding (POWERGRID)

Name of Sub-station: AGRA
Name of the Utility: POWERGRID

Name of the Feeder	Whether Feeder is radial or not(Y/N)	Initial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5	Flow on the feeder at the time of receipt of signal (MW)
–	–	0						
–	–							
–	–							

attached separately

Revised Logic of SPS for 765 kV Agra-Gwalior

Sr. No	Revised Logic	Action in revised SPS
1	When both ckts are in service and total steady state flow on 765 kV Gwalior to Agra is more than 4000 MW for a period of 10 seconds	Shed loads in Group C, D.
2	When only one ckt is in service and flow on 765 kV Gwalior to Agra is more than 3000MW for a period of 5 seconds	Shed loads in Group C, D.
3	Steady state voltage at 400kV Agra less than 380 kV & more than 50kV for a period of 10secondsdirection of power flows is WR to NR)	Shed loads in Group C, D.
5	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-I & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW in Group H, I, J and K. Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.

(Signature of sub-station officer/in-charge with Name, Designation and Mobile No)

S.SRINIVAS
DGM- AGRA S/S

Annex-B

Counter Increment at Agra POWERGRID during Mock Testing of Agra Gwalior SPS dated 01.05.2019

	ABB DTPC-1 (To Dadri) -				ABB DTPC-2 (To Sasan)	Alstom DTPC-1 (To Dadri)		Alstom DTPC (To Mundra/Vindhyanagar/Korba)	
	Code A (Case-1)	Code B (Case 2)	Code D (Case-2)	Code E (Case-2)	Code B (Case-2)	Code 1 (Case-1)	Code 2 (Case-2)	Code 1 (Case-2)	Code 1 (Case-2)
Initial counter reading	0	0	0	0	0	0	0	0	0
Counter reading after Condition 1	1	0	0	0	0	1	0	0	0
Counter reading after Condition 2	2	0	0	0	0	2	0	0	0
Counter reading after Condition 3	3	0	0	0	0	3	0	0	0
Counter reading after Condition 4	3	1	1	1	1	3	1	1	1

(Signature of sub-station officer/in-charge with Name, Designation and Mobile No.

SRINIVAS SUROJ
DGM- AGRA S/S

Annex-B

Format for submission regarding load shedding (Punjab)

Name of Sub-Station : **220 kV S/S Lalton kalan**

Name of Utility : **PSTCL**

Name of feeder	Whether Feeder is radial or not (YN)	Intail counter reading	Counter reading after condition:1	Counter reading after condition:2	Counter reading after condition:3	Counter reading after condition:4	Counter reading after condition:5	Flow on the feeder at the time of receipt of signal (M/W)
66 kV Gill road CKT:1	Y	12	13	14	15	18	20	44.92
66 kV Gill road CKT:2	Y	12	13	14	15	18	20	39.6
66 kV Dugri	Y	12	13	14	15	18	20	13.91

Note: The cable has not been laid for 66 kV Sarinh Ckt by PGCIL

2) Relays were unblocked before condition 5 as desired by NRLDC and all 3 66kV Circuits were tripped on command for Mock Testing.

Sr Xen/ P&M Divn.
PSTCL, Lalton Kalan

Nameof Sub-station: **220 kV Mandi GOBINDGARH-1**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66KV Focal Point	Y	**81**	**82**	**84**	**87**	**89**	**94**	**20.58**
66KV Talwara-1	Y	**35**	**36**	**38**	**41**	**43**	**48**	**22.86**
66KV Talwara-2	Y	**35**	**36**	**38**	**41**	**43**	**48**	**22.86**
66KV Chaurwala 1 1	Y	**57**	**58**	**60**	**63**	**65**	**70**	**2.29**
66KV Chaurwala 2 2	Y	**81**	**82**	**84**	**87**	**89**	**94**	**3.43**

Nameof Sub-station: **220 kV Ablowal**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Baran	Y	**2**	**NA**	**NA**	**NA**	**NA**	**3**	**Nil**
66 kV Passiana	Y	**2**	**NA**	**NA**	**NA**	**NA**	**3**	**Nil**

Nameof Sub-station: **220 kV Ajitwal**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Chogawan 1	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**2.93**
66 kV Passiana	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**3.16**
66 kV Galib Kalan	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**2.82**
66 kV Daudhar	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**6.32**

Nameof Sub-station: **220 kV Bahadurgarh (Bhateri)**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Bahadurgarh-1	Y	**3**	**NA**	**NA**	**NA**	**NA**	**4**	**7.20**
66 kV Ghanour	N	**2**	**NA**	**NA**	**NA**	**NA**	**3**	**3.49**
66 kV Barn-1	Y	**3**	**NA**	**NA**	**NA**	**NA**	**4**	**16.20**
66 kV Barn-2	Y	**2**	**NA**	**NA**	**NA**	**NA**	**3**	**16.20**

Nameof Sub-station: **220 kV Dhandhari Kalan-2**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66/11 kV 20MVA Transformer-2	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**9.73**
66/11 kV 20MVA Transformer-4	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**11.31**
66 kV Dhandhari-Sherpur ckt-1	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**44.13**
66 kV Dhandhari-Sherpur ckt-1	Y	**0**	**NA**	**NA**	**NA**	**NA**	**1**	**44.13**

There was DC supply problem wih DC supply to DTPC and Fibre Home. Supply to these was restored at 14:40 hrs before start of Condition-5

Annex-B

Format for submission regarding load shedding (Punjab)

Nameof Sub-station: **220 kV Mandi Gobindgarh-2**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Bhari line	Y	3	NA	NA	NA	NA	4	0.00
66/11 kV 20MVA Transformer-4	Y	3	NA	NA	NA	NA	4	1.37
66 kV Central S/S	Y	3	NA	NA	NA	NA	4	11.45
66/11 kV 20MVA Transformer-2	Y	3	NA	NA	NA	NA	4	8.01
66 kV Khanna-1	Y	3	NA	NA	NA	NA	4	10.50
66 kV Khanna-2	Y	3	NA	NA	NA	NA	4	10.50
66 kV Badeenpur	Y	3	NA	NA	NA	NA	4	13.74
66/11 kV 20MVA Transformer-6	Y	3	NA	NA	NA	NA	4	5.04

66 kV Bhari ckt was on standby during mock testing, so there was no load shedding

Nameof Sub-station: **220 kV Jamsher**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Nakodar-1	N	--	NA	NA	NA	NA	Counter Defective	Nil
66 kV Nakodar-2	N	--	NA	NA	NA	NA	Counter Defective	Nil

Nameof Sub-station: **220 kV Mohali-1 (NSD-570)**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Incomer C-1	Y	0	NA	NA	NA	NA	1	90.53
66 kV Incomer C-2	Y	0	NA	NA	NA	NA	1	53.10
66 kV Incomer C-3	Y	0	NA	NA	NA	NA	1	56.94
66 kV Chandigarh ckt-1	Y	0	NA	NA	NA	NA	1	36.46
66 kV Chandigarh ckt-2	Y	0	NA	NA	NA	NA	1	21.49
66 kV Chandigarh ckt-3	Y	0	NA	NA	NA	NA	1	22.72
66 kV Chandigarh ckt-4	Y	0	NA	NA	NA	NA	1	22.74

Note : Load on 66 kV Chandigarh ckts included in the load on 66 kV Incomers so net load shedding is 220.57MW

Nameof Sub-station: **220 kV Mohali-1 (DIP-5000)**

Nameof the Feeder	Whether Feederis radialor not(Y/N)	Initial Counter Reading	Counter Reading after Condition1	CounteReadingafterCondition2	Counter ReadingafterCondition3	Counter Reading after Condition4	Counter Reading after Condition5	Flowonthefeederatthetimeofreceiptofsignal(MW)
66 kV Incomer C-1	Y	0	NA	NA	NA	NA	1	90.53
66 kV Incomer C-2	Y	0	NA	NA	NA	NA	1	53.10
66 kV Incomer C-3	Y	0	NA	NA	NA	NA	1	56.94
66 kV Chandigarh ckt-1	Y	0	NA	NA	NA	NA	1	36.46

Annex-B

Submission of informatiion regarding mock testing for 765kV Agra Gwalior on 01.05.2019

Name of Utility **HVPNL (Haryana)**

Name of Substation	Whether feeder is Radial or not (Y/N)	**Initial Counter Reading**	**Counter reading after Condition 1**	**Counter reading after Condition 2**	**Counter reading after Condition 3**	**Counter reading after Condition 5**	**Flow on the feeder at the time of receipt of signal (MW)**
1 X 100 MVA, 220/132 kV TlF at 400 kV Dhanonda 220 kV Dhanonda-Lula Ahir ckt 1&2	Not reported	counter 0	First try 6 Second try 7	8	9	11	197
2 X 100 MVA 220/132 kV T/F- T-2 & T-3 at 220kV N/Majra	Not reported	counter 7	7	7	7	8	76
2 X 100 MVA 220/132 kV T/F at 132 kV Safidon	Not reported	counter 0	0	0	0	1	62
132kV Garhi,Tohana,Ukalana,Dhamtansahib, 132/33 20MVA,132/11 8MVA at 220kV Narwana	Not reported	counter 8	8	8	8	8	41
220kV PTPS 132kV PTPS- 132kV Chandauli &132kV Munak	Not reported	counter 0	0	0	0	1	36
TOTAL							**412**

Name of Substation:220 KV Samaypur
Name of Utility:BBMB

Name of the Feeder	Whether feeder is Radial or not (Y/N)	Initial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5
220 KV Palwal I&II	Radial	71	80 13:12Hrs	81 13:40Hrs	82 14:20Hrs	83 14:42Hrs	84 15:32Hrs
Flow on the feeder at the time of receipt of signal (MW)-Palwal 1		79.31	96.55	110.34	106.89	103.44	113.79
Flow on the feeder at the time of receipt of signal (MW)-Palwal 2		103.44	127.58	96.55	93.1	96.55	117.24

Annex-B

Detail report of One to One testing of SPS on 765KV Agra- Gwalior Line on dated 01.05.2019 (Rajsthan details)

Name of GSS	Name of the Feeder	Whether Feeder is radial or not(Y/N)	Initial counter Reading	Counter reading after condition 1	Counter reading after condition 2	Counter reading after condition 3	Counter reading after condition 4	Counter reading after condition 5	Flow on the feeder at time of receipt of Signal (MW)
220 KV GSS Chittorgarh	133/33kV 40/50 MVA TR	Y	1	1	1	1		2	Cond. 5 - 10.5 MW
	133/33kV 20/25 MVA TR	Y	1	1	1	1		2	Cond. 5 - 17.4 MW
	132/11kV 6.3/8 MVA TR	Y	1	1	1	1		2	Cond. 5 - 0
	132kV Ajoliya Ka Khera + Bassi Line	Y	1	1	1	1		2	Cond. 5 - 34.2 MW
220 KV GSS Alwar	132 kv Alwar - Bansur	Y	16	17	18	19 & 20		21	132 kV Bansur fed from 220 kV GSS Bansur due to system constraints
	132 KV Alwar - Malakhera	Y	10	11	12	13 & 14		**15**	Cond.1 - 22 MW Cond.2- 20 MW Cond. 3 - 18 MW Cond. 5- 10 MW
	132 KV Alwar local	Y	68	68	68	68		69	Cond. 5- 84 MW
220 KV GSS Ratangarh	132 Kv Momasar + Patlisar	Y	1	1	1	1		2	Cond. 5- 37 MW
	132 Kv Fatehpur	Y	1	1	1	1		2	132 kV Fatehpur fed from 220 kV Laxmangarh due to system constraints
220 KV GSS Beawer	132 KV Masuda	Y	1	1	1	1		2	Cond 5 - 5 MW
	Local Load	Y	1	1	1	1		2	Cond 5- 63 MW
400 KV GSS Merta	132 Kv Merta City	N	36	44	46	48		49	Cond. 1 - 52 MW Cond. 2 - 54 MW Cond. 3 - 54 MW Cond. 5- 50 MW
	132 Kv Roon	Y							Cond. 1 - 8 MW Cond. 2 - 8 MW Cond. 3 - 4 MW Cond. 5 - 6 MW
220 KV GSS Kota	132 KV Nanta	Y	9	10	11	12 &13		14	Cond.1- 10.4 MW Cond.2- 10.05 MW Cond 3- 11.4 MW Cond 5- 11.35 MW
	132/33 Kv 40/50 MVA T/F	Y	2	3	4	5 & 6		7	Cond.1- 20.6 MW Cond.2- 21.5 MW Cond 3- 123.4 MW Cond 5- 123.1 MW
220 KV GSS Debari	132 KV Bhatewar	Y	35	0	0	0		36	132kV Bhatewar fed from 220 kV GSS Nimbahera due to system constraints
	132 KV Mavli	Y	26	0	0	0		27	Cond 5- 18 MW
220 kv gss Bhilwara	132 Kv GSS Danta	Y	0	0	0	0	0	1	Cond. 5 - 35 MW
	132 KV GSS Karera	Y	0	0	0	0	0	1	Cond. 5 - 33 MW
	132 KV GSS Gangapur	Y	0	0	0	0	0	1	Cond. 5 - 39 MW
	Local Load	Y	0	0	0	0	0	1	Cond. 5 - 50 MW

Annex-B

Format for submisssion of information regarding load shedding (UPPTCL)

Name of Sub-station : **220 KV Sub-station Saharanpur.** Name of Sub Station Incharge/ Mob No- Abhinav Garg/9412756282
Name of Utility : UPPTCL

Name of the Feeder	Whether Feeder is radial (Y/N)	Intial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5	Flow on the feeder at the time of receipt of signal (MW)
40 MVA-I T/F	-	3	3	3	3	3	4	16.9 MW
63 MVA-II T/F	-	3	3	3	3	3	4	23.9 MW
132 KV Ambala Road line	N	3	3	3	3	3	4	45.3 MW

Name of Sub-station : **220 KV Sub-station Nanauta.** Name of Sub Station Incharge/ Mob No- Peetam Singh/9412756285
Name of Utility : UPPTCL

Name of the Feeder	Whether Feeder is radial (Y/N)	Intial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5	Flow on the feeder at the time of receipt of signal (MW)
63 MVA-I	-	4	4	4	4	4	5	10.70 MW
63 MVA-II T/F	-	4	4	4	4	4	5	08.70 MW
132 KV Deoband line	N	4	4	4	4	4	5	42.01 MW

Name of Sub-station : **220 KV Sub-station Mainpuri** Name of Sub Station Incharge/ Mob No- P.R. Singh/9458096486
Name of Utility : UPPTCL

Name of the Feeder	Whether Feeder is radial (Y/N)	Intial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5	Flow on the feeder at the time of receipt of signal (MW)
63 MVA-I	-	16	16	16	16	16	17	24 MW
63 MVA-II T/F	-	16	16	16	16	16	17	9 MW

Name of Sub-station : **220 KV Sub-station Nara** Name of Sub Station Incharge/ Mob No- Anurag Singh/9412749863
Name of Utility : UPPTCL

Name of the Feeder	Whether Feeder is radial (Y/N)	Intial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5	Flow on the feeder at the time of receipt of signal (MW)
63 MVA-I	-	-	Counter Display defective at 220 KV Nara S/S since 07.01.16					29.22 MW
63 MVA-II T/F	-	-						25.10 MW
40 MVA T/F	-	-						Shut Down

Note :- DTPC major alarm problem at 220 KV Nara Substation was rectified by PGCIL on dated 29.04.19 but it was again occurred on dated 01.05.19. Major alarm problem was resolved by PGCIL engineer after mock testing at 16:10 hrs on dated 01.05.19.

Annex-B

Format for submisssion of information regarding load shedding (UPPTCL)

Name of Sub-station : **220 KV Sub-station Modipuram.** Name of Sub Station Incharge/ Mob No- Ravindra Dholka/9412749810

Name of Utility : UPPTCL

Name of the Feeder	Feeder is radial (Y/N)	Intial Counter Reading	Counter Reading after Condition 1		Counter Reading after Condition 2		Counter Reading after Condition 3		Counter Reading after Condition 4		Counter Reading after Condition 5	
			counter	Load	counter	Load	counter	Load	counter	Load	counter	Load
132 KV Sardhana	Y	10	11	20 MW	12	26 MW	13	29 MW	14	28 MW	15	25 MW
132 KV Kankerkhera	N	10	11	36 MW	12	38 MW	13	40 MW	14	40 MW	15	42 MW
132 KV Kapsad	Y	10	11	12 MW	12	12 MW	13	16 MW	14	18 MW	15	17 MW
132 KV KKR 2	Y	10	11	16 MW	12	15 MW	13	15 MW	14	14 MW	15	16 MW
40 MVA T/F 2	-	10	11	10 MW	12	11 MW	13	13 MW	14	12 MW	15	12 MW
63 MVA T/F 3	-	10	11	17 MW	12	20 MW	13	23 MW	14	21 MW	15	22 MW
33 KV Ladies Park	-	10	11	07 MW	12	07 MW	13	08 MW	14	08 MW	15	08 MW
33 KV Pallavpuram	-	10	11	06 MW	12	07 MW	13	07 MW	14	07 MW	15	08 MW
33 KV Siwaya	-	10	11	01 MW	12	01 MW	13	03 MW	14	03 MW	15	03 MW

Annex-B

Details received from Delhi (DTL)

Annex-II

Format for submission of Information regarding load shedding

Name of Sub-station: 400 kV Bamnauli
Name of the Utility: DTL

Name of the Feeder	Whether Feeder is radial or not(Y/N)	Initial Counter Reading	Counter Reading after Condition 1	Counter Reading after Condition 2	Counter Reading after Condition 3	Counter Reading after Condition 4	Counter Reading after Condition 5	Flow on the feeder at the time of receipt of signal (MW)
220kV PPK-I CKT-1	N	4	—	—	—	—	5	100 MW
220 kV PPK-I CKT-2	N	4	—	—	—	—	5	100 MW

Revised Logic of SPS for 765 kV Agra-Gwalior

Sr. No	Revised Logic	Action in revised SPS
1	When both ckts are in service and total steady state flow on 765 kV Gwalior to Agra is more than 4000 MW for a period of 10 seconds	Shed loads in Group C, D.
2	When only one ckt is in service and flow on 765 kV Gwalior to Agra is more than 3000MW for a period of 5 seconds	Shed loads in Group C, D.
3	Steady state voltage at 400kV Agra less than 380 kV & more than 50kV for a period of 10secondsdirection of power flows is WR to NR)	Shed loads in Group C, D.
5	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-1 & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW in Group H, I, J and K. Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.

(Signature of sub-station officer/in-charge with Name, Designation and Mobile No)

Amit G
09-05-2019
AM(T) Pdt-I
#-9999535079

Annex-C

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Government of India Enterprise)

पश्चिम क्षेत्रीय भार प्रेषण केन्द्र
एफ-3, सेन्ट्रल रोड, एम्.आई.डी.सी. एरिया, मरोल, अन्धेरी (पूर्व), मुंबई - 400 093.
दूरभाष : 022-28202690 • फैक्स : 022-28235434, 28202630 • ई-मेल : wrldc@posoco.in
WESTERN REGIONAL LOAD DESPATCH CENTRE
F-3, Central Road, MIDC Area, Marol, Andheri (East), Mumbai – 400 093.
Phone : 022-28202690 • Telefax : 28235434, 28202630 • E-mail : wrldc@posoco.in
CIN : U40105DL2009GOI188682

WRLDC/SO-II/002/2019-01 Date: 02.05.2019

संदर्भ संख्या / Ref. No.

To

Member Secretary,
Western Region Power Committee
F-3 MIDC Area, Marol, Andheri East
Mumbai 400093

Sub: Report on the mock testing of 765kV Agra-Gwalior SPS for load shedding in NR and automatic generation backing down in WR generating stations conducted on 01.05.19

Ref: - NRPC letter No-NRPC/ OPR/107/03/2019/4040-4049 dt 26.04.19

Dear Sir,

This has reference to the above mentioned letter regarding mock testing of 765kV Agra-Gwalior SPS conducted on 01.05.19. The above SPS testing was conducted successfully on 01st May 2019 and all the four generators in Western Region i.e. CGPL, SASAN, NTPC Korba and NTPC Vindhyachal have received the signal for Condition 5 of WR-NR SPS. The report on the SPS testing is attached as annexure.

Thanking you

Yours faithfully,

Pushpa

(Pushpa. S)
General Manager (SO)

Copy to:-

1. CGM, NLDC, POSOCO, New Delhi.
2. ED, NRLDC, POSOCO, New Delhi.
3. MS, NRPC, New Delhi.

Annexo

Report on testing of 765 kV Agra-Gwalior SPS on 01-05-19

As per letter No. NRPC/OPR/107/03/2019/4040-4049 dt 26.04.2019 from SE (O) NRPC, a mock testing of SPS for 765 kV Gwalior-Agra was proposed on 30th April 2019. However due to shutdown requirement of 765kV Gwalior-Agra bays one by one for logic modification as suggested by NRPC, the above said testing was postponed to 01st May 2019.

WRLDC coordinated for condition-5 of 765kV Agra-Gwalior SPS i.e. "Reduction of import by NR on 765kV Agra-Gwalior-I&II by more than or equal to 3000 MW and action of 1000 MW automatic generation back down in WR" (Presently automatic generation back down is 500 MW in WR) with CGPL, SASAN, NTPC and POWERGRID. Code was issued from WRLDC Control room to CGPL, SASAN and NTPC to block the automatic backing down of generation during the mock drill.

Accordingly test signal for condition-5 of 765kV Agra-Gwalior SPS was sent from Agra end at 15:30hrs on 01st May 2019 as intimated by NRLDC and it was reported from CGPL, SASAN, KSTPS and VSTPS that SPS signals were received at their end. The confirmation mail received from CGPL, SASAN, KSTPS and VSTPS are attached as annexures 1, 2, 3 and 4 respectively.

WRLDC, Mumbai

Annexure 1: CGPL

Annex-III

Format for submission of Information regarding Generation Back down

Name of the Generating Station	Initial Counter reading	Counter Reading after condition 5
CGPL	15	16

Sr. No	Revised Logic	Actions in revised SPS
5	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-1 & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW : Group H, I, J and K. Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.

Name : Priyank Shah.
Desig. : Shift charge Engineer
Mob no : 9227891537
Priyank.

(Signature of generating station officer/in-charge with Name, Designation and Mobile No)

Annexure 2: SASAN

Annex-III

Format for submission of Information regarding Generation Back down

Name of the Generating Station	Initial Counter reading	Counter Reading after condition 5
SASAN	Code B 14	15

Sr. No	Revised Logic	Actions in revised SPS
5	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-I & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW : Group H, I, J and K. Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.

We received Generation Back Down Signal through Code B of DTPC related to Agra. There was no increment for DTPC related to Gwalior.

(Signature of generating station officer/in-charge with Name, Designation and Mobile No)

RAGHAWENDRA JHA
SENIOR MANAGER
9820359447.

Annexure 3: NTPC-KORBA

Mock Testing of Gwalior-Agra-SPS_01.05.2019

Name of the Generating station	Initial counter reading		Counter reaging after simulation of condition-5	
	Rx	Tx	Rx	Tx
NTPC-Korba	00 00 00 00	00 00 00 00	01 01 00 00	00 00 01 00

Yatish Tiwari
01/05/2019
YATISH TIWARIA
AGM (Opers)
9425249891

Annexure 4: NTPC-VINDHYACHAL

Annex-III

Format for submission of Information regarding Generation Back down

Name of the Generating Station	Initial Counter reading	Counter Reading after condition
VSTPS Stage #03	5	4

Sr. No	Revised Logic	Actions in revised SPS
5	Reduction of import by NR on 765 kV Agra-Gwalior Ckt-1 & II by more than or equal to 3000 MW. (The sum of flows on these circuits would be continuously compared with the sum of flows two (2) seconds earlier and the SPS would activate if the difference crosses 3000 MW).	Shed loads in Group C, D, E and F. Additional loads of 500-1000 MW : Group H, I, J and K. Automatically back down 1000 MW generation in WR in the shortest possible time at Vindhyachal, Sasan and CGPL Mundra.

31/5/2019

मुनेन्द्र शर्मा
MUNENDRA SHARMA
उप महाप्रबंधक (विद्युत अनुरक्षण)
DGM (O&M-EMD)
एनटीपीसी लि.–विंध्याचल
N[illegible]td.-Vindhyachal

(Signature of generating station officer/in-charge with Name, Designation and Mobile No)

Mobile:> 9650323666

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)
उत्तरी क्षेत्रीय भार प्रेशण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली- 110016
OFFICE : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi- 110016
CIN : U40105DL2009GOI188682, Website : www.nrldc.org, www.nrldc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 26852747

Ref no. : NRLDC\ RES\TS-108\ Date: 15-Feb-2022

To,

1. DGM, Adani Hybrid Energy Jaisalmer One Limited, Village Madhipura, Tehsil-Pokharan, Dist-Jaiselmer,, Rajasthan-345026	2. DGM, Adani Hybrid Energy Jaisalmer Two Ltd, Fatehgarh-II, Village-Kajasar, Tehsil-Pokharan, Dist.:-Jaisalmer, Rajasthan-345026.
3. DGM, Adani Hybrid Energy Jaisalmer Three Ltd., Fatehgarh-II, Village-Kajasar, Tehsil-Pokharan, Dist.:-Jaisalmer, Rajasthan-345026.	

Sub: Suspected HVRT failure during recent events on 30th Jan, 4th Feb and 11th Feb 2022

Sir,

It is to bring to your notice that in several events in past 10-15 days, there have been tripping of Adani hybrid plants connected at 765/400/220kV Fatehgarh-II. Details of these events are mentioned below:

S. No.	Event	Generation loss of Adani Hybrid Plants connected at Fatehgarh-II(PG) and Fatehgarh-I (MW)	Generation loss (MW) at Fatehgarh-II(PG) pooling	Frequency dip (Hz)
1	On 30th Jan 2022 at 11:27 Hrs, due to over voltage tripping of internal elements of Plants or suspected HVRT failure.	753	2038	0.18
2	On 04th February 2022 at 13:16 hrs, due to over voltage tripping of internal elements of Plants or suspected HVRT failure.	618	1882	0.16
3	On 11th Feb 2022 at 11:45 hrs, due to over voltage tripping of internal elements of Plants or suspected HVRT failure.	927	2316	0.20
4	On 11th Feb 2022 at 12:38 hrs, due to over voltage tripping of internal elements of Plants or suspected HVRT failure.	904	2558	0.27

In all these events, it can be seen from the data available at NRLDC (Annexure-I) that the solar generation significantly reduced at Adani plants. The generation at these locations has picked up only after 2-3 minutes even though sustained high voltage was not observed. This large outage of solar generation could be interpreted as failure of HVRT capability of these solar plants. Such behaviour during transients is totally not expected nor desirable. Outage of around 1500-2000 MW in these events also resulted in frequency excursion of the order of 0.2-0.3 Hz.

It could be inferred from the sample plots for 30th Jan 2022 attached as Annexure-I that HVRT at Fatehgarh-II Adani hybrid plants did not function as mandated by CEA standards/ CERC orders and the affidavit of compliance submitted by the plant owners. The plots also suggest differences in the PSSe model output submitted by plants at the time of registration and their performance in real-time. Such non-operation of HVRT leads to generation drop and therefore frequency dip and is severe threat to the security of the grid.

There is also need to have standard data retention practice to understand inverter behaviour during such transient events. It is also important that inverter and POI level settings are such that the plant is able to comply with all the mandated CEA standards and undertakings given before connection to the grid.

Therefore, the event needs to be analysed in detail and a report may be submitted before 20th Feb'22 explaining reasons for non-operation of proper HVRT functionality along with remedial action plan to avoid such issues in future.

Regards

Alok Kumar

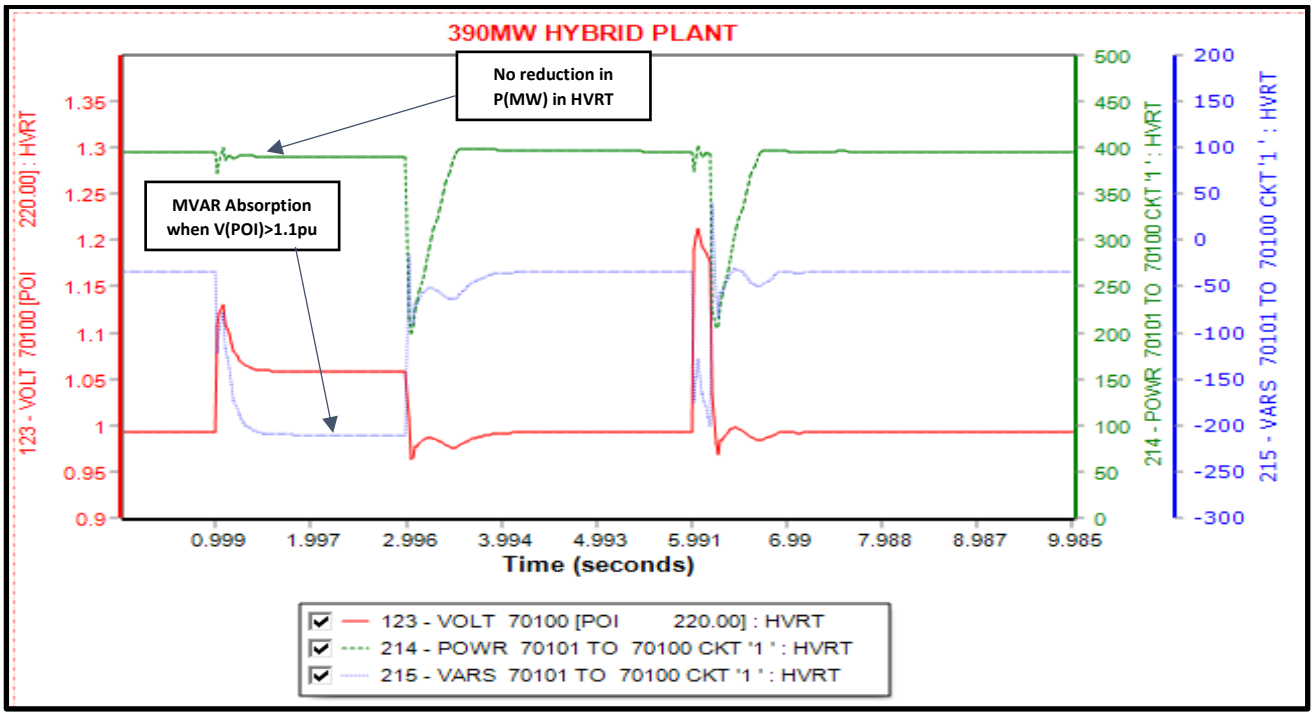
(Alok Kumar)
General Manager

1. Member Secretary, NRPC, 18-A SJSS Marg, Katwaria Sarai, New Delhi-110016.
2. Dy. Chief Operating Officer (CTUIL), POWERGRID, Saudamini, Plot number-2, Sector-29, IFFCO Chowk, Gurgaon-122001
3. Member (Power System), Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi–110066
4. Director (System Operations), POSOCO, B-9, Qutub Institutional Area, New Delhi-110016

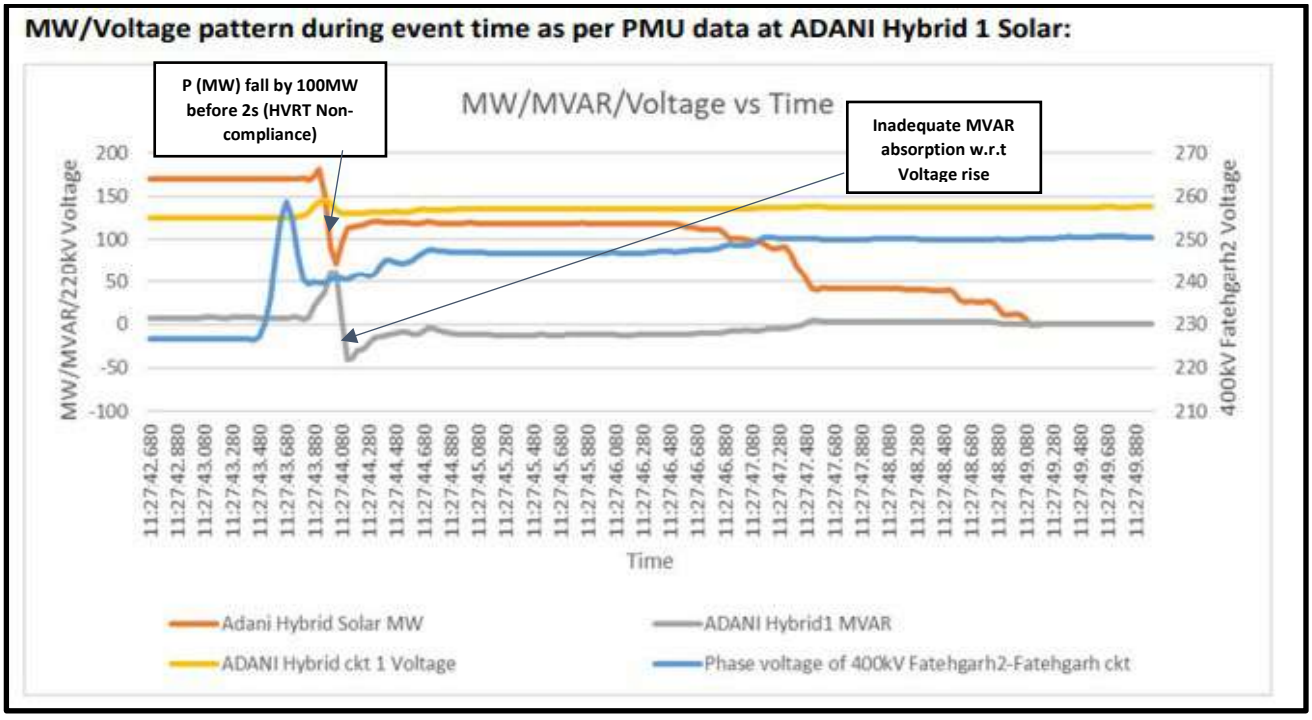
Annexure-I

Simulated response and Real-time response of AHEJOL (Adani Hybrid Energy One)

Simulated response



Actual response



- **From the simulation result of model submitted at the time of registration, it can be inferred that when voltage at POI reaches to 1.2pu, plant would remain connected to grid without any reduction in P(MW) and absorb MVAR, however in real-time Plant generation P(MW) fall down by 100MW and also MVAR absorption was not sufficient.**
- **Real time response of the plant is not matching with the validated model submitted at the time of registration and shows that plant failed to meet CEA HVRT compliance in Real time.**

Simulated response and Real-time response of AHEJ2L (Adani Hybrid Energy Two)

Simulated response

Table 9-4 300MW Hybrid 2A Plant: HVRT Case-1

Case	Description
Case-1	Rise in POC grid voltage is up to 1.2pu for 2 sec

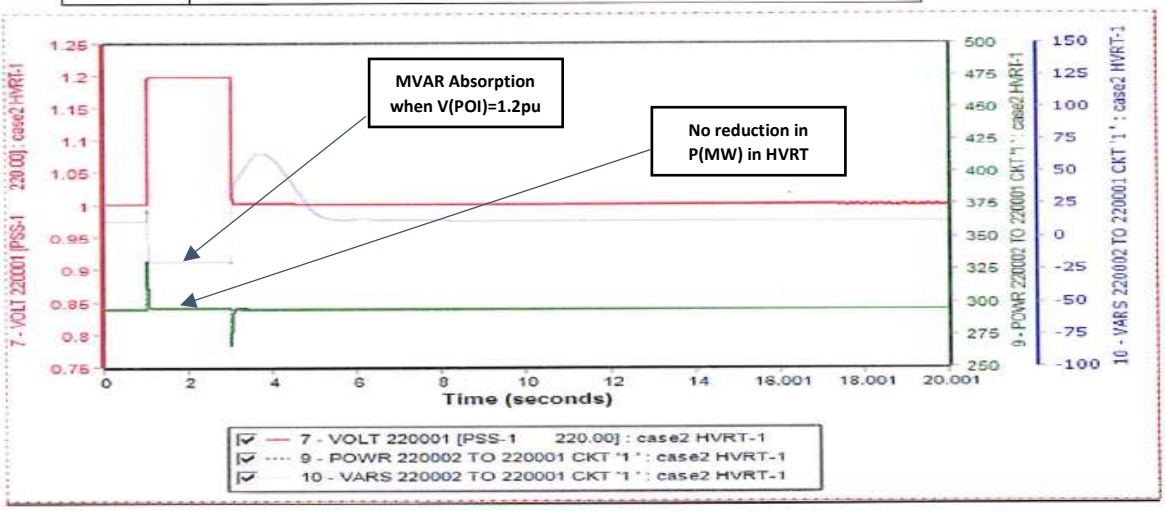
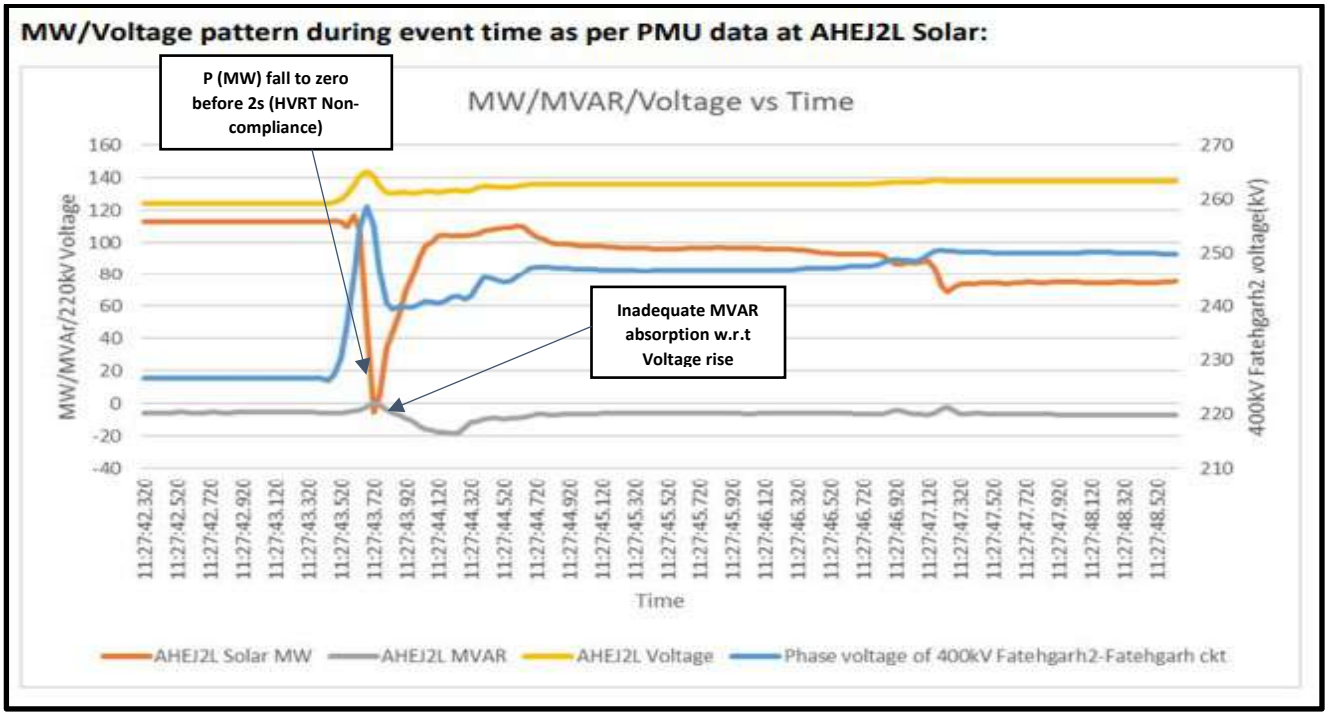


Figure 9-3 HVRT Compliance for a POC voltage of 1.2pu for 2 sec

Table 9-5 300MW Hybrid 2A Plant: HVRT Case-2

Case	Description
Case-2	Rise in POC grid voltage is up to 1.3pu for 200 msecs

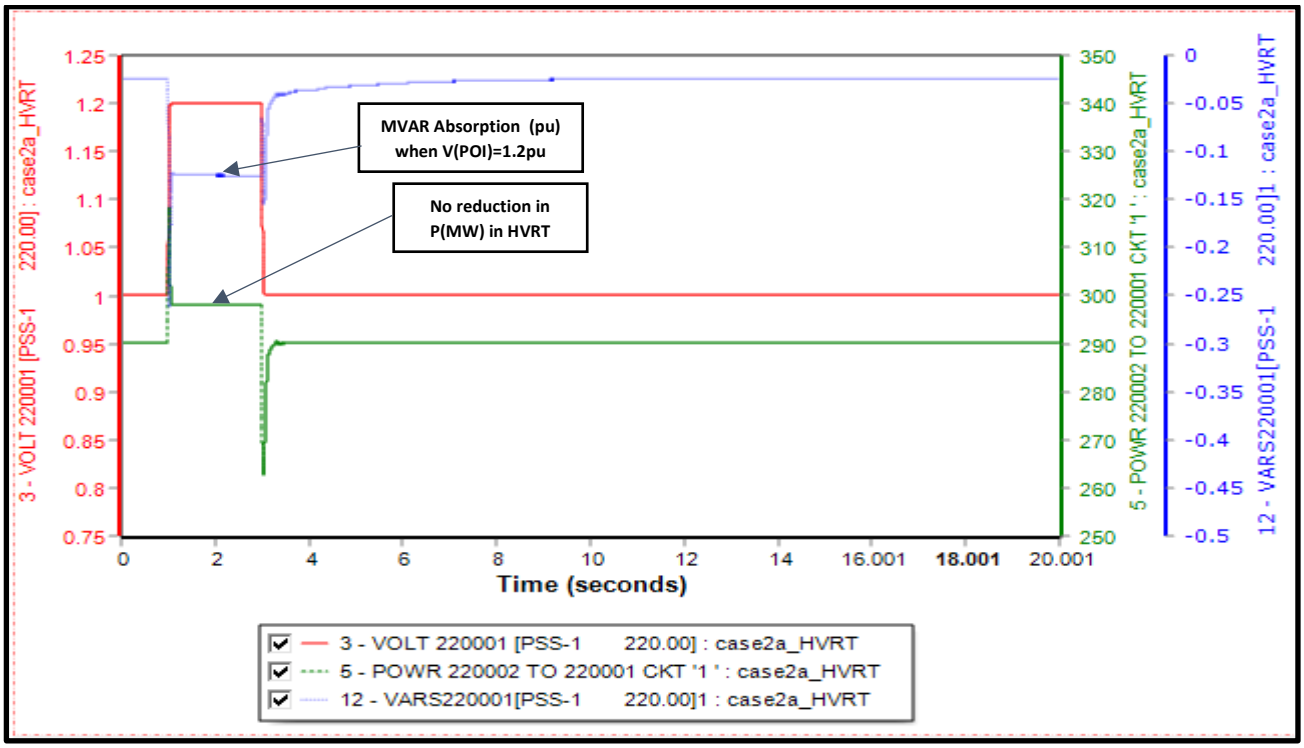
Actual response



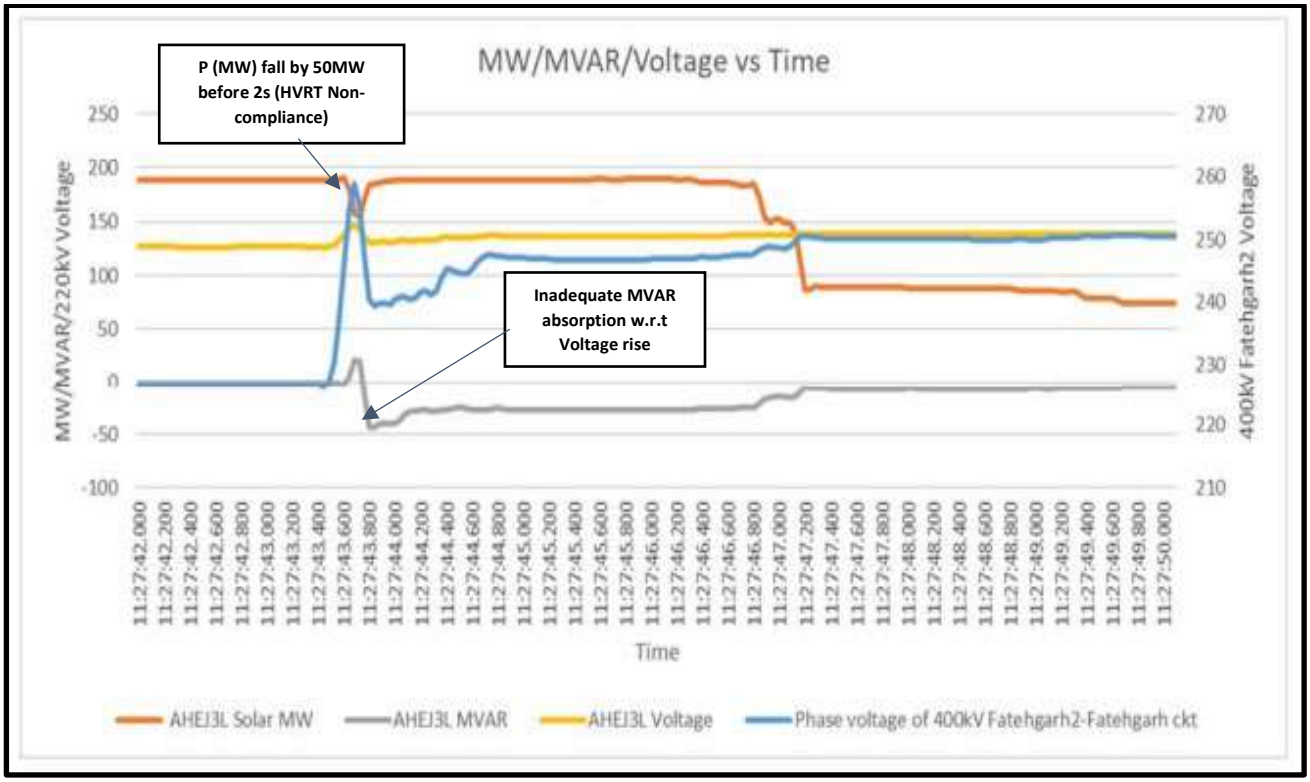
- **From the simulation result of model submitted at the time of registration, it can be inferred that when voltage at POI reaches to 1.2pu, plant would remain connected to grid without any reduction in P(MW) and absorb MVAR, however in real-time Plant generation P(MW) fall down to zero and also MVAR absorption was not sufficient.**
- **Real time response of the plant is not matching with the validated model submitted at the time of registration and shows that plant failed to meet CEA HVRT compliance in Real time.**

Simulated response and Real-time response of AHEJ3L (Adani Hybrid Energy Three)

Simulated response



Actual response



- **From the simulation result of model submitted at the time of registration, it can be inferred that when voltage at POI reaches to 1.2pu, plant would remain connected to grid without any reduction in P(MW) and absorb MVAR, however in real-time Plant generation P(MW) fall down by 50MW and also MVAR absorption was not sufficient.**
- **Real time response of the plant is not matching with the validated model submitted at the time of registration and shows that plant failed to meet CEA HVRT compliance in Real time.**

Annexure-II

Ideally there should not be any generation tripping/Backing down of generation in the incident, but tripping/baking down happened in real time its mean there might be some Over Voltage protection operated at in plant internal element or inverter responded undesirably, Over voltage setting of plant internal elements and PPC settings should be kept such that Plant would be able to meet CEA compliance at POI.

Following details is required from RE plants end for further analysis.

1. In which mode plant is being operated? (If it is in Voltage Control mode, which Reference voltage is being taken by PPC, (Is it 220kV voltage of Fatehgarh-II (PG) or 220kV Voltage at Plant end or something else?)).
2. Dead band of 220kV Voltage, i.e voltage above which or below which plant would start absorbing or injecting MVAR respectively.
3. Time delay setting after which it would start absorbing or injecting MVAR, once the voltage got changed at POI above or below dead band.
4. Following details from PPC.
    - Reference voltage for HVRT/LVRT.
    - Time delay setting for HVRT/LVRT operation.
    - HVRT/LVRT Voltage setting.
    - PPC mode of control (Voltage control/ PF control/ Q control).
    - PPC detailed communication mechanism with inverter, As per the details submitted by Plant for registration pertaining that PPC controls all the inverter, weather PPC controlling all the inverter individually or with 50MW block wise? Is there any false signal/command going to inverter to reduce its P(MW)?
5. Over voltage and overcurrent setting of 220kV line, 220/33kV power transformer, 33/0.6kV or 33/0.66kV IDT and Inverter/WTG and their time delay.
6. If there is any over voltage tripping of internal element then voltage at which it got tripped, and over voltage setting of that element.

adani
Renewables

Annexure-II(B)

22.02.2022

Shri Alok Kumar
General Manger
Northern Regional Load Despatch Centre (NRLDC)
18-A, Shaheed Jeet Singh Sansanwal Marg,
Katwaria Sarai,
New Delhi – 10016.

Sub: Overvoltage incidences during recent events on 30th Jan, 4th Feb and 11th Feb 2022.

Ref: NRLDC Letters No NRLDC/RES/TS-108 and NRLDC/RES/TS-108\06 both dated 15th Feb 2022

Plant Reference: (1) Adani Hybrid Energy Jaisalmer One Ltd (AHEJ1L)
(2) Adani Hybrid Energy Jaisalmer Two Ltd (AHEJ2L)
(3) Adani Hybrid Energy Jaisalmer Three Ltd (AHEJ3L)

Dear Sir,

This has reference to above mentioned letter dated 15th Feb 2022, regarding suspected HVRT failure of above referred Adani Hybrid plants connected at Fatehgarh-II (PG).

At the outset, we would like to bring to your kind notice that in all three hybrid plants (AHEJ1L, AHEJ2L & AHEJ3L) no trippings were observed on 220kV or 33kV feeders during recent incidences of grid overvoltage. All the three hybrid plants remained connected to the grid during overvoltage condition. All the inverters installed in the above mentioned hybrid plants are HVRT compliant and overvoltage protections are set as per the latest amendment of CEA regulation for grid connectivity, 2019. For detail kindly refer **A)** of **Annexure-1**.

Our response to each of the individual events under consideration is as follows

S.No.	Event date	Response	Action Plan
1	30.01.2022	As per the preliminary report of NRLDC for occurrence on dated 30th January 2022, It has been noticed that overvoltage was observed on 400kV & 220kV Fatehgarh-II(PG) grid on	As a preventive measure we have rechecked HVRT settings in all the inverters and found it to be in order as

Registered Office :
"Adani Corporate House", 4th Floor – South Wing,
Shantigram, Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

		account of possible reactor switching in Fatehgarh-II substation during peak solar generation hours. Due to this phenomenon, 220kV bus voltage at our hybrid plant had shot more than 253kV i.e.,>1.15pu. Disturbance Record snapshot is attached as **C) of Annexure-1**. Preceding this event Hybrid plants were operating in reactive power injection mode as voltages at plant bus were observed below <0.99pu and terminal voltages of inverters were maintained above >1.05pu during injection of reactive power into the grid.	per the requirement stated in CEA regulation. In addition to this, tap position of power transformer is lowered by one tap from nominal to immune plant from facing unwanted high voltages due to such grid disturbances and same is kept under observation.
2	04.02.2022	Preliminary occurrence report is awaited from NRLDC for further analysis of incident.	
3	11.02.2022 (@11:45 hrs)	Preliminary occurrence report is awaited from NRLDC for further analysis of incident.	
4	11.02.2022 (@12:38 hrs)	Preliminary occurrence report is awaited from NRLDC for further analysis of incident.	

Further, we would like to bring to your kind notice that during normal voltage conditions at Pooling Substation (PSS) of hybrid plant, it is observed that the Inverters which are distant from plant end switchyard have terminal voltage above >1.05pu. In this regard, SCADA snapshot is attached as **B)** of **Annexure-1** for reference. Thus, inverters located far from PSS are prone to sustained overvoltage conditions and are observed to have voltages beyond HVRT limits during such system disturbances and it may have led to tripping of these inverters.

The details sought in Annexure II of the NRLDC letter is enclosed as **Annexure-2**.

Registered Office :
"Adani Corporate House", 4th Floor – South Wing,
Shantigram, Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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Renewables

In light of the above, we also seek your support and guidance on above matter as we too are facing huge generation loss and want to avoid such incidences in future.

Yours sincerely,

(Sameer Ganju)
Head Northern Region
sameer.ganju@adani.com

Copy to

Shri Surajit Banerjee
Chief General Manager
Northern Regional Load Despatch Centre (NRLDC)
18-A, Shaheed Jeet Singh Sansanwal Marg,
Katwaria Sarai,
New Delhi – 10016.

Encl.: Annexure 1 & 2

adani
Renewables

Annexure-1

A) Inverter HVRT Settings

Sungrow

Default Value of Protection Parameters

SUNGROW

Parameter	Default
Country	India
Protection level	Fifth level
AC Under Voltage Level 1 Protection Value	680.0 V
AC Over Voltage Level 1 Protection Value	880.0 V
AC Under Frequency Level 1 Protection Value	47.5 Hz
Grid Over Frequency Level 1 Protection Value	52.00 Hz
AC Under Voltage Level 1 Protection Time	2.00 s
AC Over Voltage Level 1 Protection Time	2.00 s
AC Under Frequency Level 1 Protection Time	0.20 s
Grid Over Frequency Level 1 Protection Time	0.20 s
AC under Voltage Level 2 Protection value	400.0 V
AC Over Voltage Level 2 Protection Value	1080.0 V
AC Under Frequency Level 2 Protection Value	47.50 Hz
Grid Over Frequency Level 2 Protection Value	52.00 Hz
AC Under Voltage Level 2 Protection Time	0.10 s
AC Over Voltage Level 2 Protection Time	0.05 s
AC Under Frequency Level 2 Protection Time	0.20 s
Grid Over Frequency Level 2 Protection Time	0.20 s
Under- Voltage level-3 Protection Value of Power Grid	400.0 V
Over- Voltage level-3 Protection Value of Power Grid	1080.0 V
Under - frequency Level-3 Protection Value of Power Grid	47.50 Hz
Over - frequency Level-3 Protection Value of Power Grid	52.00 Hz
AC Under voltage level three protection time	0.10 s
AC Overvoltage level three protection time	0.05 s

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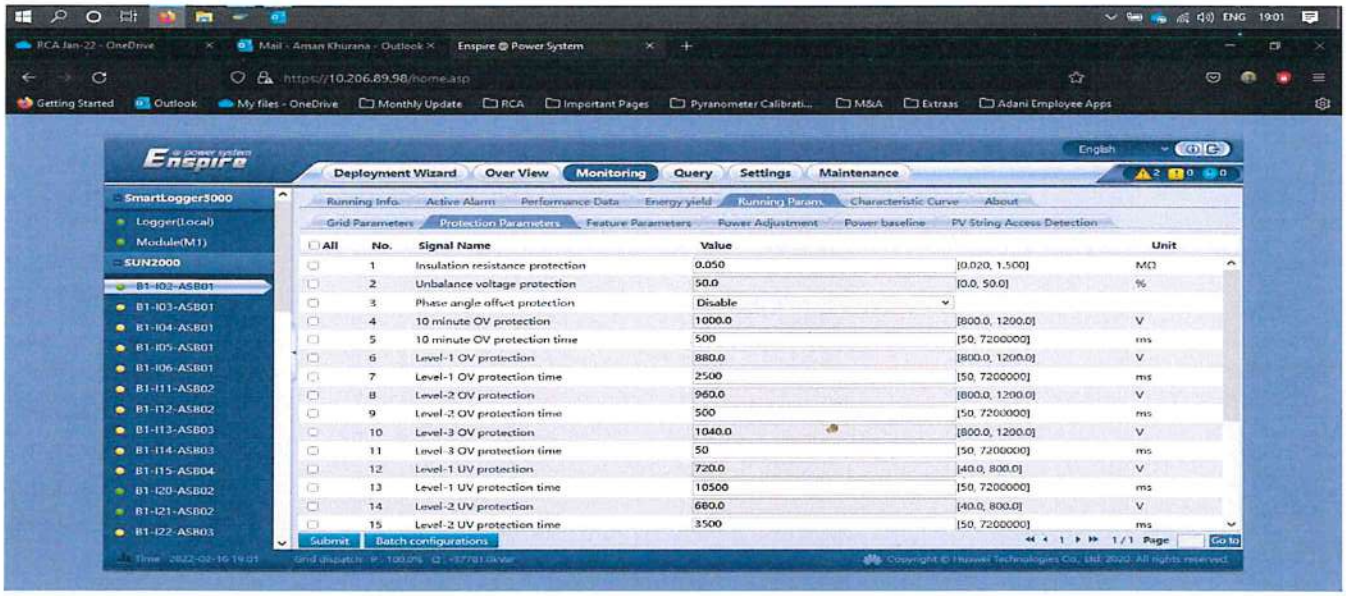
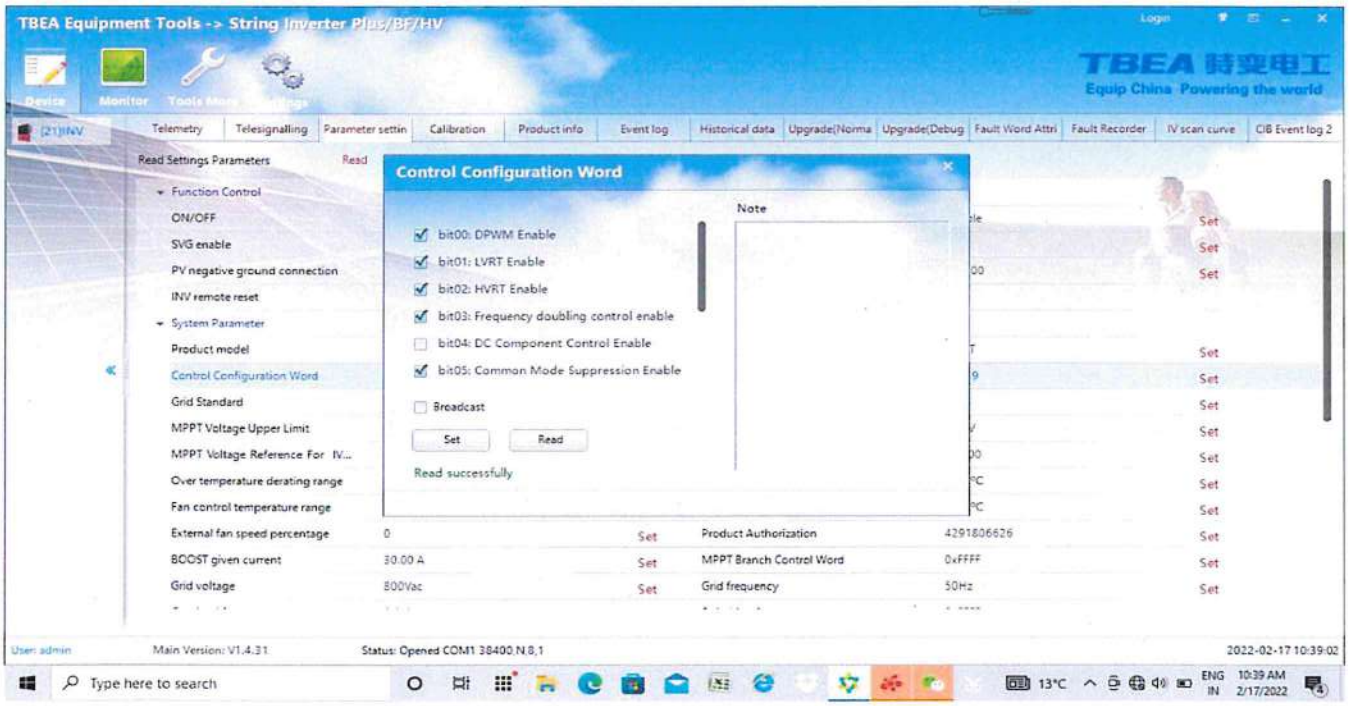
Huawei



TBEA



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www.adanigreenenergy.com

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Renewables

220kV voltage around 1.0pu

Inverter terminal voltage > 1.08 pu

B) Terminal Voltages of distant Inverters

YYYY/MM/DD HH:MM:SS	YieldHarvest(kWh)	PV Num	MPPT1_Volt(V)	PV15_Cur(A)	PV16_Cur(A)	PV17_Cur(A)	PV18_Cur(A)	220KV voltage R/Y/B	33kv Voltage R/Y/B	OutputMode	Ua/Uab(V)	Ub/Ubc(V)	Ia(A)	Ib(A)	Q(kVar)	P(kW)	F(Hz)	RunState
2/13/2022 12:00	118946.4	18	1006	10	10	10.19	10.32	222.78/219.86/219.61		1	868.9	856.5	106	106	34.173	154.17	50.11	On-grid
2/10/2022 15:25	115524.4	18	975.9	10	10	9.46	9.6	222.53/219.94/219.71	34.28/34.05/34.2	1	870.3	861.6	99.5	99.9	38.299	144.29	49.96	On-grid
2/10/2022 15:20	115512.5	18	975.7	10	10	9.41	9.56	222.48/219/81/219.57	34.27/34.03/34.19	1	871.1	862.2	99.1	99.5	39.458	143.464	50.04	On-grid
2/10/2022 15:15	115500.6	18	985.5	10	10	9.51	9.65	222.27/219.67/219.42	34.24/34/34/16	1	871.5	862.8	99.3	99.6	40.704	143.506	49.95	On-grid
2/10/2022 15:10	115488.5	18	976.3	10	10	9.71	9.85	221.86/219.19/219.03	34.16/33.93/34.09	1	869.6	860.8	99.8	100	40.697	144.056	49.97	On-grid
2/10/2022 15:05	115476.5	18	1004	10	10	9.64	9.72	221.88/219.96/218/93	34.16/33.92/34.08	1	869.1	860.6	101	101	40.778	145.163	50.07	On-grid
2/10/2022 15:00	115464.4	18	1003	10	10	9.71	9.77	221.77/219.12/218.85	34.18/33.94/34.1	1	869.8	860.8	101	101	40.75	145.893	50.05	On-grid
2/10/2022 14:50	115439.8	18	1003	10	10	9.74	9.84	221.42/218.74/218.49	34.1/33.86/34.02	1	868.4	859.3	102	102	40.607	146.659	50.07	On-grid
2/4/2022 12:20	108155	18	1032	10	10	9.55	9.75	22.09/219.25/219.08	33.89/33.67/33.84	1	868.4	858.8	103	104	35.693	150.476	50.01	On-grid

Registered Office :
"Adani Corporate House", 4th Floor – South Wing,
Shantigram, Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

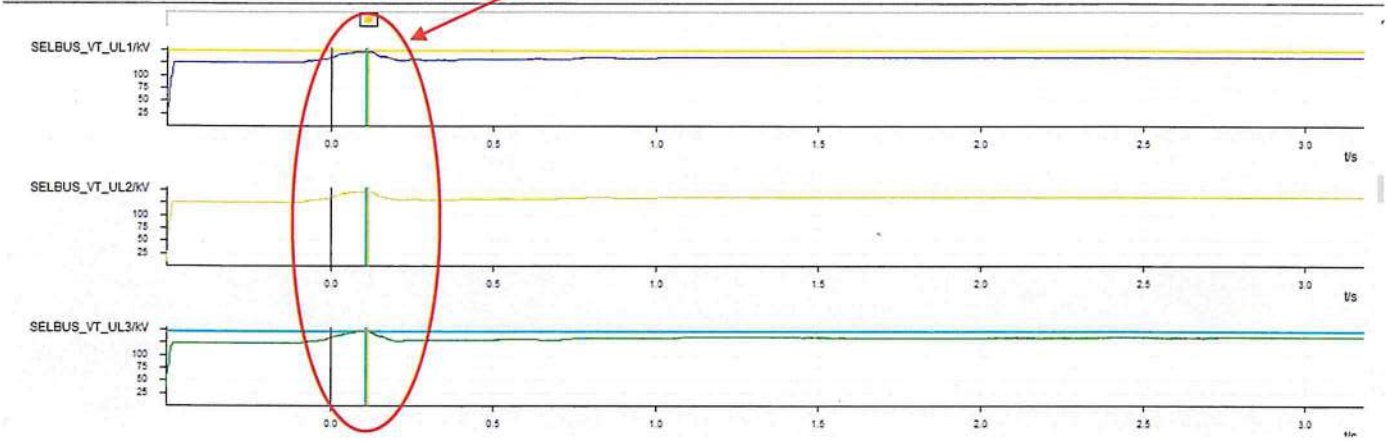
C) **Disturbance Record of 220kV line bay at AHEJ0L**

220kV side voltage observed @ >253kV

	Time in ms	Measuring Signal	Instantaneous	R.M.S.
Cursor 1:	116.6	SELBUS_VT_UL1	-173.87 kV	146.64 kV
Cursor 2:	110.3	SELBUS_VT_UL3	-188.60 kV	145.97 kV
C2 - C1	-6.3	SELBUS_VT_UL3 - SELBUS_V	-14.73 kV	-0.67 kV
C2 + C1	226.9	SELBUS_VT_UL3 + SELBUS_V	-362.46 kV	292.61 kV

390MW SECI HYBRID
File path: C:\ONEDRIVE - ADANI\ENGINEERING\PROJECTS\HYBRID\390MW HYBRID-1\GRID DISTURBANCE\ALL DR\ADANI SOLAR
Start time: 1/30/2022 11:27:43.099 AM
Sample rate: 1000 Hz
Value representation: Binary
Record type: COMTRADE
Comment:

```
<?xml version="1.0" encoding="UTF-8"?>
<DisturbanceRecording HeaderFileVersion="1.0" >
<generals>
<general name="RecorderId" value="1" />
<general name="TrigDateTime" value="30/01/2022,11:27:43.598" />
<general name="TrigChannel" value="OEX_START" />
<general name="TrigWhileIEDinTestMode" value="0" />
```



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Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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Annexure -2

Details pertaining to Adani RE plants for further analysis.

1. In which mode plant is being operated? (If it is in Voltage Control mode, which Reference voltage is being taken by PPC, (Is it 220kV voltage of Fatehgarh-II (PG) or 220kV Voltage at Plant end or something else?)).
   Adani Reply: Plant is operated in Voltage Control mode. PPC takes reference of 220kV voltage at plant end.

2. Dead band of 220kV Voltage, i.e voltage above which or below which plant would start absorbing or injecting MVAR respectively.
   Adani Reply: Dead band is set to 1% above or below which plant would start absorbing or injecting MVAr respectively.

3. Time delay setting after which it would start absorbing or injecting MVAR, once the voltage got changed at POI above or below dead band.
   Adani Reply: PPC shall give command to inverters to start absorbing or injecting MVAr on real time basis upon occurrence of voltage change above or below dead band.

4. Following details from PPC.
   - Reference voltage for HVRT/LVRT.
     Adani Reply: Reference voltage for HVRT/LVRT is +/- 10% of Vn
   - Time delay setting for HVRT/LVRT operation.
     Adani Reply: Time delay settings for HVRT & LVRT shall be part of inverter parameter settings. It is not applicable for PPC
   - HVRT/LVRT Voltage setting.
     Adani Reply: HVRT & LVRT voltage settings is part of inverter parameter settings. It is not applicable for PPC
   - PPC mode of control (Voltage control/ PF control/ Q control).
     Adani Reply: PPC is operating in Voltage Control mode.
   - PPC detailed communication mechanism with inverter, As per the details submitted by Plant for registration pertaining that PPC controls all the inverter, weather PPC controlling all the inverter individually or with 50MW block wise? Is there any false signal/command going to inverter to reduce its P(MW)?
     Adani Reply: PPC controls all the inverters individually. There is no false signal/command going to inverter to reduce active power.

5. Over voltage and overcurrent setting of 220kV line, 220/33kV power transformer, 33/0.6kV or 33/0.66kV IDT and Inverter/WTG and their time delay.

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Adani Reply: Attached as Appendix.

6. If there is any over voltage tripping of internal element then voltage at which it got tripped, and over voltage setting of that element.

   Adani Reply: No overvoltage tripping of internal power evacuation system element was observed.

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Tel +91 79 2555 8005
Fax +91 79 2555 7294
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www.adanigreenenergy.com

Annexure-B-III

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)
उत्तरी क्षेत्रीय भार प्रेषण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली- 110016
OFFICE : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi- 110016
CIN : U40105DL2009GOI188682, Website : www.nrldc.org, www.nrldc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 26852747

Ref no. : NRLDC\ RES\TS-108\146 Date: 25-Feb-2022

To

1. DGM, Adani Hybrid Energy Jaisalmer One Limited, Village Madhipura, Tehsil-Pokharan, Dist-Jaiselmer,, Rajasthan-345026	2. DGM, Adani Hybrid Energy Jaisalmer Two Ltd, Fatehgarh-II, Village-Kajasar, Tehsil-Pokharan, Dist.:-Jaisalmer, Rajasthan-345026.
3. DGM, Adani Hybrid Energy Jaisalmer Three Ltd., Fatehgarh-II, Village-Kajasar, Tehsil-Pokharan, Dist.:-Jaisalmer, Rajasthan-345026.	

Sub: Suspected HVRT failure during recent events on 30th Jan, 4th Feb and 11th Feb 2022

Ref: AGEL letter dated 23.02.2022

Sir,

With reference to AGEL letter dated 23.02.22 following points may be noted;

1. AGEL in its letter has stated that when voltage at its 220kV Plant bus was around 1pu, voltage at inverter terminal, located at a considerable distance, was around 1.05pu. However, it is reasonable that when the plant has to inject MVAR at POI to support the grid voltage after meeting its internal reactive losses as well as the reactive power consumed by the 220/33 kV transformer and the 220kV dedicated line, terminal voltage of inverter has to be at higher side. It is a basic requirement for the plant to meet the compliances as stipulated in the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2013, Part-II, clause B2, Sub-clause (1) at POI, which states that *"The generating station shall be capable of supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading"* that's mean plant should have the capability to deliver MVAR upto 33% of its rated MW at POI, in steady state. Compliance to CEA Technical Standards of Connectivity Regulations is required at the point of interconnection (POI) irrespective of the configuration or issues in collector system.

2. As per DR/EL, 220kV Bus voltage of AHEJOL rose upto 253kV (1.15pu) during the disturbance (As mentioned in Annexure-I (C) of reference letter). Therefore, as per provision of the aforesaid CEA connectivity regulations, the plant has to Ride-through for 2sec when voltage at POI is 1.2pu. However, in real-time, AHEJOL active power generation P(MW) dipped significantly within 1 second (when POI voltage was around 1.15pu) which shows that the plant couldn't meet the HVRT compliance as specified in CEA Regulations, at POI. Further, there is no mention of reason for reduction in generation with rise in voltage. It is requested to furnish the reason for gradual reduction in generation and recovery thereafter.

3. AGEL has stated that PPC takes inputs from 220kV Plant Bus. However, the correct inputs to PPC should be the measurements at POI (i.e 220kV Fatehgarh-II(PG)).
4. As per the model submitted for Registration of AHEJOL, AHEJ2L and AHEJ3L, there is no reduction/dip in Active power generation P(MW) of Plant in case of HVRT, but in real-time significant dip in Active power generation P(MW) has been observed, please explain the reasons for reduction/dip in active power in real-time but not reflected in model.
5. Reason for no/negligible MVAR absorption support by the Plants as per HVRT requirement in case of high voltage at POI may please be clarified.

Observations on the inverter settings submitted by AGEL in reply letter dated 23.02.22 is attached as annexures as follows:
Annexure-I (For HVRT setting of Inverter)
Annexure-II (For LVRT setting of Inverter)
Annexure-III (Inverter settings submitted by AGEL)

Examination of Annexure-I&II leads us to infer that improper settings of Over Voltage and Under Voltage protection be one of the reason for not meeting CEA compliances at POI.
It appears that there is some issue with inverter controls which is causing undesired variation in generation of plants during transients.

It is therefore requested to furnish the inverter settings for TBEA TS208KTL-HV and HUAWEI SUN2000-185KTL inverters, P-Q meter data of Power plant controller and Station Event Logger for the duration of events as mentioned in letter for further analysis.

It is reiterated that all RE plants have to meet the CEA compliances at POI, and there for all the Inverters/WTG setting, including protection settings, should be such that the plant would be capable to meet all the requirements of CEA Regulations (Technical Standards for Connectivity to Grid) at POI.

To meet these compliances further actions as deemed appropriate, may be taken by the Plants for ensuring reliability and security of Grid.

Yours faithfully,

(Alok Kumar)
General Manager

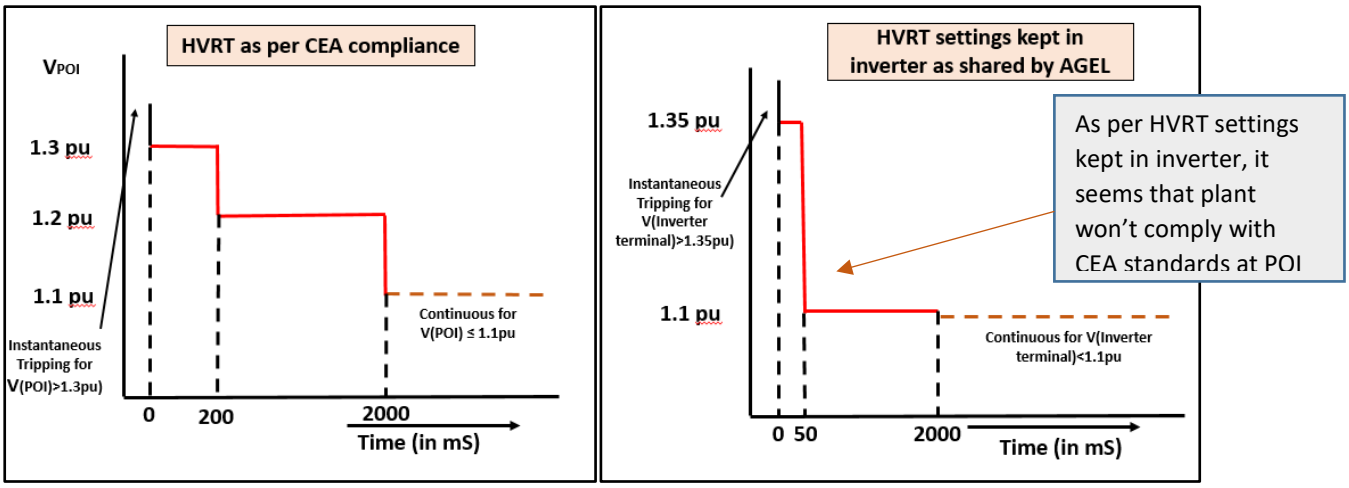
Distribution:

1. Member Secretary, NRPC, 18-A SJSS Marg, Katwaria Sarai, New Delhi-110016.
2. Dy. Chief Operating Officer (CTUIL), POWERGRID, Saudamini, Plot number-2, Sector-29, IFFCO Chowk, Gurgaon-122001
3. Member (Power System), Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066
4. Chairman and Managing Director (POSOCO), POSOCO, B-9, Qutub Institutional Area, New Delhi-110016
5. Chief General Manager (SO), NRLDC/Executive Director (NLDC), POSOCO, B-9, Qutub Institutional Area, New Delhi-110016

Annexure-I

As per the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019, Part-II, clause B2, Sub-clause (7) The generating station connected to the grid, shall remain connected to the grid when voltage at the ***interconnection point****, on any or all phases (symmetrical or asymmetrical overvoltage conditions) rises above the specified values given below for specified time —*

Over voltage (pu)	Minimum time to remain connected (Seconds)
1.30 < V	0 Sec (Instantaneous trip)
1.30 ≥ V > 1.20	0.2 Sec
1.20 ≥ V >1.10	2 Sec
V ≤ 1.10	Continuous

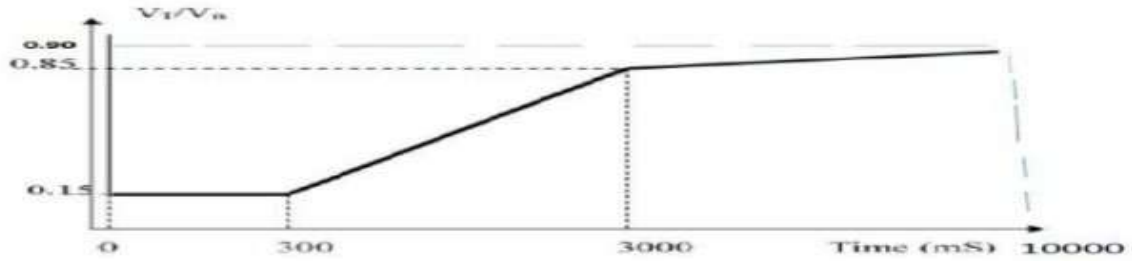


Following Over voltage settings of Inverter need to be changed

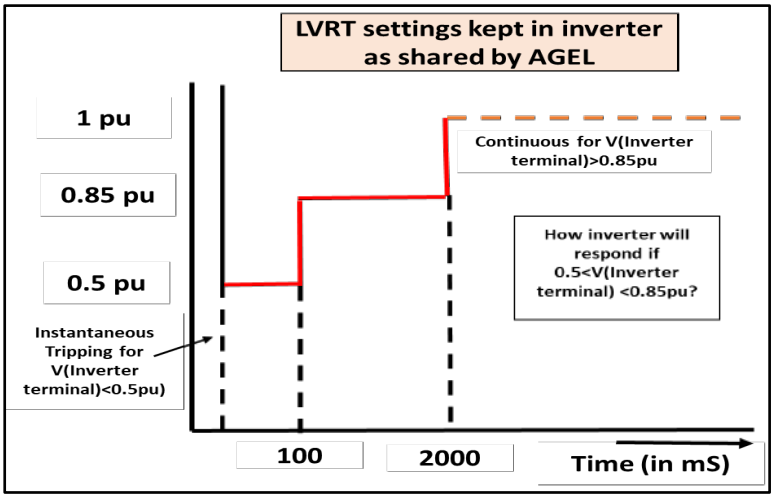
Parameters	Default values as shared by AGEL (Inverter)	Remarks
AC Overvoltage level 1 protection Value	880V	Overvoltage level 1 protection setting of Inverter should be kept in such a way that Plant would be able to Ride-through for 2sec in case of V(POI)=1.2pu. (As stated by AGEL, Inverter terminal voltage is around 1.05pu when voltage at POI is 1pu. Hence, OV setting of inverter (in pu) should be kept higher w.r.t HVRT voltage set value (in pu) at POI)
AC Overvoltage level 1 protection Time	2s	
AC Overvoltage level 2 protection Value	1080V	Overvoltage level 2 protection setting of Inverter should be kept in such a way that Plant would be able to Ride-through for 0.2sec in case of V(POI)=1.3pu. (As stated by AGEL, Inverter terminal voltage is around 1.05pu when voltage at POI is 1pu. Hence, OV setting of inverter (in pu) should be kept higher w.r.t HVRT voltage set value (in pu) at POI)
AC Overvoltage level 2 protection Time	0.05s	

Annexure-II

As per the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019, Part-II, clause B2, Sub-clause (3) The generating station connected to the grid, shall remain connected to the grid when voltage at the interconnection point on any or all phases dips up to the level depicted by the thick lines in the following curve, namely: — VT : Actual Voltage; Vn: Nominal Voltage—



Provided that during the voltage dip, the supply of reactive power has first priority, while the supply of active power has second priority and the active power preferably be maintained during voltage drops, provided, a reduction in active power within the plant's design specifications is acceptable and active power be restored to at least 90% of the pre-fault level within 1 sec of restoration of voltage.



- As per LVRT settings kept in inverter, it seems that plant won't comply with CEA standards at POI.
- For V (Inverter terminal) =0.85pu, time delay kept 2sec (this should be 3sec for V(POI).
- For V (Inverter terminal) <0.5pu, instant tripping, however instantaneous tripping should be at voltage <0.15pu at POI.
- Above two settings shows violation of CEA compliances

Following Under voltage settings of Inverter need to be changed

Parameters	Default values as shared by AGEL (Inverter)	Remarks
AC Undervoltage level 1 protection Value	680V (0.85pu)	Undervoltage level 1 protection setting of Inverter should be kept in such a way that Plant would be able to Ride-through for 3sec in case of 0.15pu<V(POI)≤0.85pu.
AC Undervoltage level 1 protection Time	2s	
AC Undervoltage level 2 protection Value	400V (0.5pu)	Undervoltage level 2 protection setting of Inverter should be kept in such a way that Plant would be able to Ride-through for 0.3sec in case of V(POI)=0.15pu.
AC Undervoltage level 2 protection Time	0.1s	

Annexure-III

Sungrow

Default Value of Protection Parameters

SUNGROW

Parameter	Default
Country	India
Protection level	Fifth level
AC Under Voltage Level 1 Protection Value	680.0 V
AC Over Voltage Level 1 Protection Value	880.0 V
AC Under Frequency Level 1 Protection Value	47.5 Hz
Grid Over Frequency Level 1 Protection Value	52.00 Hz
AC Under Voltage Level 1 Protection Time	2.00 s
AC Over Voltage Level 1 Protection Time	2.00 s
AC Under Frequency Level 1 Protection Time	0.20 s
Grid Over Frequency Level 1 Protection Time	0.20 s
AC under Voltage Level 2 Protection value	400.0 V
AC Over Voltage Level 2 Protection Value	1080.0 V
AC Under Frequency Level 2 Protection Value	47.50 Hz
Grid Over Frequency Level 2 Protection Value	52.00 Hz
AC Under Voltage Level 2 Protection Time	0.10 s
AC Over Voltage Level 2 Protection Time	0.05 s
AC Under Frequency Level 2 Protection Time	0.20 s
Grid Over Frequency Level 2 Protection Time	0.20 s
Under- Voltage level-3 Protection Value of Power Grid	400.0 V
Over- Voltage level-3 Protection Value of Power Grid	1080.0 V
Under - frequency Level-3 Protection Value of Power Grid	47.50 Hz
Over - frequency Level-3 Protection Value of Power Grid	52.00 Hz
AC Under voltage level three protection time	0.10 s
AC Overvoltage level three protection time	0.05 s

Annexure-B-IV

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11/03/2022

Shri Alok Kumar
General Manager
Northern Regional Load Despatch Centre (NRLDC)
18-A, Shaheed Jeet Singh Sansanwal Marg,
Katwaria Sarai,
New Delhi – 10016.

Sub: Overvoltage incidence during recent events on 30th Jan, 4th Feb and 11th Feb 2022

Ref: 1) NRLDC Letters No NRLDC\RES\TS-108\146 dated 25th Feb 2022.
2) Old NRLDC Letters No NRLDC/RES/TS-108 and NRLDC/RES/TS-108\06 both dated 15th Feb 2022.
3) Old AGEL letter dt:22/02/2022

Plant Reference: 1) Adani Hybrid Energy Jaisalmer One Ltd (AHEJ1L)
2) Adani Hybrid Energy Jaisalmer Two Ltd (AHEJ2L)
3) Adani Hybrid Energy Jaisalmer Three Ltd (AHEJ3L)

Dear Sir,

This has reference to the above-mentioned letter dated 25th Feb 2022, regarding suspected HVRT failure of above referred Adani Hybrid plants connected at Fatehgarh-II (PG).

Our response to each point under consideration is as follows:

1. AGEL in its letter has stated that when voltage at its 220kV Plant bus was around 1pu, voltage at inverter terminal, located at a considerable distance, was around 1.05pu. However, it is reasonable that when the plant has to inject MVAR at POI to support the grid voltage after meeting its internal reactive losses as well as the reactive power consumed by the 220/33 kV transformer and the 220kV dedicated line, terminal voltage of inverter has to be at higher side. It is a basic requirement for the plant to meet the compliances as stipulated in the Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2013, Part-II, clause B2, Sub-clause (1) at POI, which states that "The generating station shall be capable of supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading" that's mean plant should have the capability to deliver MVAR up to 33% of its rated MW at POI, in steady state. Compliance to CEA Technical Standards of Connectivity Regulations is required at the point of interconnection (POI) irrespective of the configuration or issues in collector system.

   Adani reply: Noted. All plants mentioned above are complying with CEA regulation for reactive power requirement of supplying dynamically varying reactive power support so as to maintain power factor within the limits of 0.95 lagging to 0.95 leading. In this regard, it may be noted that the CEA convened a meeting on 14.07.2021 with MNRE, CTU, POSOCO and Wind Power Generating

Registered Office :

"Adani Corporate House", 4th Floor – South Wing,
Shantigram, Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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Companies to discuss the reactive power requirement in accordance with Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulation (MoM of the meeting enclosed for ready reference). The meeting was convened as certain RE generators had approached CEA on account of difficulty being faced w.r.t. interpretation of Clause (1) of B2 of Part-II of Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations for issuance of grant of connectivity by CTU and processing of F.T.C. (First Time Charging) by RLDCs. After deliberation, it was concluded that the provision related to reactive power requirement for generation stations provided in the CEA Grid Connectivity regulations may need to be clarified considering, amongst other issues, the following [Reference Para 38 (ii)) of the MoM]

"The RE generator should have reactive power capability to operate up to the 'Vcurve' boundaries at corresponding generation level. Accordingly, the terms "dynamically varying" and "within the limits of 0.95 lagging to 0.95 leading" need clarification."

However, the clarification on above is still awaited from CEA.

2. As per DR/EL, 220kV Bus voltage of AHEJOL rose upto 253kV (1.15pu) during the disturbance (As mentioned in Annexure-I (C) of reference letter). Therefore, as per provision of the aforesaid CEA connectivity regulations, the plant has to Ride-through for 2sec when voltage at POI is 1.2pu. However, in real-time, AHEJOL active power generation P(MW) dipped significantly within 1 second (when POI voltage was around 1.15pu) which shows that the plant couldn't meet the HVRT compliance as specified in CEA Regulations, at POI. Further, there is no mention of reason for reduction in generation with rise in voltage. It is requested to furnish the reason for gradual reduction in generation and recovery thereafter.

Adani reply:

i. **Event on dt.30/01/2022:** As per the preliminary report of NRLDC for occurrence on dated 30th January 2022, It has been noticed that overvoltage was observed on 400kV & 220kV Fatehgarh-II(PG) grid on account of possible reactor switching in Fatehgarh-II substation during peak solar generation hours. Due to this phenomenon, 220kV bus voltage at our hybrid plant had shot more than 253kV i.e.,>1.15pu. Disturbance Record snapshot is attached as **B) of Annexure-1**. Preceding this event Hybrid plants were operating in reactive power injection mode as voltages at plant bus were observed below <0.99pu and terminal voltages of inverters were maintained above >1.05pu during injection of reactive power into the grid.

ii. **Event on dt.11.02.2022 (@11:45 hrs):** We have observed voltage rise at our plant in 220Kv line feeder. From the DR the voltage rise found up to 149KV phase to neutral i.e., 1.17 pu is very much higher the 1.1 pu and also there is no rise in current in any phase which is evidence that there is some disturbance from grid side might be due to switching of element or operation of reactor. Disturbance Record snapshot is attached as C**) of Annexure-1**.

iii. **Event on dt.11.02.2022 (@12:38 hrs)**: We have observed voltage rise at our plant in 220Kv line feeder. From the DR the voltage rise found up to 148KV phase to neutral i.e 1.17 pu is very much higher the 1.1 pu and also there is no rise in current in any phase which is evidence that

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Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
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there is some disturbance from grid side might be due to switching of element or operation of reactor. Disturbance Record snapshot is attached as D**) of Annexure-1**.

It is evident that in all above events voltage rose up to 1.17pu at 220kV bus of plant end substation subsequently, voltage at inverter terminal is observed > 1.05pu during reactive power injection in to the grid. Hence, it is suspected that during these disturbances terminal voltage of some of the inverter which are distant from plant end substation has crossed above 1.2pu and tripped as per HVRT settings. Further Please note that inverter HVRT / overvoltage settings are as per CEA guideline details are attached as A**) of Annexure-1**

Action plan:

Tap position of power transformer is lowered by one tap from nominal to immune plant from facing unwanted high voltages due to such grid disturbances and same is kept under observation. As a preventive measure, we have rechecked HVRT settings in all the inverters and found to be in order as per the requirement stated in CEA regulation.

3. AGEL has stated that PPC takes inputs from 220kV Plant Bus. However, the correct inputs to PPC should be the measurements at POI i.e 220kV Fatehgarh-II(PG).

   Adani reply: PPC is installed at plant end and there is no technical feasibility to measure real time inputs from remote end. Hence, PPC takes input from plant end bus as reference for voltage control mode operation.

4. As per the model submitted for Registration of AHEJOL, AHEJ2L and AHEJ3L, there is no reduction/dip in Active power generation P(MW) of Plant in case of HVRT, but in real-time significant dip in Active power generation P(MW) has been observed, please explain the reasons for reduction/dip in active power in real-time but not reflected in model.

   Adani reply: As described in point no:2, preceding to the grid disturbance, Inverter were operating in reactive power injection mode as voltage at plant end bus was less then <0.99 pu. During grid disturbance plant end bus voltage immediately rose to 1.17pu and Inverter terminals might had observed voltages more than >1.2puPlant which led to tripping of few inverters which are distant from plant end substation. It is to be noted that dynamic simulation studies were carried out considering slack bus at remote end and not as per actual network conditions. Hence it is requested that actual grid disturbance should be simulated with present grid connection & network available with NRLDC for further analysis of the incident.

5. Reason for no/negligible MVAR absorption support by the Plants as per HVRT requirement in case of high voltage at POI may please be clarified.

   Adani reply: Please refer reply in point no:4

Registered Office :

"Adani Corporate House", 4th Floor – South Wing,
Shantigram, Near Vaishno Devi Circle,
S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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6. Examination of annexure-I & II leads us to infer that improper setting of overvoltage and under voltage protection be one of the reason for not meeting CEA compliance at POI. It appears that there is some issue with inverter controls which is causing undersign variation in generation of plant during transients.

   Adani Reply: HVRT settings of inverter are set as per CEA regulation requirement. Further HVRT & LVRT settings are attached for your kind perusal please. Attached as **Annexure-2**

Yours sincerely,

(Sameer Ganju)
Head Northern Region
Sameer.ganju@adani.com

Copy to

Shri Surajit Banerjee
Chief General Manager
Northern Regional Load Despatch Centre (NRLDC)
18-A, Shaheed Jeet Singh Sansanwal Marg,
Katwaria Sarai,
New Delhi – 10016.

Encl.: Annexure 1 & 2 and MoM of CEA meeting.

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Annexure-1

A) Inverter HVRT Settings

Sungrow

Default Value of Protection Parameter

SUNGROW

Parameter	Default
Vmax-recover	878.0 V
Vmin-recover	722.0 V
Fmax-recover	51.98 Hz
Fmin-recover	47.52 Hz
HVRT	ON
HVRT K Factor	1.0
HVRT Voltage 1	880.0 V
HVRT Voltage 2	960.0 V
HVRT Voltage 3	1040.0 V
HVRT Time 1 (ms)	10.000 s
HVRT Time 2 (ms)	2.000 s
HVRT Time 3 (ms)	0.000 s
LVRT	ON
LVRT K Factor	2.0
LVRT Voltage 1	720.0 V
LVRT Voltage 2	680.0 V
LVRT Voltage 3	120.0 V
LVRT Time 1 (ms)	10.000 s
LVRT Time 2 (ms)	3.000 s
LVRT Time 3 (ms)	0.300 s

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Huawei

RE: Compliance to CEA guidelines w.r.t LVRT & HVRT settings in Huawei inverter

RS Ravinder Singh (Ravinder, India Solar Inverter Business Dept) <ravinder.singh@huawei.com>
To Sureshkumar Mistri
Cc Vivek Ratna; jiangshuai (C); Gopal Singh Negi; Aman Khurana; Sunilkumar Desai; ANKUR KUMAA

NRLDC Communication_Adani Hybrid_F-2_25.02.22_reply.pdf
662 KB

SG250HX-IN Default Value of Pro
433 KB

Vmin-recover	722.0 V
Fmax-recover	51.98 Hz
Fmin-recover	47.52 Hz
HVRT	ON
HVRT K Factor	1.0
HVRT Voltage 1	880.0 V
HVRT Voltage 2	960.0 V
HVRT Voltage 3	1040.0 V
HVRT Time 1 (ms)	10.000 s
HVRT Time 2 (ms)	2.000 s
HVRT Time 3 (ms)	0.000 s
LVRT	ON
LVRT K Factor	2.0
LVRT Voltage 1	720.0 V
LVRT Voltage 2	680.0 V
LVRT Voltage 3	120.0 V
LVRT Time 1 (ms)	10.000 s
LVRT Time 2 (ms)	3.000 s
LVRT Time 3 (ms)	0.300 s

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Ahmedabad 382 421, Gujarat, India
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Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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TBEA

RE: Compliance to CEA guidelines w.r.t LVRT & HVRT settings in TBEA inverter

NK

Naveen Kumar <naveenkumar@tbea.com>

To Aman Khurana

Cc Jigar Thakkar; Nileshkumar Patel; Hiren Tailor; Sunilkumar Desai; Sureshkumar Mistri; HO Ele
vaibhavkaushik@tbea.com; pardeep@tbea.com

This message was sent with High importance.

Grid Over Frequency Level Protection Time	200ms
Vmax-recover (V)	878V
Vmin-recover (V)	722V
Fmax-recover (Hz)	51.98HZ
Fmin-recover (Hz)	47.52HZ
HVRT (ON/OFF)	ON
HVRT K Factor	0.95
HVRT Voltage 1	880V
HVRT Voltage 2	960V
HVRT Voltage 3	1040V
HVRT Time 1 (ms)	2000ms
HVRT Time 2 (ms)	200ms
HVRT Time 3 (ms)	0ms
LVRT (ON/OFF)	ON
LVRT K Factor	0.5
LVRT Voltage 1	720V
LVRT Voltage 2	680V
LVRT Voltage 3	120V
LVRT Time 1 (ms)	10000ms
LVRT Time 2 (ms)	3000ms
LVRT Time 3 (ms)	300ms

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S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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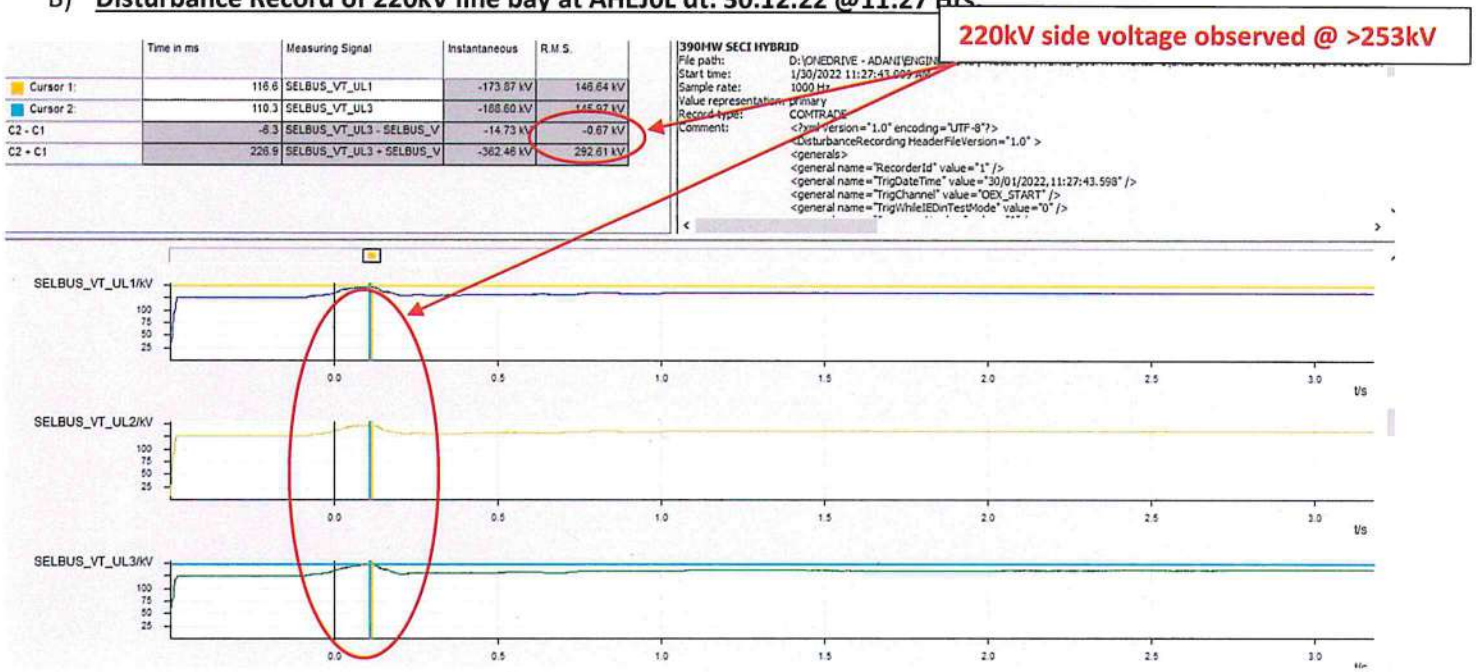
B) **Disturbance Record of 220kV line bay at AHEJ0L dt: 30.12.22 @11:27 Hrs.**



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CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
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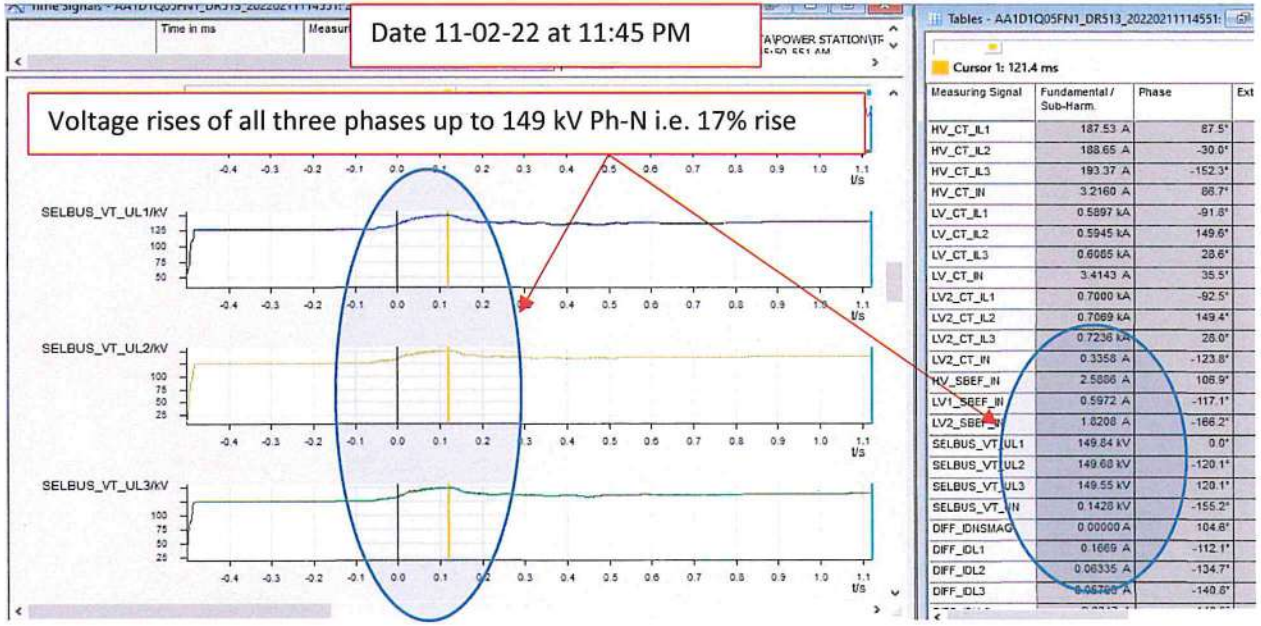
C) **Disturbance Record of 220kV line bay dt: 11.02.22 @11:45 Hrs**



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CIN: U40106GJ2019PLC110171

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Fax +91 79 2555 7294
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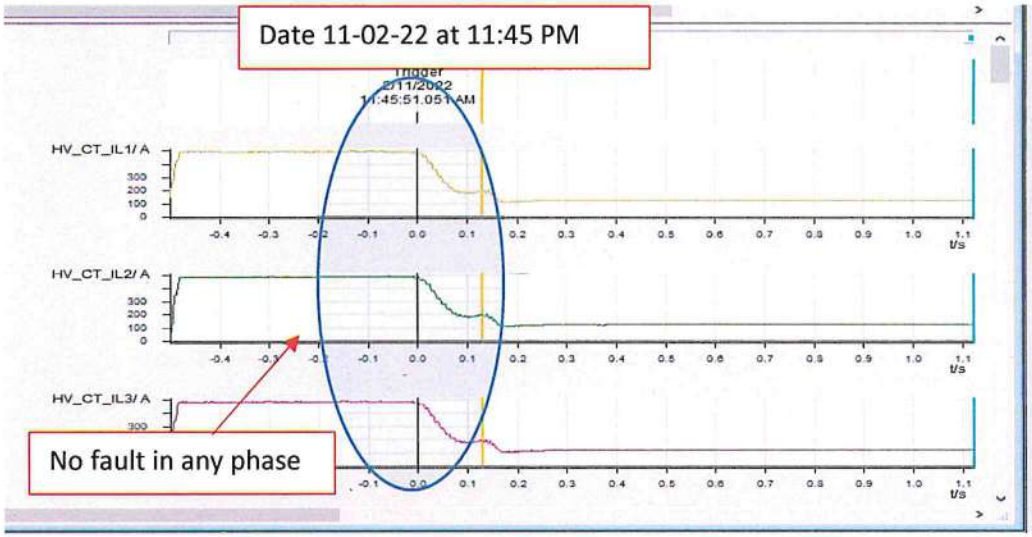

Cursor 1: 131.1 ms

Measuring Signal	Fundamental / Sub-Harm	Phase	Ex
HV_CT_IL1	189.24 A	93.0°	
HV_CT_IL2	196.36 A	-27.0°	
HV_CT_IL3	191.41 A	-149.6°	
HV_CT_IN	3.0387 A	93.1°	
LV_CT_IL1	0.5927 kA	-86.2°	
LV_CT_IL2	0.6164 kA	152.4°	
LV_CT_IL3	0.5944 kA	31.2°	
LV_CT_IN	2.5573 A	56.4°	
LV2_CT_IL1	0.7066 kA	-87.3°	
LV2_CT_IL2	0.7356 kA	152.7°	
LV2_CT_IL3	0.7213 kA	30.7°	
LV2_CT_IN	0.3100 A	-11.7°	
HV_SBEF_IN	2.4983 A	168.9°	
LV1_SBEF_IN	0.3143 A	-78.8°	
LV2_SBEF_IN	0.7006 A	141.8°	
SELBUS_VT_UL1	148.95 kV	0.6°	
SELBUS_VT_UL2	148.61 kV	-119.3°	
SELBUS_VT_UL3	148.88 kV	120.6°	
SELBUS_VT_UN	0.1651 kV	-134.8°	
DIFF_IDNSMAG	0.00000 A	104.6°	
DIFF_IDL1	0.1421 A	-176.1°	
DIFF_IDL2	0.07336 A	-168.2°	
DIFF_IDL3	0.09618 A	155.0°	

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CIN: U40106GJ2019PLC110171

Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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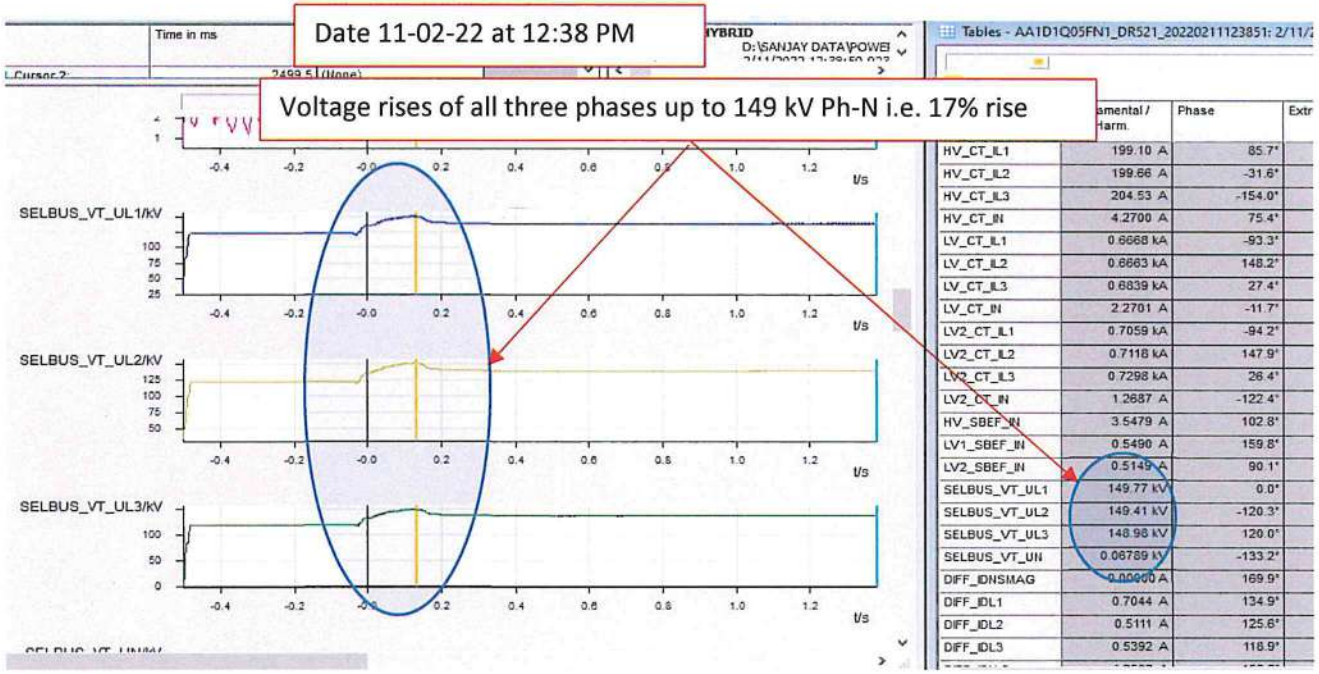
D) **Disturbance Record of 220kV line bay dt: 11.02.22 @12:38 Hrs**



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S. G. Highway, Khodiyar,
Ahmedabad 382 421, Gujarat, India
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Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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Annexure-2

A) TBEA

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装备中国 装备世界

特变电工西安电气科技有限公司
企业地址：陕西西安市高新区上林苑四路70号 邮编：710119
联系电话：+86-29-68760666 传真：+86-29-68760500
http://www.tbeapower.com

TS208KTL-HV Parameters Settings -50MW Adani

Parameter	Default Values
Country	India
Protection level	Fifth Level
AC Under Voltage Level Protection Value	720V
AC Over Voltage Level Protection Value	880V
AC Under Frequency Level Protection Value	47.5HZ
Grid Over Frequency Level Protection Value	52HZ
AC Under Voltage Level Protection Time	10000ms
AC Over Voltage Level Protection Time	2000ms
AC Under Frequency Level Protection Time	200ms
Grid Over Frequency Level Protection Time	200ms
Vmax-recover (V)	878V
Vmin-recover (V)	722V
Fmax-recover (Hz)	51.98HZ
Fmin-recover (Hz)	47.52HZ
HVRT (ON/OFF)	ON
HVRT K Factor	0.95
HVRT Voltage 1	880V
HVRT Voltage 2	960V
HVRT Voltage 3	1040V
HVRT Time 1 (ms)	2000ms
HVRT Time 2 (ms)	200ms
HVRT Time 3 (ms)	0ms
LVRT (ON/OFF)	ON
LVRT K Factor	0.5
LVRT Voltage 1	720V
LVRT Voltage 2	680V
LVRT Voltage 3	120V
LVRT Time 1 (ms)	10000ms
LVRT Time 2 (ms)	3000ms
LVRT Time 3 (ms)	300ms

TBEA XI'AN ELECTRIC TECHNOLOGY CO., LTD.
Add: TBEA Xi'an Solar Industrial Park, No. 70, Shanglinyuan 4th Road, High-tech Zone, Xi'an (710019), China
www.tbeasolar.com

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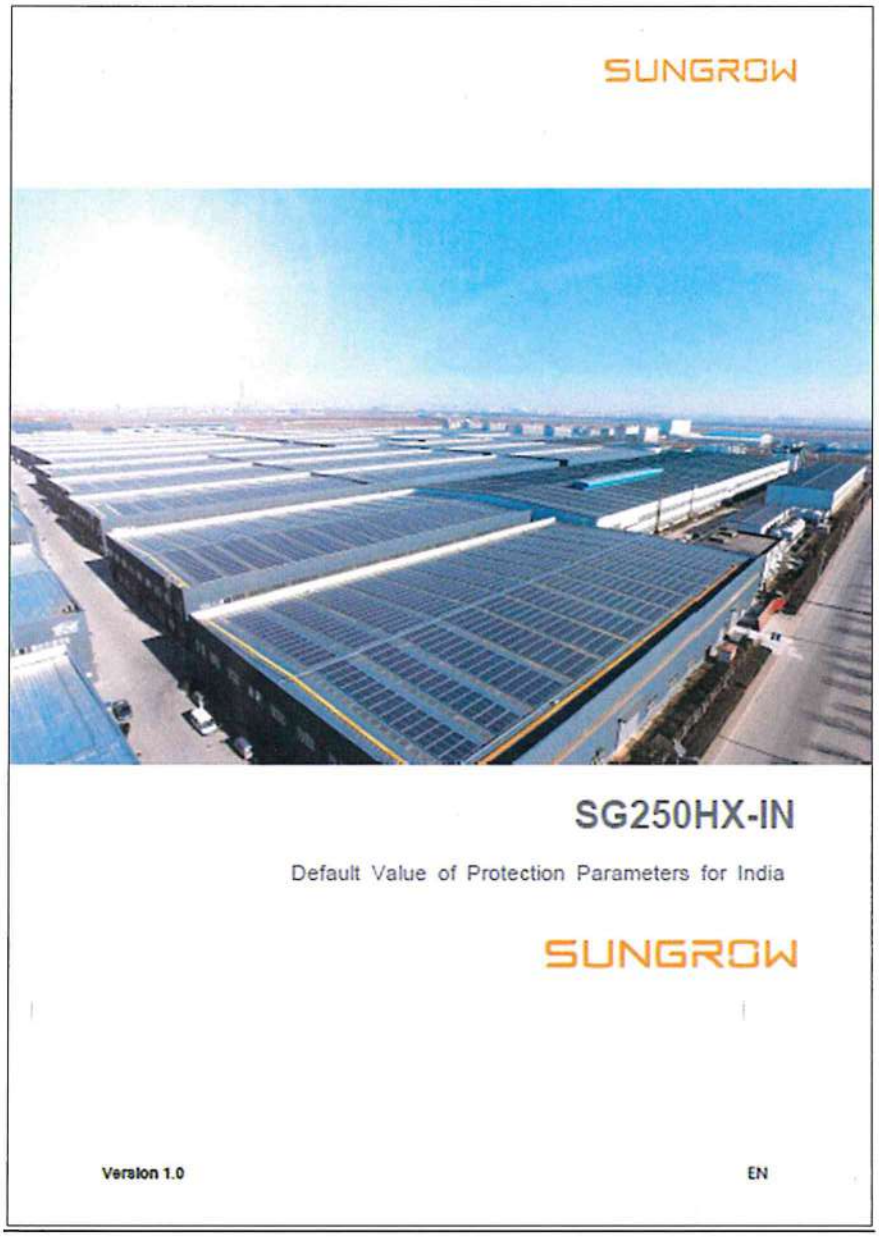
B) Sungrow



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S. G. Highway, Khodiyar,
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Tel +91 79 2555 8005
Fax +91 79 2555 7294
solar.bd@adani.com
www.adanigreenenergy.com

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Default Value of Protection Parameters

SUNGROW

Parameter	Default
Country	India
Protection level	Single level
AC Under Voltage Level Protection Value	680.0 V
AC Over Voltage Level Protection Value	880.0 V
AC Under Frequency Level Protection Value	47.5 Hz
Grid Over Frequency Level Protection Value	52.00 Hz
AC Under Voltage Level Protection Time	10.00 s
AC Over Voltage Level Protection Time	10.00 s
AC Under Frequency Level Protection Time	0.20 s
Grid Over Frequency Level Protection Time	0.20 s
AC Under Frequency Level Protection Value	47.50 Hz
Grid Over Frequency Level Protection Value	52.00 Hz

Default Value of Protection Parameter

SUNGROW

Parameter	Default
Vmax-recover	878.0 V
Vmin-recover	722.0 V
Fmax-recover	51.98 Hz
Fmin-recover	47.52 Hz
HVRT	ON
HVRT K Factor	1.0
HVRT Voltage 1	880.0 V
HVRT Voltage 2	960.0 V
HVRT Voltage 3	1040.0 V
HVRT Time 1 (ms)	10.000 s
HVRT Time 2 (ms)	2.000 s
HVRT Time 3 (ms)	0.000 s
LVRT	ON
LVRT K Factor	2.0
LVRT Voltage 1	720.0 V
LVRT Voltage 2	680.0 V
LVRT Voltage 3	120.0 V
LVRT Time 1 (ms)	10.000 s
LVRT Time 2 (ms)	3.000 s
LVRT Time 3 (ms)	0.300 s

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Ahmedabad 382 421, Gujarat, India
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Fax +91 79 2555 7294
solar.bd@adani.com
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C) Huawei

Parameter	Default
Country	India
Protection level	Single level
AC Under Voltage Level Protection Value	680.0 V
AC Over Voltage Level Protection Value	880.0 V
AC Under Frequency Level Protection Value	47.5 Hz
Grid Over Frequency Level Protection Value	52.00 Hz
AC Under Voltage Level Protection Time	10.00 s
AC Over Voltage Level Protection Time	10.00 s
AC Under Frequency Level Protection Time	0.20 s
Grid Over Frequency Level Protection Time	0.20 s
AC Under Frequency Level Protection Value	47.50 Hz
Grid Over Frequency Level Protection Value	52.00 Hz

Parameter	Default
Vmax-recover	878.0 V
Vmin-recover	722.0 V
Fmax-recover	51.98 Hz
Fmin-recover	47.52 Hz
HVRT	ON
HVRT K Factor	1.0
HVRT Voltage 1	880.0 V
HVRT Voltage 2	960.0 V
HVRT Voltage 3	1040.0 V
HVRT Time 1 (ms)	10.000 s
HVRT Time 2 (ms)	2.000 s
HVRT Time 3 (ms)	0.000 s
LVRT	ON
LVRT K Factor	2.0
LVRT Voltage 1	720.0 V
LVRT Voltage 2	680.0 V
LVRT Voltage 3	120.0 V
LVRT Time 1 (ms)	10.000 s
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LVRT Time 3 (ms)	0.300 s

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