सत्यमेव जयते

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

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (59वीं)/2022/1085-1052 दिनाँक: 28 अक्टूबर 2022

सेवा में / To,

उ.क्षे.वि.स. के सभी सदस्य (संलग्न सूचीनुसार)
Members of NRPC (As per List)

विषय: उत्तर क्षेत्रीय विद्युत समिति की 59वीं बैठक की कार्यसूची ।
Subject: Agenda for 59th meeting of Northern Regional Power Committee-reg

महोदय / Sir,

उत्तर क्षेत्रीय विद्युत समिति की 59वीं बैठक दिनांक **31 अक्टूबर 2022** को **1100** बजे विडियो कोंफ्रेंसिंग के माध्यम से आयोजित की जाएगी । बैठक की कार्यसूची संलग्न है। बैठक का लिंक एंव पासवर्ड नियत समय पर ईमेल द्वारा उपलब्ध करा दिया जायेगा ।

The 59th meeting of Northern Regional Power Committee (NRPC) will be held at **1100 Hrs** on **31 October 2022** via video conferencing. Agenda for the same is attached. The link and password for joining the meeting shall be sent in due course of time.

भवदीय
Yours faithfully,

(नरेश भंडारी) 28/10/22
(Naresh Bhandari)
सदस्य सचिव
Member Secretary

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उत्तरी क्षेत्रीय विद्युत समिति की 59वीं बैठक
59th MEETING OF NORTHERN REGIONAL POWER COMMITTEE

Time & Date of NRPC meeting: 11:00 HRS; 31 October 2022

Venue: Video Conferencing

AGENDA

A.1 Approval of MoM of 58th NRPC meeting

A.1.1 Minutes of 58th NRPC meeting has been issued vide letter dtd. 26 October 2022. No comment has been received till the date.

Members may kindly approve.

A.2 Unchahar Islanding Scheme (agenda by UP)

A.2.1 Unchahar islanding scheme, proposed by UPSLDC, vide letter dtd. 13 October 2022 (attached as **Annexure-A.I**) has been discussed in 200th OCC meeting held on 18 October 2022.

A.2.2 OCC has recommended the scheme for approval of NRPC Forum.

Members may kindly deliberate.

A.3 Inclusion of RE generators at various fora of NRPC (agenda by NRPC Sectt.)

A.3.1 ACME Solar Holdings Private Limited vide letter dtd. 13 October 2022 has requested that RE generation addition is growing on fast pace and which in turn increasing the number of various operational and technical issues regarding the plant day to day operations and it is necessary to deliberate these issues at a common forum at the RPC level so that the issue can be monitored and resolved.

A.3.2 ACME has highlighted that presently operational and technical issues of thermal generators are discussed and resolved at OCC/TCC/ Board Meeting.

A.3.3 ACME has suggested that RE Generators and Solar Park Developers may be made members of committees at RPC forum alongwith CTU, STU, RLDC, and SLDC.

Members may kindly deliberate.

A.4 Formation of standing committee for physical inspection in cases of tower collapse and equipment failure in Northern Region (agenda by NRPC Sectt.)

A.4.1 Under section 73(l) of Electricity Act, 2003, CEA is required to carry out or cause to be carried out, any investigation for the purpose of generating or transmitting or distributing electricity. CEA has constituted/re-constituted following committees (**Annexure-A.II**):-

i. 'Standing Committee of Experts to Investigate Failure of Towers' vide office order no. CEA/5-41(18)/Secy-2012/166 dtd. 06 August 2012

ii. 'Standing Committee of Experts to Investigate Failure of Equipment at 220 kV and above sub-stations' vide office order no. CEA/SETD/220-O/2012/1-80 dtd. 01 January 2013

A.4.2 It has been observed that the above two committees generally gives report on yearly basis for all cases reported in the year. However, availability certificate of previous month is required to be issued by RPC Secretariat on 3rd day of next month.

A.4.3 As per clause 5 of Appendix-II in CERC Tariff Regulations, 2019, outage period of transmission elements, as certified by the Member Secretary, RPC, shall be excluded from the total time of the element under period of consideration for outage of elements due to acts of God and force majeure events beyond the control of the transmission licensee. However, whether the same outage is due to force majeure (not design failure) will be verified by the Member Secretary, RPC. A reasonable restoration time for the element shall be considered by Member Secretary, RPC. Member Secretary, RPC may consult, the transmission licensee or any expert for estimation of reasonable restoration time.

A.4.4 In view of above and to avoid delay in resolution of availability cases of tower/equipment failures, it is proposed that a committee named, 'Standing Committee for verification of cause of failure of transmission system for purpose of availability' may be formed that may visit the place of failure for all system (tower/equipment/etc.) for which availability is certified by NRPC. The committee may submit its preliminary report to Member Secretary, NRPC. Based on preliminary report, availability shall be certified by Member Secretary, NRPC. However, availability certificate may be revised, if required, due to recommendation report of CEA Standing Committees.

A.4.5 The committee may have following members:

i. Superintending Engineer, NRPC *(dealing availability matters)* as Chairperson
ii. Superintending Engineer (Transmission), STU of concerned circle of State/UT
iii. Concerned General Manager or equivalent of concerned licensee/owner of asset
iv. Executive Engineer, NRPC *(dealing availability matters)* as Member Convenor
v. Any other member as considered necessary by Chairperson

Un-availability of any of above members shall not be cause for delay in visit and available members may visit the place and submit report.

A.4.6 Licensees/owner of the system (tower/equipment/etc.) may intimate failure of asset within 24 hours of the incident in format attached as **Annexure-A.III** so that committee may visit the place preferably within next 3 working days. Licensees/owner shall facilitate visit.

Members may kindly deliberate.

A.5 Staff Crunch in NRPC Secretariat (agenda by NRPC Sectt.)

A.5.1 Currently, NRPC Secretariat is reeling under acute staff crunch as below:

S.N.	Designation	Sanctioned Strength	Currently in NRPC Secretariat
1	Superintending Engineer	3	1
2	Executive Engineer	4	3
3	Assistant Executive Engineer	4	4
4	Assistant Engineer	2	0

A.5.2 One Superintending Engineer and One Executive Engineer are on rolls of NRPC however, they are working in MoP on loan basis.

A.5.3 CEA has mandate to provide staff to RPCs. However, CEA has not been able to provide the same. Due to staff crunch, NRPC is not able to deliver its responsibilities timely and effectively. Even post of Private Secretary to Member Secretary is also vacant since retirement of incumbent on 28 February 2022.

A.5.4 In view of above, it is proposed that NR constituents may post their officials to NRPC Secretariat on loan basis.

A.6 Hosting of next NRPC meeting (agenda by NRPC Sectt.)

A.6.1 44th TCC & 47th NRPC Meetings (10 and 11 December, 2019) was hosted by Rajasthan. As per decision taken in 47th NRPC meeting, next meeting was to be hosted by Uttarakhand, however, due to COVID pandemic, all subsequent meetings have been held via video-conferencing till the date.

A.6.2 Roster finalized in 40th TCC & 43rd NRPC Meetings (29 and 30 October, 2018) is as below:

D.4 Roster for Hosting NRPC Meetings

D.4.1 MS, NRPC informed that it is proposed that roster for hosting of NRPC meeting may be revised as old roster included state utilities and PSUs but not IPPs. He informed that currently there are 10 IPPs which are members of NRPC and after every 4 meeting member IPP will get an opportunity to host the meeting. The modified roster is as followed:

1.Member IPP	9. Punjab	17. Member Trader/PTC
2.NPCIL	10.Member IPP	18. Delhi
3.J&K	11. Rajasthan	19.Member IPP
4.THDC	12. POWERGRID	20. BBMB
5.Member IPP	13. UT of Chandigarh	21. Uttarakhand
6. Haryana	14.Member IPP	22. HP
7. SJVN	15. NHPC	
8. NTPC	16. UP	

Roster for Members IPP is as followed:

1.Adani Power	6.LPGCL
2.APCPL	7.NPL
3.CLP	8.PPGCL
4.JSW Power	9.RPSCL
5.LAPL	10.TSPCL

D.4.2 NRPC approved the revised roster for the hosting of the meeting.

A.6.3 Decision may be taken on hosting of next meeting in November 2022.

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Annexure A.1

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ANNEXURES

CHAPTER-1

1.0 GENERAL PHILOSOPHY FOR FORMATION OF ISLANDS

1 The size of the Islands should be big as the chances of its survival will be more due to high inertia and stability. However, to form bigger islands, more number of switching operations would be required, which would considerably reduce the chances of success of Islanding. But what is more important is reliability of load-generation balance in the islands and hence criteria for formation of islands should not be the geographical or electrical size but more emphasis should be given to Load-Generation balance.

2 However, under frequency based load shedding scheme should be as the first line of defense during frequency collapse and formation of islands should be initiated only when this defense mechanism fails and frequency continues to fall further.

3 The probability of survival of islands will be realistic only when all the generating units are on free governor mode of operation in accordance with provisions of Indian Electricity Grid Code.

4 Islanding Scheme should be a two-tier scheme. At frequency level of say 47.9Hz, trigger for formation of islands comprising of more than one generating stations (if possible) along with pre-identified load should be initiated. However, if frequency continues to fall further to say 47.7Hz, possibilities of forming smaller islands with pre-identified total load should be explored.

5 Islands should be created in such a manner that possibility of generation exceeding load is more.

6 As the load-generation balance in pre-identified islands may change due to seasonality of load, there would be need to review the scheme on seasonal basis. Such review would also capture network changes taking place over a period of time.

7 As far as possible, major hospitals, Cantonment Area, Railway supply and VIP establishments and other essential loads should be incorporated in the islands. However, if this is not possible due to some reasons, efforts should be made to extend supply from these islands to essential loads on priority basis.

8 Major issues that need to be deliberated regarding the formulation of Islanding scheme are:

a. Size of Island
b. Frequency level at which Islanding should take place.
c. Possibilities of formation of smaller island in case of failure of bigger island and the frequency for the same and the time delay between two stages of Island.
d. Identification of dedicated load for the purposes of forming an island.
e. Monitoring of UFRs.
f. Segregation of feeder and loads for different Schemes such as SPS, UFLS&df/dt and Islanding scheme.
g. Monitoring of Islanding Schemes for the purposes of load-Generation balance.
h. House-load for survival of Island in case of extreme contingencies.

CHAPTER-2.0

2.0 ISLANDING SCHEME FOR 5X210 MW UNCHAHAR THERMAL POWER STATION

2.1 In the state of Uttar Pradesh, Islanding Scheme at the Narora Atomic Power Station (NAPS) is in operation. This generating station was able to successfully Island itself during the grid disturbances of 30th July 2012 and 31st July 2012. Islanding for this generating station has been planned in two stages at frequencies of 47.9Hz and 47.5Hz. At frequency of 47.9Hz the bulk load is disconnected by operation of UFR relays and load from 220kV S/S Khurja and Simbholi remains part of the Island.

Similar methodology has been adopted for Islanding of 5x210MW Unchahar generating station of NTPC in Uttar Pradesh. The first stage of Islanding is targeted at a frequency of 47.9Hz with dedicated average load of 540MW. This average load comprises of the load centre at Rai Bareilly, Fatehpur and Lucknow Region. The averaging of load has been done by taking the average of summer peak and off-peak of identified substation (Details attached as Annexure-3). If the frequency still continues to fall, the second stage of Islanding is targeted at a frequency of 47.7 Hz with dedicated load of only 160 MW (i.e. house load of Unchahar TPS (20MW) +load of Raibareilly (140 MW)), with only one generator unit considered under operation. For the second stage of Islanding suitable scheme would be required for tripping of generator units and to prevent over-speeding of balance unit due to reduced load.

2.2 With respect of Islanding Scheme, in general following philosophy need to be followed:-

i. That islanding would be initiated as a step of last resort, should the frequency continue to fall to lower levels even after the operation of Under Frequency Relays (UFRs) under automatic load shedding schemes in the UP system.

ii. With respect to UFR's to be utilized for Islanding purposes :-
   a) At all transmission and generating stations UFRs shall be installed on both side of the elements. For 33kV feeders UFR shall be installed at transmission end only.
   b) Remote monitoring facility of the under frequency relays for its operational readiness need to be built in the scheme.
   c) Development of communication system to enable the UFR data communication to SLDC so that the load relief obtained through UFR operations is available at the central location.

iii. The islanding scheme would be devised in two stages. In the first stage of islanding at 47.9Hz larger island of operation would be enabled. In case the 1st islanding attempt at 47.9 Hz does not survive, the 2nd stage islanding at 47.7Hz would be initiated with only one generating unit running with house load of the generating station and local load of Raibareilly so as to maintain load generation balance at frequency of 47.7Hz. Further, considering the time of relay operation and opening of breaker, a time delay 3500 mili second shall be provided between two stages of islanding so that first stage of Islanding gets enough time to stabilizes.

iv. In case of second stage of Islanding, no traction load shall be included as it may give rise to harmonics and lead to instability of the system.

v. For the survival of island it shall be ensured that Island always remains slightly on generation plus side.

vi. For effective control of frequency Generator units will run in free governor mode of operation.

vii. The seasonal changes shall be reviewed periodically with the real time data at the UP-SLDC.

viii. The major essential loads has been identified including hospitals, Railway Station, traction supply points, important government offices, defence installation, cantonment etc. To the extent possible, efforts would be made to extend supply from these islands on priority to the essential load supply stations.

ix. The identified loads of the island shall not be included in the automatic load shedding schemes through UFRs and the SPS schemes.

x. The State load dispatch centre (SLDC) shall be nodal control room responsible for the island control; however, it may involve concerned generating station and ALDS, for effective management of the Island. For proper real-time monitoring of Load – Generation balance of Unchahar Islanding Scheme at SLDC and NRLDC level, mapping of the said Islanding scheme in SCADA must be done.

CHAPTER-3.0

3.0 Average generation, dedicated load details and elements to remain connected in proposed Island Scheme of Unchahar:

3.1 The Unchahar (NTPC) generating station has five units of 210 MW capacities each and one unit of 500 MW capacity. Based on the generation pattern (1 October 2021- 31 August 2022) the average ex-bus generation for 5X210MW units at Unchahar TPS is taken as 600MW (attached as Annexure-5). Average ex-bus generation for 500 MW units is considered as 350 MW. Therefore total average ex-bus generation at Unchahar is 950 MW. Further, to maintain the Island in a generation surplus state, the dedicated load for this Island Scheme has to be 855 MW, i.e. approximately 90% of the average available ex-bus generation from this generating station. However, as per simulation studies, load of 855 MW for this Island is not technically feasible due to overloading constraint of 220kV Raibareilly-Bachrawan & Raibareilly-C.G City lines and Under voltages observed at some substations while meeting out this much of load (Simulation study result attached as Annexure-4)

After considering the above constraints it is concluded that 500 MW unit of Unchahar (NTPC) may be omitted from proposed Islanding scheme. Therefore, total average generation for island is 600 MW and load identified for Island is 540 MW i.e. approximately 90% of the average available ex- bus generation of 600MW.

3.2 Through Islanding of Unchahar Generating Station 260 MW average load requirement of Lucknow and140 MW average load requirement of Raibareilly and Fatehpur each would be catered.

3.3 Further through this Islanding, supply to following essential loads shall be provided:

a) State Assembly and nearby VIP areas.
b) Raj Bhawan.
c) Cantonment Area, Memore Air Force Station.
d) Hospitals like Ram Manohar Lohiya, Medanta Hospital, Cancer Institute.
e) Railway and Metro Station.
f) Traction load through Sarojini Nagar & SGPGI in Lucknow, Bachrawan
g) Police Headquarter.

3.4 List of 220kV feeders, 132kV feeders, 33kV feeders and transformers to open at 47.9Hz. (stage-1) for formation of Island (UFR to be installed on both side of the elements to ensure the reliability)

A	**Unchahar Generating St. end**		
1	220kV Unchahar Gen Stn.- Kanpur (PG) ckt. I, II, III & IV	2	1*500MVA(400/220kV) ICT
B	**132kV S/S Amawan (Rai Bareilly)**		
1	132kV Amawan (Rai Bareilly)- Salon ckt. I & II	3	132kV Amawan (Rai Bareilly)-Gauri Ganj
2	132kV Amawan (Rai Bareilly)-Tiloi (Bachrawan)	4	132kV Amawan (Rai Bareilly)-Bachrawan (132kV)
C	**132kV S/S Tripula (Rai Bareilly)**		
1	132kV Tripula (Rai Bareilly)- Dalmau		
D	**220kV S/S Fatehpur**		
1	220kV Fatehpur-Banda	4	220kV Fatehpur-Fatehpur (PG)
2	220kV Fatehpur-Sirathu	5	220kV Fatehpur-Allahabad (Cantt)
3	132kV Fatehpur-Khaga		
E	**220kV S/S Malwan**		
1	132kV Malwan-Bhadoli ckt. I & II	3	132kV Malwan-Bindki
2	132kV Malwa-Jahanabad	4	132kV Malwa-Naubasta (220kV)
F	**220kV S/S Bachrawan**		
1	132kV Bachrawan-Sarini ckt. I & II	2	2*40MVA (132/33kV) ICT
G	**132kV S/S Bachrawan**		
1	132kV Bachrawan-Amawan (Rai Bareilly)	4	132kV Bachrawan- RINL
2	132kV Bachrawan (132kV)-RCF	5	2*40MVA (132/33kV) ICT
3	132kV Bachrawan- R Cement		
H	**220kV S/S Satrikh Road**		
1	220kV Satrikh Road-Barabanki ckt. I & II	2	2*60MVA(220/33kV) ICT
I	**220kV S/S Sarojini Nagar**		
1	2*500MVA (400/220kV) ICT	5	132kV Sarojini Nagar-TRT ckt. I & II
2	220kV Sarojini Nagar-Dahi Chauki	6	132kV Sarojini Nagar-Rahimabad
3	220kV Sarojini Nagar-Kanpur Road	7	132kV Sarojini Nagar-Kundan Road

4	220kV Sarojini Nagar- Hardoi Road	8	33kV feeder except Nadarganj and Mewara
J	**220kV S/S Chinhat**		
1	220kV Chinhat-Kursi Road	5	132kV Chinhat-NKN
2	220kV Chinhat-Lucknow(PG)	6	132kV Chinhat-Indra Nagar
3	132kV Chinhat-TELCO	7	33kV feeder except Dainik Jagaran, HAL, High Court and Ram Manohar Lohiya
4	132kV Chinhat-Barabanki		
K	**220kV S/S Gomti Nagar**		
1	33kV feeder except Lohiya Hospital, Mantri Awas, High Court, 200 Bed Hospital		
L	**132kV S/S SGPGI**		
1	2*63MVA(132/33kV) ICT		
M	**220 kV S/S Bijnor**		
1	2*40MVA (132/33kV)		

3.5 List of Generators/transmission line/transformers available after formation of Island in stage-1.

A	**Unchahar Generating Station**		
1	5X210 MW Units (Stage-1,2 &3)	4	220kV Unchahar Gen Stn.- Malwan
2	220kV Unchahar Gen Stn.- Raibareilly (PG) ckt. I, II & III	5	Self Load of Unchahar
3	220kV Unchahar Gen Stn.- Fatehpur line		
B	**220kV S/S Rai Bareilly (PG) details**		
1	220kV Rai Bareilly (PG)-Bachrawan	4	2X200 +100 MVA (220/132kV) ICT
2	220kV Rai Bareilly (PG)- Unchahar ckt. I, II & III	5	132kV Rai Bareilly (PG)- Amawan (Rai Bareilly) ckt. I, II & III
3	220kV Rai Bareilly (PG)- 220kV CG City		
C	**132kV S/S Amawan (Rai Bareilly)**		
1	132kV Amawan (Rai Bareilly)-Rai Bareilly (PG) ckt. I, II & III	3	2X63 MVA (132/33kV) ICT
2	132kV Amawan (Rai Bareilly)- Tripula (Rai Bareilly)- ckt. I&II		
D	**132kV S/S Tripula (Rai Bareilly)**		
1	132kV Tripula (Rai Bareilly)- Amawan (Rai Bareilly) ckt. I&II	2	2*63MVA (132/33kV) ICT
E	**220kV S/S Fatehpur**		
1	220kV Fatehpur-Unchahar	4	132kV Fatehpur-Husainganj

2	220kV Fatehpur-Malwan	5	132kV Fatehpur-Malwan
3	2*200MVA (220/132kV) ICT	6	2*63MVA(132/33kV) ICT
F	**220kV S/S Malwan**		
1	220kV Malwan-Unchahar	4	132kV Malwa-Husainganj
2	220kV Malwan-Fatehpur	5	132kV Malwa-Fatehpur
3	2*160MVA (220/132kV) ICT	6	3*40MVA (132/33kV) ICT
G	**132kV S/S Husainganj**		
1	132kV Husainganj-Fatehpur	3	2*40MVA (132/33kV) ICT
2	132kV Husainganj-Malwan		
H	**220kV S/S Bachrawan**		
1	220kV Bachrawan-Raibareilly(PG)	3	2*160MVA (220/132kV) ICT
2	220kV Bachrawan-Sarojini Nagar	4	132kV Bachrawan (220)- Bachrawan (132) ckt. I & II
I	**132kV S/S Bachrawan**		
1	132kV Bachrawan (132kV)-Bachrawan (220kV) ckt. I & II	2	132kV Bachrawan-TSS
J	**220kV S/S C.G City**		
1	220kV C.G City-Rai Bareilly (PG)	3	3*60MVA (220/33kV) ICT
2	220kV C.G City-Satrikh Road		
K	**220kV S/S Satrikh Road**		
1	220kV Satrikh Road -C.G City	2	220kV Satrikh Road-Chinhat
L	**220kV S/S Sarojini Nagar**		
1	220kV Sarojini Nagar-Bachrawan	6	132kV Sarojini Nagar-LMRC ckt. I & II
2	220kV Sarojini Nagar-Gomti Nagar	7	132kV Sarojini Nagar-TSS ckt. I & II
3	3*200MVA (220/132kV) ICT	8	100+63MVA(132/33kV) ICT
4	132kV Sarojini Nagar- Bijnor	9	33kV Sarojininagar-Nadarganj
5	132kV Sarojini Nagar- SGPGI ckt. I & II	10	33kV Sarojininagar-Mewara
M	**220kV S/S Chinhat**		
1	220kV Chinhat-Satrikh Road	7	2*63MVA(132/33kV) ICT
2	220kV Chinhat-Gomti Nagar	8	33kV Chinhat- DainikJagran
3	220kV Chinhat-LMRC ckt. I & II	9	33kV Chinhat-HAL
4	2*200MVA (220/132kV) ICT	10	33kV Chinhat-High Court
5	132kV Chinhat-Gomti Nagar	11	33kV Chinhat-RML
6	132kV Chinhat-Martinpurwa		
N	**220kV S/S Gomti Nagar**		
1	220kV Gomti Nagar-Chinhat	5	33kV Gomti Nagar-Mantri Awas
2	220kV Gomti Nagar-Sarojini Nagar	6	33kV Gomti Nagar-High Court
3	4*60MVA (220/33kV) ICT	7	33kV Gomti Nagar-200 Bed Hospital

4	33kV Gomti Nagar-Lohiya Hospital		
O	**132kV S/S SGPGI**		
1	132kV SGPGI-Bijnor	4	132kV SGPGI-Sultanpur Road (Awas Vikas)
2	132kV SGPGI-Utrathiya TSS	5	132kV SGPGI-Sarojini Nagar (220kV) ckt. I & II
3	132kV SGPGI-Gomti Nagar	6	2*20MVA(132/11kV) ICT
P	**132kV S/S Bijnor**		
1	132kV Bijnor-Sarojini Nagar (220kV)	2	132kV Bijnor-SGPGI
Q	**132kV S/S Gomti Nagar**		
1	132kV Gomti Nagar-Chinhat (220kV)	3	3*40MVA(132/33kV) ICT
2	132kV Gomti Nagar-SGPGI		
R	**132kV S/S Martinpurwa**		
1	132kV Martinpurwa-Chinhat (220kV)	3	3*63MVA(132/33kV) ICT
2	132kV Martinpurwa-Sultanpur Road (Awas Vikas)		
S	**132kV S/S Sultanpur Road (Awas Vikas)**		
1	132kV S/S Sultanpur Road (Awas Vikas)-SGPGI	3	2*40MVA (132/33kV) ICT
2	132kV S/S Sultanpur Road (Awas Vikas)-Martinpurwa		

3.6 List of 220kV feeders, 132kV feeders, 33kV feeders and transformers to open at 47.7Hz. (stage-2) for formation of Island (UFR to be installed on both sides of the elements to ensure the reliability)

A	**Unchahar Generating St. end**		
1	220kV Unchahar Gen Stn.- Kanpur (PG) ckt. I, II,III & IV (Already opened by UFR in stage -1)	4	220kV Unchahar Gen Stn.-Malwan
2	1*500MVA(400/220kV) ICT(Already opened by UFR in stage -1)	5	220kV Unchahar Gen Stn.-Fatehpur
3	4X210 MW Units		
B	**220kV S/S Rai Bareilly (PG)**		
1	220kV Rai Bareilly- Bachrawan (220)	2	220kV Rai Bareilly- C.G City

3.7 List of transmission line/transformers available after formation of Island in stage-2.

A	**Unchahar Generating St. end**		
1	220kV Unchahar Gen Stn.- Raibareilly (PG) ckt. I, II & III	2	Self Load of Unchahar
2	One Unit at Unchahar TPS		
B	**220kV S/S Rai Bareilly (PG) details**		
1	220kV Rai Bareilly (PG)- Unchahar ckt. I,	2	132kV Rai Bareilly (PG)- Amawan (Rai

	II & III		Bareilly) ckt. I, II & III
2	2X200 +100 MVA (220/132kV) ICT		
C	**132kV S/S Amawan(Rai Bareilly)**		
1	132kV Amawan (Rai Bareilly)- Rai Bareilly (PG) ckt. I, II & III	3	63+40MVA (132/33kV) ICT
2	132kV Amawan (Rai Bareilly)- Tripula (Rai Bareilly) ckt. I & II		
D	**132kV S/S Tripula (Rai Bareilly)**		
1	132kV Tripula (Rai Bareilly)- Amawan (Rai Bareilly) ckt. I & II	2	2*63MVA (132/33kV) ICT

3.8 Dedicated load for Islanding scheme at various substations:-

Kindly refer to Annexure-3.

CHAPTER-4

4.0 MAJOR CHALLENGES AND WAY FORWARD

4.1 Maintaining load Generation balance for the Island throughout the year in view of changing demand during different seasons. This shall require regular review and re-adjustments. In addition to this load dedicated for Islanding purpose must be free from any kind of scheduled rostering

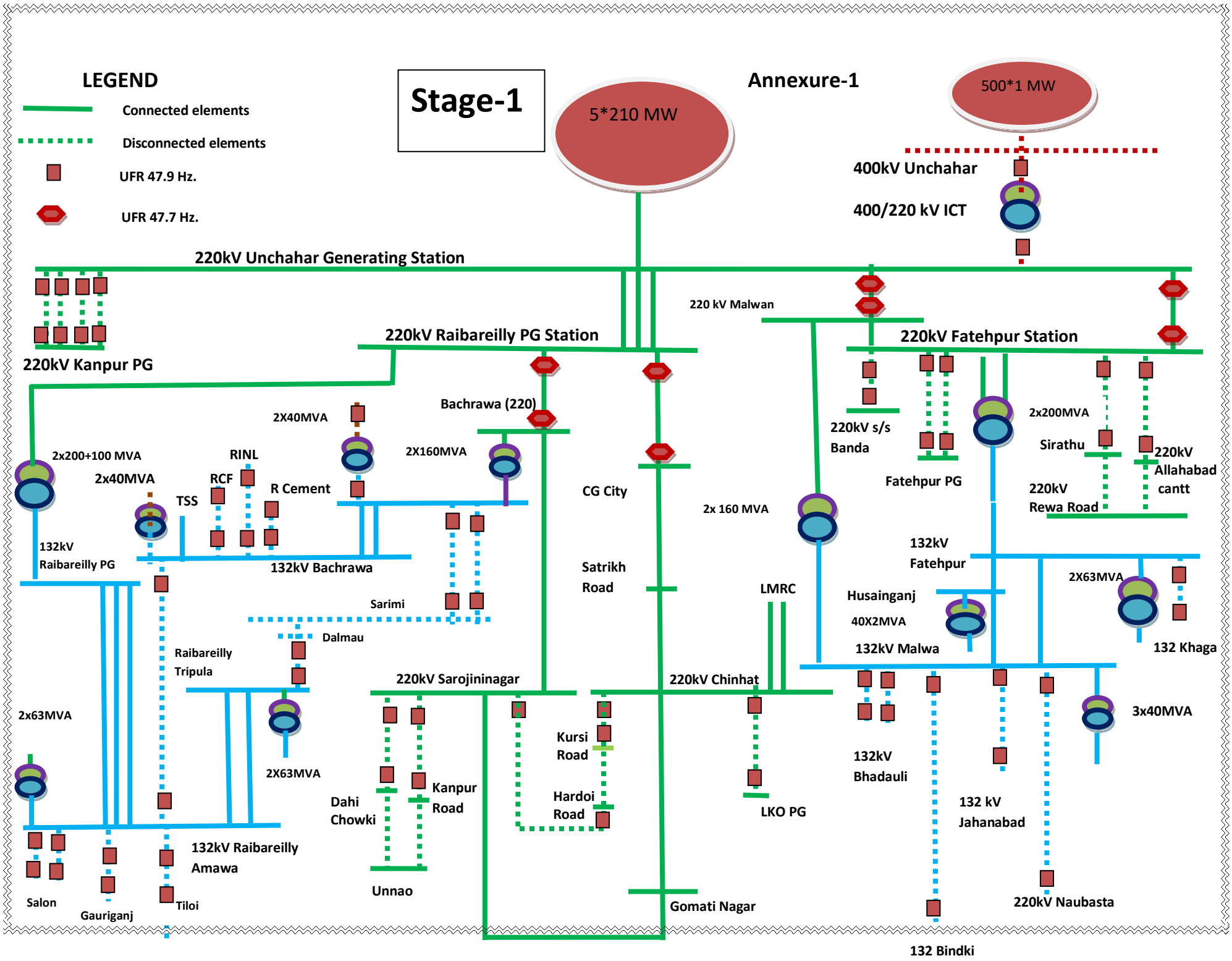
4.2 Commitment of the generators for Free Governor Mode Operation of Generating Stations to effectively control frequency on real time basis.

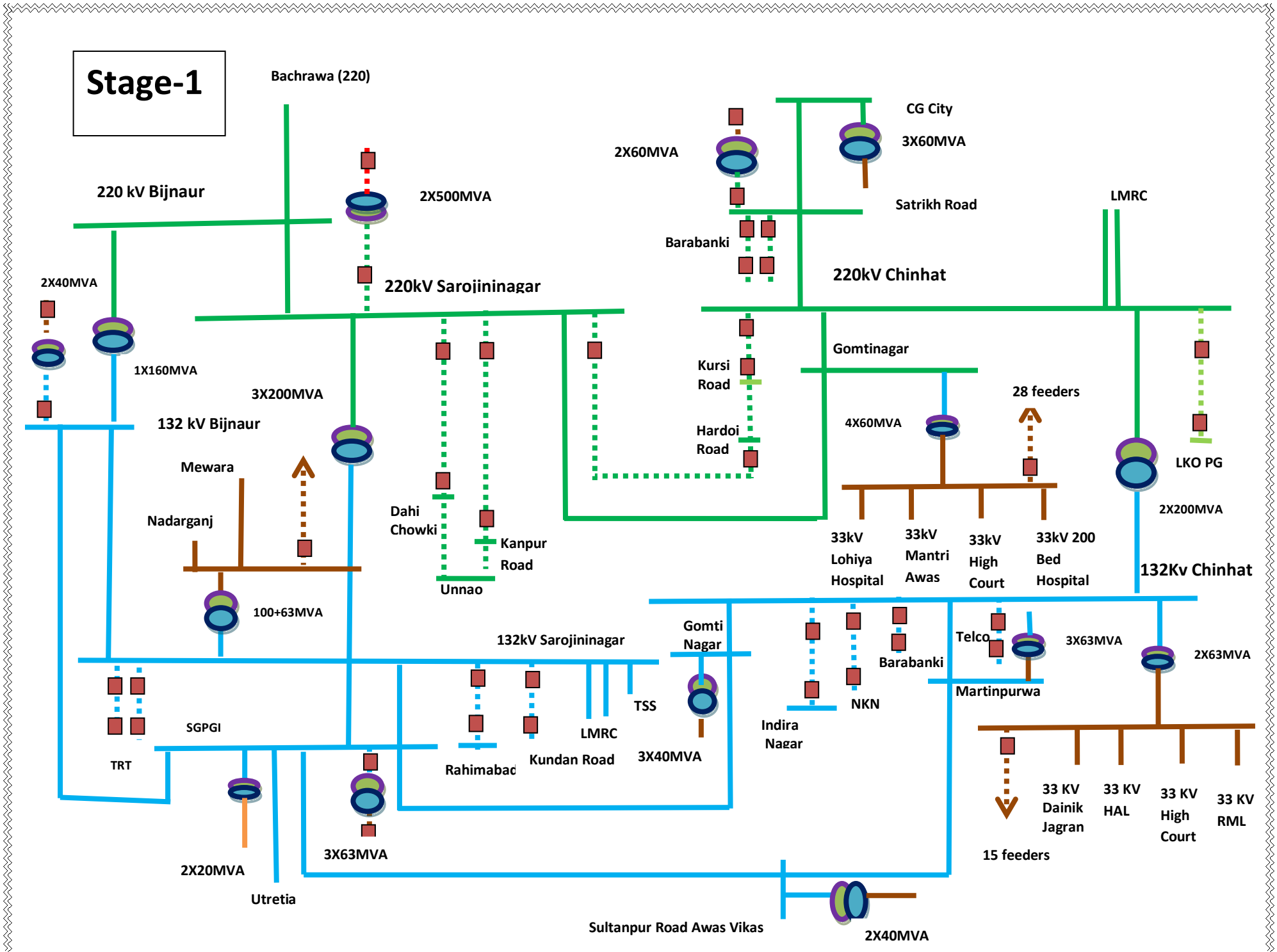
4.3 Monitoring of healthiness of Under Frequency Relays for their operation at the set frequency. Therefore telemetry data through SCADA of all the substations to be part of the Island must be available at UPSLDC control room for effective monitoring of Load and Generation mismatch.

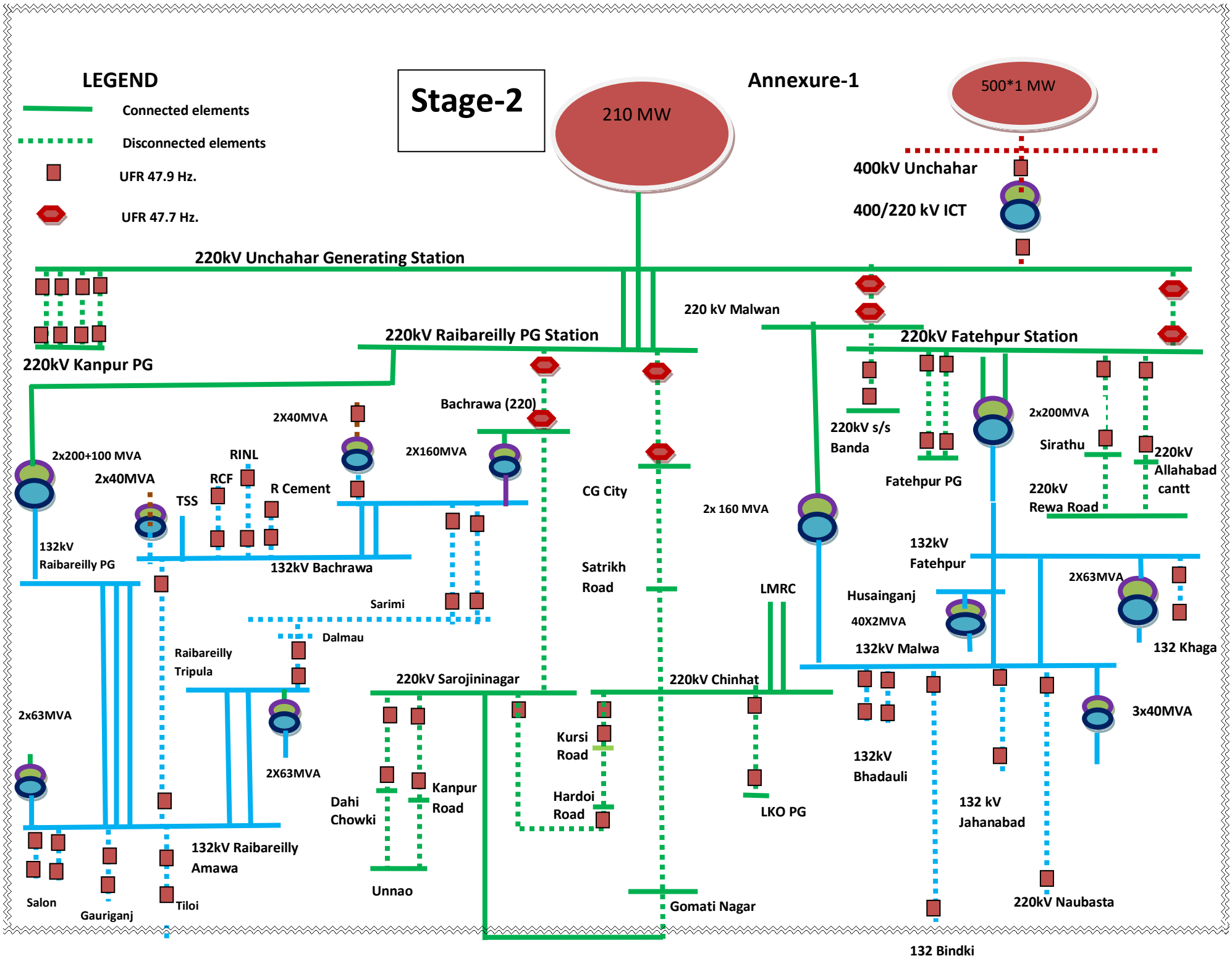
4.4 Regular testing of under frequency relay need to be done to ensure healthiness of UFRs.

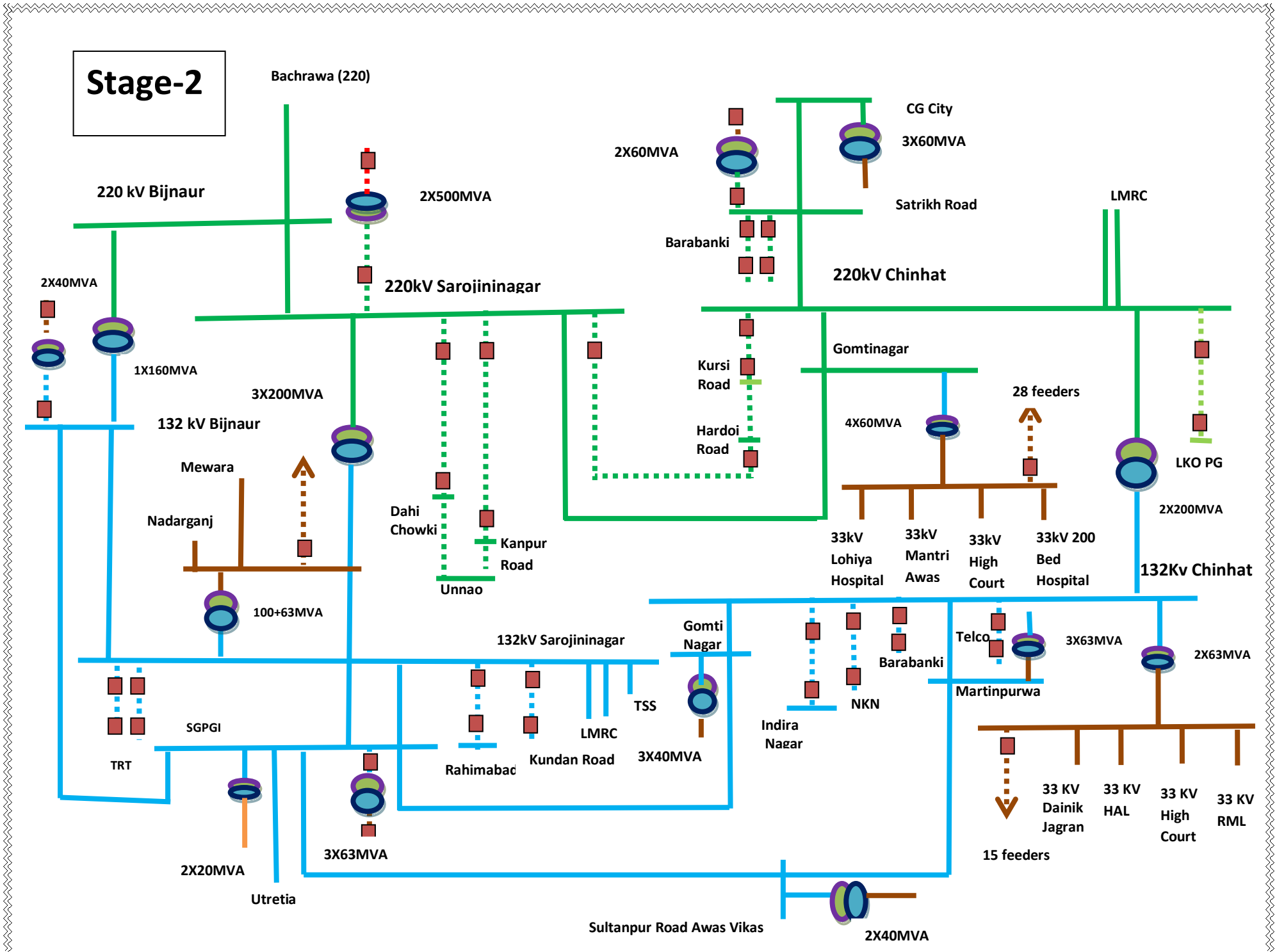
4.5 Experience gained during the implementation of this Islanding scheme should be used to explore the possibility of other Islanding Scheme in UP Control Area.

4.6 Dynamic study of Islanding Scheme should be carried out to study the dynamic behavior of generators and other elements of Island. Results of this study should be used to improve the stability of Islanding Scheme.


LEGEND
Connected elements
Disconnected elements
UFR 47.9 Hz.
UFR 47.7 Hz.
Stage-1
Annexure-1
5*210 MW
500*1 MW
400kV Unchahar
400/220 kV ICT
220kV Unchahar Generating Station
220kV Kanpur PG
220kV Raibareilly PG Station
220 kV Malwan
220kV Fatehpur Station
Bachrawa (220)
2X40MVA
2X160MVA
2x200+100 MVA
2x40MVA
RINL
RCF
R Cement
TSS
132kV Raibareilly PG
132kV Bachrawa
Sarimi
Dalmau
CG City
Satrikh Road
2x 160 MVA
LMRC
220kV s/s Banda
Fatehpur PG
2x200MVA
Sirathu
220kV Allahabad cantt
220kV Rewa Road
132kV Fatehpur
2X63MVA
Husainganj
40X2MVA
132 Khaga
132kV Malwa
3x40MVA
132kV Bhadauli
132 kV Jahanabad
220kV Naubasta
132 Bindki
Raibareilly Tripula
2x63MVA
2X63MVA
220kV Sarojininagar
220kV Chinhat
Kursi Road
Hardoi Road
LKO PG
Dahi Chowki
Kanpur Road
Unnao
Gomati Nagar
132kV Raibareilly Amawa
Salon
Gauriganj
Tiloi


Stage-1
Bachrawa (220)
220 kV Bijnaur
2X500MVA
2X40MVA
1X160MVA
220kV Sarojininagar
3X200MVA
132 kV Bijnaur
Mewara
Nadarganj
100+63MVA
Dahi Chowki
Kanpur Road
Unnao
2X60MVA
CG City
3X60MVA
Satrikh Road
Barabanki
220kV Chinhat
LMRC
Kursi Road
Hardoi Road
Gomtinagar
4X60MVA
28 feeders
33kV Lohiya Hospital
33kV Mantri Awas
33kV High Court
33kV 200 Bed Hospital
LKO PG
2X200MVA
132Kv Chinhat
132kV Sarojininagar
Gomti Nagar
3X40MVA
TSS
LMRC
Kundan Road
Rahimabad
SGPGI
TRT
2X20MVA
Utretia
3X63MVA
Indira Nagar
NKN
Barabanki
Telco
3X63MVA
2X63MVA
Martinpurwa
33 KV Dainik Jagran
33 KV HAL
33 KV High Court
33 KV RML
15 feeders
Sultanpur Road Awas Vikas
2X40MVA


LEGEND
Connected elements
Disconnected elements
UFR 47.9 Hz.
UFR 47.7 Hz.
Stage-2
Annexure-1
210 MW
500*1 MW
400kV Unchahar
400/220 kV ICT
220kV Unchahar Generating Station
220kV Kanpur PG
220kV Raibareilly PG Station
220 kV Malwan
220kV Fatehpur Station
2x200+100 MVA
2x40MVA
TSS
RINL
RCF
R Cement
2X40MVA
2X160MVA
Bachrawa (220)
132kV Raibareilly PG
132kV Bachrawa
Sarimi
Dalmau
CG City
Satrikh Road
2x 160 MVA
220kV s/s Banda
Fatehpur PG
2x200MVA
Sirathu
220kV Allahabad cantt
220kV Rewa Road
132kV Fatehpur
2X63MVA
Husainganj
40X2MVA
132 Khaga
132kV Malwa
3x40MVA
LMRC
Raibareilly Tripula
2x63MVA
2X63MVA
220kV Sarojininagar
220kV Chinhat
Kursi Road
Hardoi Road
LKO PG
132kV Bhadauli
132 kV Jahanabad
Dahi Chowki
Kanpur Road
Unnao
132kV Raibareilly Amawa
Salon
Gauriganj
Tiloi
Gomati Nagar
220kV Naubasta
132 Bindki


Stage-2
Bachrawa (220)
220 kV Bijnaur
2X500MVA
2X40MVA
1X160MVA
220kV Sarojininagar
3X200MVA
132 kV Bijnaur
Mewara
Nadarganj
100+63MVA
Dahi Chowki
Kanpur Road
Unnao
2X60MVA
CG City
3X60MVA
Satrikh Road
Barabanki
220kV Chinhat
LMRC
Kursi Road
Hardoi Road
Gomtinagar
4X60MVA
28 feeders
33kV Lohiya Hospital
33kV Mantri Awas
33kV High Court
33kV 200 Bed Hospital
LKO PG
2X200MVA
132Kv Chinhat
132kV Sarojininagar
Gomti Nagar
3X40MVA
TSS
LMRC
Kundan Road
Rahimabad
SGPGI
TRT
2X20MVA
Utretia
3X63MVA
Indira Nagar
NKN
Barabanki
Telco
3X63MVA
2X63MVA
Martinpurwa
33 KV Dainik Jagran
33 KV HAL
33 KV High Court
33 KV RML
15 feeders
Sultanpur Road Awas Vikas
2X40MVA

TRANSMISSION GRID MAP OF UTTAR PRADESH

UTTARAKHAND

LEGEND

- HVDC
- 765 kV
- 400 kV
- 66 kV
- 132kV C0-Gen
- 33 kV C0-Gen
- Biomass base Co-gen
- 220 kV
- 132 kV
- U/C
- Solar Plant 132kV
- Solar Plant 33kV
- Flue gas base Co-ge
- Coal Base Co-gen

TRANSMISSION PLANNING & POWER SYSTEM STUDIES UNIT, UPPTCL LUCKNOW
Dated 09.09.2022

Summary of load

S.no		Summer Peak (2021-22) MW	Summer Off Peak (2021-22) MW	Summer Average (2021-22)	Winter Peak (2020-21) MW	Winter Off Peak (2020-21) MW	Winter Average (2020-21)
1	Load for Lucknow Region and 220kV substation Bachrawan	390.38	129.89	259.73	307.29	97.79	202.99
2	Load for 220kV substation Fatehpur	164.8	101.4	133.1	172	101.8	136.9
3	Load for 220kV substation Raibareilly	169.45	104.792	137.121	134.75	97.42	116.085
	TOTAL	724.63	336.082	529.951	614.04	297.01	455.975

09/9/21

IDENTIFICATION OF LOAD FOR UNCHAHAR ISLANDING SCHEME

Load for Lucknow Region and 220kV substation Bachrawan

S.No.	Name of substation	Name of the ICT/ Feeder	Rating of ICT		Summer Peak (2021-22) MW	date and time	Summer Off Peak (2021-22) MW	date and time	Summer Average (2021-22)	Winter Peak (2020-21) MW	date and time	Winter Off Peak (2020-21) MW	date and time	Winter Average (2020-21)	Details of Essential load if any
			Installed Capacity (MVA)	Installed Capacity (MW)											
1	132kV Substation	132 KV TSS			14	05.06.2021 12:00	21.6	23.04.2021 21:00	14	10	05.01.2021 17:00	13.6	24.11.2020 16:00	10	
2	220kV S/S Sarojininagar	33kV Nadarganj-II			18	05-07-2021 15:00	6.3	26-03-2021 19:00	12	14	28-01-2021 11:00	7.7	29-11-2021 15:00	11	33 KV Nadarganj (Lokbhandu and Appolo Hospital)and Memora(Airbase)
		33kV Memora			15	01-07-2021 01:00	11	14-03-2021 20:00	13	17	18-01-2021 07:00	16	01-11-2021 01:00	17	
		132kV LMRC Ckt-I			6	07-07-2021 19:00	14	31-05-2021 24:00	10	18	17-01-2021 12:00	12	02-01-2021 09:00	15	
		132kV LMRC Ckt-II			12	07-07-2021 01:00	8	01-05-2021 24:00	10	5	02-01-2021 24:00	5	01-01-2021 09:00	5	
		132 kV TSS			32		28	18-07-2021 02:00	30	19	02-01-2021 22:00	18	25-01-2021 05:00	18.5	
3	132kV Substation SGPGI	132 KV S/S SGPGI- UTRETIA TSS LINE			11	07.07.21 & 14:00 hrs	2.2	12.05.21 & 20:00 hrs	6.6	10	04.01.21 & 13:00 hrs	2.3	16.11.21 & 18:00 hrs	6.15	
		132 /11 KV , 20 MVA T/F-I	20		5.40	29.06.19 at 22:00 hrs	1.00	06.06.19 at 23:00	4.20	3.00	15.01.20 at 03:00	1.00	02.12.19 at 2:00	2.4	Supply to SGPGI HOSPITAL & COLONY
		132 /11 KV , 20 MVA T/F-II	20		9.20	23.07.19 at 13:00 hrs	3.40	06.05.19 at 02:00 hrs	8.70	8.00	31.12.19 at 10:00	2.10	29.11.19 at 24:00	6.9	Supply to SGPGI HOSPITAL & COLONY
4	132kV Substation Martinpurwa	132/33 KV S/S 63 MVA T/F-I	63		28.2	07.07.21 & 15:00 hrs	3.9	12.05.21 & 20:00 hrs	16.05	17.3	28.01.21 & 11:00 hrs	3	10.11.21 & 03:00 hrs	10.15	Load to Cantonement area and Rajbhavan
		132/33 KV S/S 63 MVA T/F-II	63		33.5	07.07.21 & 15:00 hrs	5.1	12.05.21 & 20:00 hrs	19.3	20.8	28.01.21 & 11:00 hrs	3.7	10.11.21 & 03:00 hrs	12.25	
		132/33 KV S/S 63 MVA T/F-III	63		26.9	07.07.21 & 15:00 hrs	4.4	12.05.21 & 20:00 hrs	15.65	17.3	28.01.21 & 11:00 hrs	3.4	10.11.21 & 03:00 hrs	10.35	
5	220kV Substation CG City	132kV/33kV Xmer at 220kv s/s CG City	60		10	29/06/2021 @ 16:00	1.39	06-04-2021 @ 03:00	5.695	8	24-01-2021 @ 14:00	1.3	08/12/2020 @ 06:00	4.65	Cancer institute, Medanta and Police headquarter
			60		7	17/06/2021 @ 10:00	1.15	05-04-2021 @ 07:00	4.075	4	29-01-2021 @ 10:00	1	21/11/2020 @ 08:00	2.5	

09/9/21

S.No.	Name of substation	Name of the ICT/ Feeder	Rating of ICT		Summer Peak (2021-22) MW	date and time	Summer Off Peak (2021-22) MW	date and time	Summer Average (2021-22)	Winter Peak (2020-21) MW	date and time	Winter Off Peak (2020-21) MW	date and time	Winter Average (2020-21)	Details of Essential load If any
			Installed Capacity (MVA)	Installed Capacity (MW)											
6	220kv Substation Chinhat	33 KV Dainik Jagran			0.59	19.08.2021 @23:00	0.04	17.08.2021 @21:00	0.315	0.73	31.12.2020 @04:00	0.04	01.01.2021 @06:00	0.385	
		33 KV HAL			6.73	12.07.2021 @16:00	0.31	29.06.2021 @01:00	3.52	5.45	05.10.2020 @01:00	0.31	12.03.2021 @18:00	2.88	
		33 KV High Court			0.86	17.07.2021 @06:00	0.36	02.07.2021 @01:00	0.61	1.73	19.03.2021 @14:00	0.5	09.03.2021 @23:00	1.115	
		33 KV RML			0.90	28.07.2021 20:00	0.63	28.08.2021 @22:00	0.765	Commissioned on date 22.07.2021					
		220 KV LMRC-1			10		1		5.5	10		1		5.5	
		220 KV LMRC-2			10		1		5.5	10		1		5.5	
7	132kV Substation Gomtinagar	132kV/33kV Xmer at 132 kv s/s Gomtinagar	40	39.20	24.64	15-7-21 14:00	3.13	01-08-2021 09:00	13.885	22.85	17-09-2020 14:00	0.67	16-11-2021 01:00	11.76	20 MW load of VVIP area Lucknow
			40	39.20	23.97	14-7-2021 15:00	2.68	01-08-2021 09:00	13.325	21.50	17-09-2020 14:00	0.90	16-11-2021 01:00	11.2	20 MW load of VVIP area Lucknow
			40	39.20	26.43	15-07-2021 16:00	3.13	01-08-2021 09:00	14.78	24.42	17-09-2020 14:00	0.90	16-11-2021 01:00	12.66	20 MW load of VVIP area Lucknow
8	220 kv substation Gomtinagar	33kV Lohiya Hospital			4.18	02.09.2021 @14.00	1.08	25.04.2021 @15.00	2.63	2.44	15.10.2020 @13.00	0.86	10.11.2020 @19.00	1.65	
		33kV Mantri Awas			18.04	11.07.2021 @13.00	2.98	29.05.2021 @18.00	10.51	10.43	05.10.2020 @13.00	0.70	17.11.2020 @11.00	5.57	
		33kV High Court			3.91	24.08.2021 @11.00	0.76	19.04.2021 @17.30	2.33	1.73	01.10.2020 @16.00	0.38	09.11.2020 @06.00	1.05	
		33kV 200 Bed Hospital			0.70	15.04.2021 @12.00	0.38	29.04.2021 @08.00	0.54	0.76	02.10.2020 @13.00	0.38	30.11.2020 @19.30	0.57	
9	132kv Substation Awas vikas (Sultanpur Rd)	132kV/33kV Xmer at 132 kv s/s Awas vikas (Sultanpur Rd)	40		12.6	24.07.2021 @ 21.00	0.01	07.04.2021 @ 24.00	6.305	7.75	28.09.2020 @ 23.00	0.04	01.10.2020 @21.00	3.895	
			40		18.63	03.07.21 @ 16.00	0.96	21.04.2021 @ 24.00	9.795	16.1	13.09.2020 @ 23.00	0.01	29.09.2020 @01.00	8.055	33 KV Sect 17 Feeder has Trauma 2 of SGPGI hospital
					390.38		129.89		259.73	307.29		97.79		202.99	

Rising

09/9/21

Load for 220kV substation Fatehpur

S.No.	Name of substation	Name of the ICT/ Feeder	Rating of ICT		Summer Peak (2021-22) MW	date and time	Summer Off Peak (2021-22) MW	date and time	Summer Average (2021-22)	Winter Peak (2020-21) MW	date and time	Winter off Peak (2020-21) MW	date and time	Winter Average (2020-21)	Details of Essential load if any
			Installed Capacity (MVA)	Installed Capacity (MW)											
1	220kV Substation Fatehpur	2 nos. of 132kV/33kV Xmer at 220KV S/S Fatehpur	63		47	30.06.21 20:00	33	12.05.21 10:00	40	45	07.11.20 11:00	35	02.12.20 19:00	40	
			63		36	30.06.21 20:00	28	12.05.21 10:00	32	35	07.11.20 11:00	26	02.12.20 19:00	30.5	
2	132kV Substation Malwa	132kV/33kV Xmer at 132kv s/s Malwa	40		20	16.05.21 14:00	9	29.07.21 04:00	14.5	21.6	25.01.21 13:00	8.8	15.11.20 21:00	15.2	
			40		21.8	14.07.21 22:00	10.4	29.07.21 01:00	16.1	18.8	26.12.20 13:00	9.2	06.01.21 08:00	14	
			40		20	16.05.21 14:00	9	29.07.21 04:00	14.5	21.6	25.01.21 13:00	8.8	15.11.20 21:00	15.2	
3	132kV Substation Hussainganj	132kV/33kV Xmer at 132kv s/s Hussainganj	40		10	09.05.21 19:00	6	15.05.21 07:00	8	15	21.01.21 10:00	7	26.01.21 15:00	11	
			40		10	09.05.21 19:00	6	15.05.21 07:00	8	15	21.01.21 10:00	7	16.01.21 15:00	11	
					164.8		101.4		133.1	172		101.8		136.9	

09/9/21

Load for 220kV substation Raibareilly

S.No.	Name of substation	Name of the ICT/ Feeder	Rating of ICT		Summer Peak (2021-22) MW	date and time	Summer Off Peak (2021-22) MW	date and time	Summer Average (2021-22)	Winter Peak (2020-21) MW	date and time	Winter Off Peak (2020-21) MW	date and time	Winter Average (2020-21)	Details of Essential load If any
			Installed Capacity (MVA)	Installed Capacity (MW)											
2	132kV substaton Raibareilly (Amawan)	2 nos. of 132kV/33kV Xmer at 132kV substaton Raibareilly (Mawa)	63	59.85	49.04	16.07.2021 10:00	25.172	08.04.2021 24:00	37.106	41.66	04.10.2020 20:00	27.99	11.11.2020 12:00	34.825	
			40	38	31.89	16.07.2021 10:00	16.26	08.04.2021 23:00	24.075	26.69	24.02.2021 13:00	28.21	10.11.2020 14:00	27.45	
4	132kV Substation Tripulla (Raibareilly)	132kV/33kV Xmer at 132kv s/s Tripulla (Raibareilly)	63	59.85	44.26	16.07.2021 22:00	31.68	06.06.202 22:00	37.97	33.20	22.10.2020 10:00	20.61	08.01.2021 11:00	26.905	
			63	59.85	44.26	16.07.2021 22:00	31.68	06.06.202 22:00	37.97	33.20	22.10.2020 10:00	20.61	08.01.2021 11:00	26.905	
					169.45		104.792		137.121	134.75		97.42		116.085	

09/9/21

Annexure-4

Summary of Simulation Studies

Case-1 (soft copy of base case is attached with this document)

Total load-717MW

Generation-748MW

Comments-

1. Large number of low voltages is observed in this scenario. The buses where low voltages are observed are as follows:-
    a. 220kV Sathrik Road
    b. 220kV Sarojini Nagar
    c. 220kV Chinhat.
    d. 220kV Gomti Nagar
    e. 132kV Chinhat
    g. 132kV Martinpurwa
    h. 132kV Awas Vikash
    i. 132kV SGPGI
    j. 132kV Bijnor
    h. 132kV Gomti Nagar

2. Over loading has been observed on following transmission lines:-
    a. 220kV Raibareilly-Unchahar ckt. I & II (108% each)
    b. 220kV Raibareilly-Bachrawan (118%)
    c. 220kV Sarojininagar-Bachrawan (110%)

Case-2 (soft copy of base case is attached with this document)

Total load-634MW

Generation-652MW

Comments- Considering the over loadings and under voltages observed in case 1, simulation studies is carried at reduced load of 634MW and generation of 652MW. In this case all the parameters in steady state were found within limit.

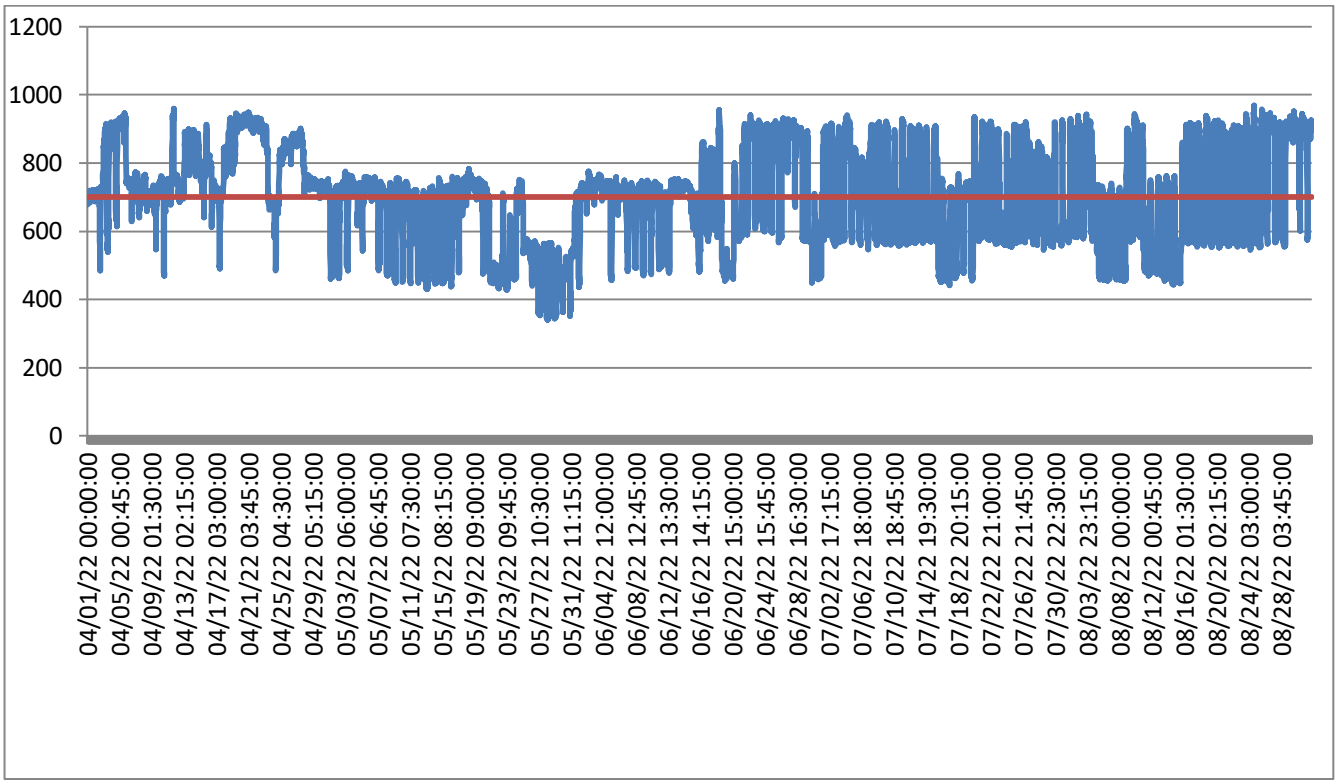
Case-3 (soft copy of base case is attached with this document)

Total load-168MW

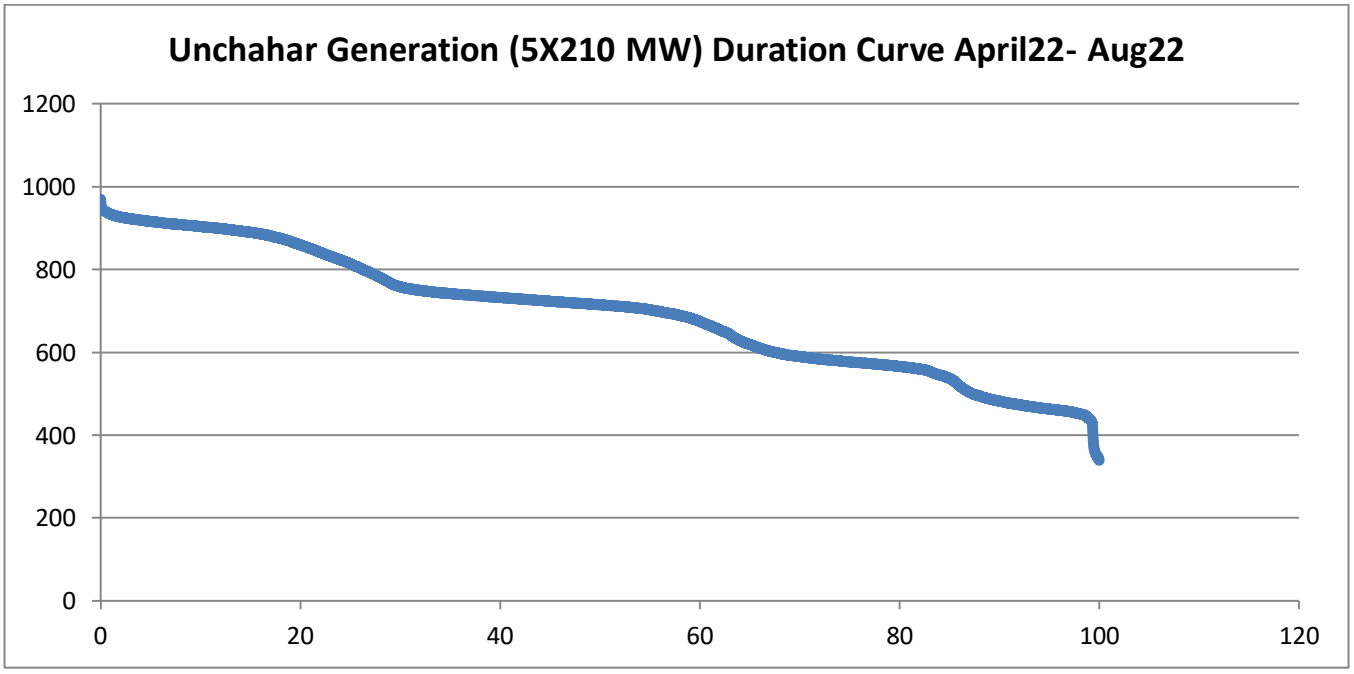
Generation-169MW

Comments- Simulation studies, considering the peak load of Raibareilly region, suggest that all the parameters in steady state were found within limit.

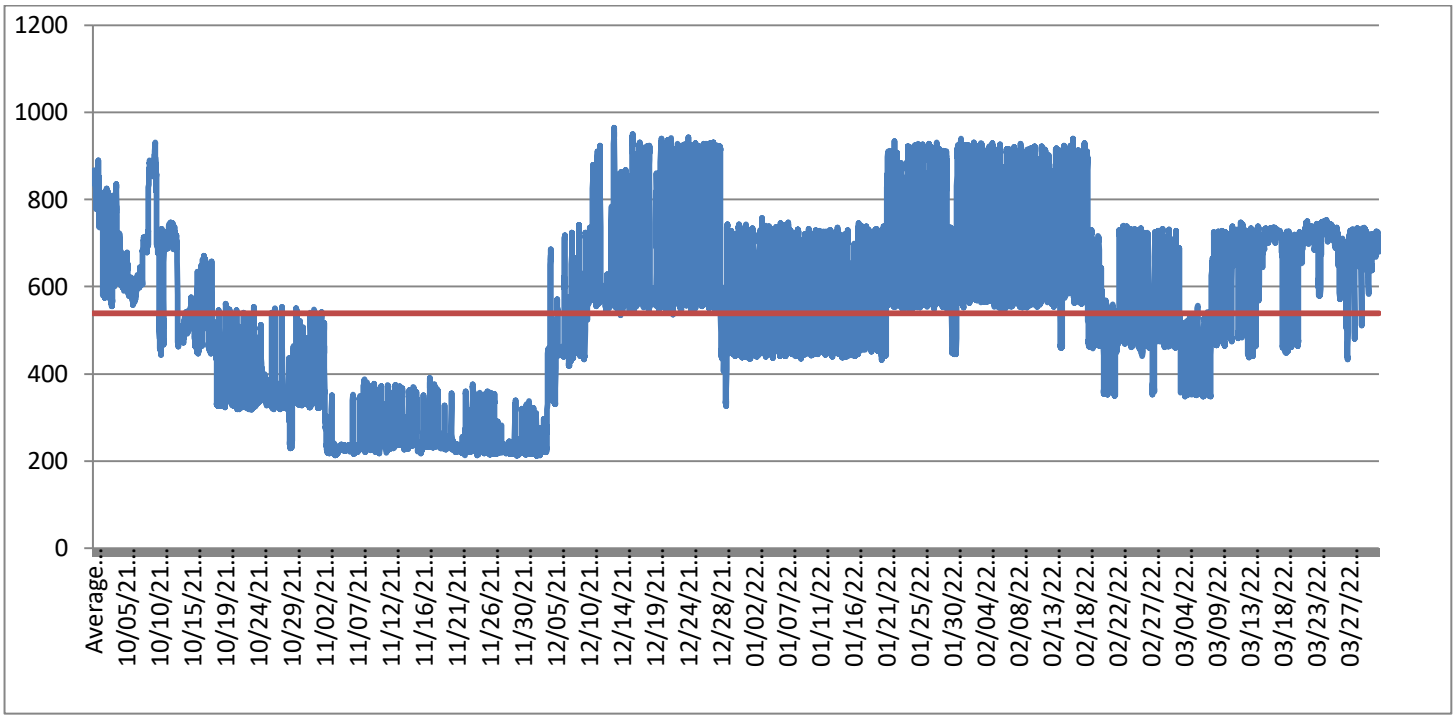
Unchahar Generation (5X210 MW) Pattern April 22- Aug 22



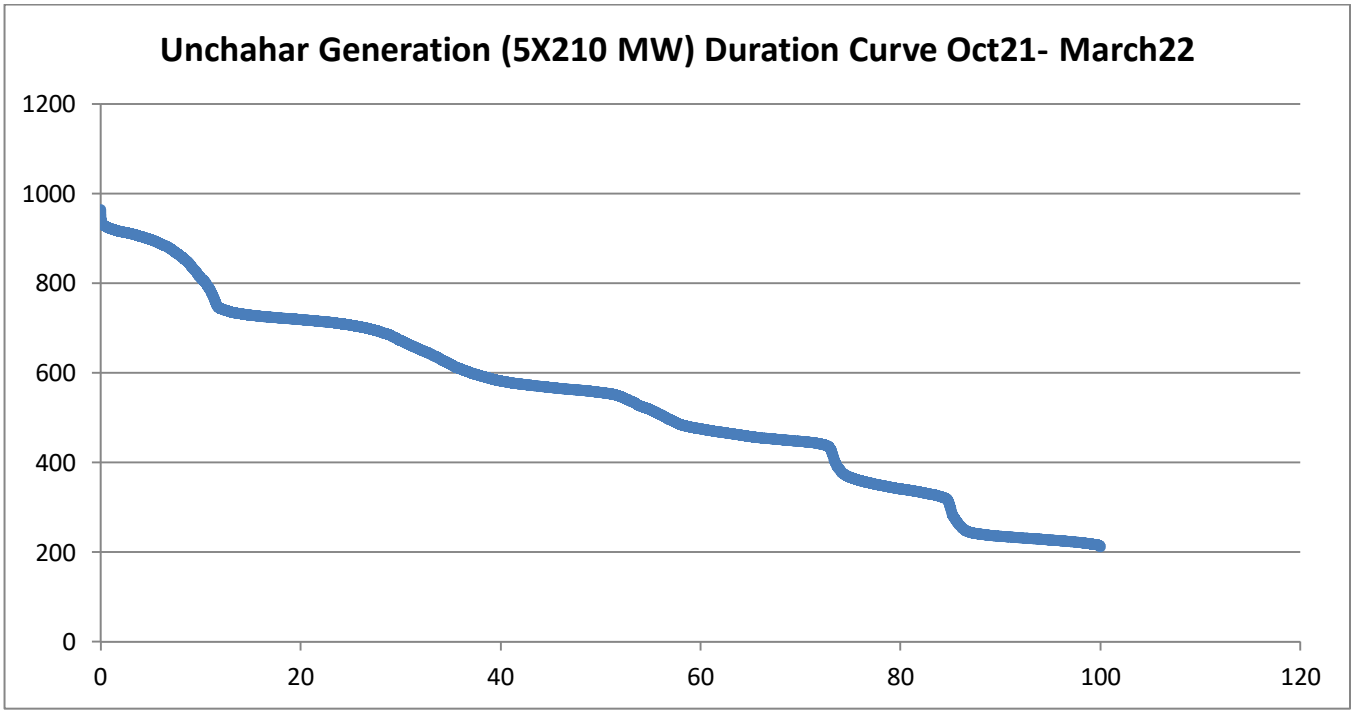
Unchahar Generation (5X210 MW) Duration Curve April22- Aug22



Unchahar Generation (5X210 MW) Pattern Oct21-March22



Unchahar Generation (5X210 MW) Duration Curve Oct21- March22



Annexure A.II

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
सचिव का कार्यालय
सेवा भवन, आर0 के0 पुरम्,
नई दिल्ली - 110 066
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(आइ.एस.ओ.: 9001:2000)

No.CEA/5-41(18)/Secy-2012 / 166 Dated: 06.08.2012

OFFICE ORDER

Subject: Re-composition of the Standing Committee of Experts to investigate failure of towers-Amendment - Reg.

Standing Committee of Experts was constituted vide this Office Memorandum (Techincal Committee No. 16) of even no. dated 30.09.1999 to investigate the causes of failure of towers. After the enactment of Electricity Act, 2003, it is felt necessary to re-compose the above said Committee. The revised Compostion of the Standing Committee of Experts to investigate failure of towers is given below:

1.	Chief Engineer, SETD, CEA	-	Chairperson
2.	Additional Director, (CPRI)	-	Member
3.	Head, Deptt. of Civil Engg, Delhi Technological University	-	Member
4.	Representative from Power Utility where Power failure occurred	-	Member
5.	Member Secretary, Regional Power Committee where Power failure occurred	-	Member
6.	Director (Transmission), SETD, CEA	-	Member Secretary

The other terms of reference shall remain the same as indicated in the above referred Office Memorandum.

(M.S. Puri)
Secretary, CEA
Tel. No.26108476

To:

1. Chief Engineer, SETD, CEA
2. Director (Transmission), SETD, CEA
3. Additional Director, Mechanical Enginering Division, Central Power Research Institute (CPRI), C.V. Raman Road, Banglore
4. Head, Deptt. of Civil Engineering, Delhi Technological University, Shahbad Daulatpur, Bawana Road, Delhi

Sh Talwar

7/8/12

5. Representative from Power Utility (as per list enclosed)
6. Member Secretary, Regional Power Committee (NRPC, WRPC, SRPC, ERPC & NERPC)

Copy for information to:

1. SA to Chairperson, CEA
2. SA to Member (PS), CEA

Copy for kind information to:

1. Secretary, Ministry of Power, Sharam Shakti Bhawan, Rafi Marg, New Delhi
2. Chairman and Managing Director, Powergrid Corporation of India Ltd., Saudamini, Plot No.2, Sector-29, Gurgaon

(M.S. Puri)
Secretary, CEA
Tel. No.26108476

Government of India
Central Electricity Authority
Office of Secretary
Sewa Bhawan, R.K. Puram
New Delhi- 110 066
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Tel.No. 011-26105619

(ISO :9001-2008)

No. CEA/SETD/220-O/2012/ /-80

01.01.2013

Subject:- Constitution of a Standing Committee of Experts to investigate the failure of equipment at 220 kV & above sub-stations.

In order to investigate the failure of equipment at 220 kV & above sub-stations, it has been decided to constitute a Standing Committee comprising experts in the field of design and operation of EHV substation from Central Electricity Authority(CEA), various power utilities and research/academic institutes under section 73, clause(1) of the Electricity Act, 2003.

2. The Committee shall consist of the following members:

(i)	Chief Engineer (SETD), CEA	-Chairperson
(ii)	A representative from CPRI, Bangalore	-Member
(iii)	A representative from IIT, Hauz Khas, New Delhi	-Member
(iv)	A representatives from concerned State Utility/Generating Companies/Transmission Companies where Substation Equipment failure has taken place	-Member
(v)	Member Secretary of concerned RPC	-Member
(vi)	Director (SETD), CEA	-Member Secretary

3. The terms of reference of the Committee shall be as follows:

(a) To investigate the causes of failure of substation equipment in service
(b) To recommend remedial measures to avert recurrences of such failures in future.

4. Every incident of substation equipment failure needs to be immediately reported to Chairperson of the Standing Committee by a designated officer of the concerned organization.

5. The Power Utility where failure of substation equipment has taken place will provide all assistance required by the Committee in carrying out the investigations.

6. The TA/DA and other expenses shall be borne by the respective organizations of the members of the Committee.

The Chairperson of the Committee will prepare compendium of the analysis of the failures and recommendations every six months and submit the same to the Authority and MoP.

(M.S. Puri)
Secretary, CEA

To:

1. Director General, Central Power Research Institute, Professor Sir C.V. Raman Road, P.O. Box- 8066, Bangalore- 560080.
2. Director, Indian Institute of Technology, Hauz Khas, New Delhi- 110016.
3. Chairman/CMDs of State Utility/ Generating Companies and Transmission Companies.

With a request to nominate their representative as member of the Committee along with an alternative member.

4. Member Secretaries, Regional Power Committees:
   a) NRPC, New Delhi
   b) WRPC, Mumbai
   c) SRPC, Bangalore
   d) ERPC, Kolkata
   e) NERPC, Shillong
5. Chief Engineer (SETD), CEA
6. Director (SETD), CEA.

Format for intimating the Failure of Transmission line Towers

1. Name of Transmission line with voltage level:
2. Date and time of occurrence/discovery of failure
3. Length of line (km):
4. Type of configuration:
   [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)
5. Number of Towers and Type of Towers failed:
   [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]
6. Tower location No. with reference to nearest substation(indicate Name):
7. Name and size of conductor:
8. No. of sub-conductors per bundle and bundle spacing:
9. Number and size of Ground wire/OPGW (if provided):
10. Type of insulators in use(Porcelain / Glass / Polymer):
11. Configuration of insulators (I / V / Y / tension):
12. No. of insulators per string and No. of strings per phase:
13. Year of construction / commissioning:
14. Executing Agency:
15. Weather condition on the date of failure:
16. Terrain Category:
17. Reliability Level:
18. Wind Zone (1/2/3/4/5/6) and velocity of wind:
19. Details of earthing of tower (pipe type/ Counter poise):
20. Line designed as per IS:802 (1977/1995/2015 any other code):
21. The agency who designed the line:
22. Any Special consideration in design:
23. Details of last maintenance activity along with date:
24. Power flow in the line prior to failure:
25. Any missing member found before / after failure of towers:
26. Condition of foundation after failure:
27. Brief Description of failure:
    [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]
28. Probable cause of failure:
29. Details of previous failure of the line / tower :
30. Whether line will be restored on ERS or Spare tower will be used:
31. Likely date of restoration:
32. Present Status:
33. Details of any Tests carried out after failure(attach test reports):
34. Wind speed data of date & time of failure from nearby authorized observatory:
35. Location of failed tower
    a. Location Coordinates:
    b. Nearest Airport:
    c. District and State:
36. Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)

37. Tower weight:
38. Tower spotting data:
39. Tower schedule of affected section
40. Sag tension calculation considered for design of tower
41. Design document of failed towers:
42. Any other relevant information:

Proforma for reporting of failure of Transformer/Reactor

i.	Name of Substation	:	
ii.	Utility	:	
iii.	Faulty Equipment (ICT/Auto-transformer/GT/Reactor etc.)	:	
iv.	Rating (MVA/MVAR, Voltage ratio, 1-phase/3-phase)	:	
v.	Make (Original equipment manufacturer)	:	
vi.	Serial No.	:	
vii.	Date and time of occurrence of fault	:	
viii.	Fault discovered during (Operation or periodic testing/ maintenance)	:	
ix.	Year of Manufacturing	:	
x.	Date of Commissioning	:	
xi.	Sequence of events/Description of fault (SOE with time stamp, Protection operated during fault)	:	
xii.	Details of Tests done after failure (What tests were conducted after the discovery of failure. If no tests were conducted, reasons for the same may be stated.)	:	
xiii.	Observations (Visual observations e.g. bulging of tank, fire, any leakage of oil, damage to various components of transformer and nearby equipment / material etc.)	:	

xiv.	Probable cause of failure	:	
xv.	If OEM representative had inspected the equipment or visited the site after failure, their remarks, MoM etc. may be attached.	:	
xvi.	Present condition of equipment (Whether repairable or beyond repair)	:	
xvii.	(a) Details of previous maintenance (Activities carried out in previous maintenance including the tests conducted, periodicity of the maintenance activities) (b) Whether any abnormality observed in these tests. If yes, attach the test reports. (c) What steps were taken to address the abnormality?	:	
xviii.	Details of any previous failure on the same unit	:	
xix.	Is tertiary winding provided (Yes/No)	:	
xx.	Tertiary loaded (Yes/No) If yes, specify load on tertiary	:	
xxi.	Whether tertiary terminals are bare/ insulated		
xxii.	Details of protection for Tertiary	:	
xxiii.	Whether relay time is synchronized with UTC	:	
xxiv.	Bushing details (OIP/RIP/RIS, Porcelain / polymer housing)	:	
xxv.	On Load Tap Changer or Off Circuit Tap Changer	:	
xxvi.	Tap position of OLTC at the time of failure	:	

xxvii.	Past record of Operation of OLTC	:	
xxviii.	Tap Range	:	
xxix.	Details of Protection provided for ICT/GT/Reactor	:	
xxx.	Details of Protection operated	:	
xxxi.	Whether equipment is properly earthed	:	
xxxii.	Earth Resistance of Substation and date of its measurement	:	
xxxiii.	Surge arrestor: (a) Is SA provided for protection (b) Whether healthiness of SA is monitored (c) Whether reading of SA counter changed during failure	:	
xxxiv.	Lightning Impulse and Switching Impulse Withstand Voltage of the bushings of all voltage level	:	
xxxv.	Lightning Impulse and Switching Impulse Withstand Voltage of the winding of all voltage level	:	
xxxvi.	Type of Fire protection provided (Emulsifier system/ N_2 Injection based fire protection system/ foam based protection etc.)	:	
xxxvii.	Weather conditions at the time of failure (clear sky/rainy/thunderstorm etc.)	:	
xxxviii.	Storage condition of equipment at site before commissioning: (a) Period of storage (b) Idle charged or uncharged (c) Dry air filled/Nitrogen filled/ Oil filled	:	
xxxix.	Whether short circuit test was carried out on this transformer or same design transformer or short circuit withstand	:	

	capability was verified on the basis of calculation?		
xl.	Number of through faults the equipment was subjected to before failure	:	
xli.	Attach the following: (a) Single Line Diagram of the substation (b) Photographs of the failed equipment (c) Disturbance Recorder/Even Logger Data (d) Reports of tests conducted after failure (e) Factory test results (f) Pre-commissioning test results (g) Protection schematic diagram	:	