CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 263/MP/2012

Coram:
Shri V.S. Verma, Member
Shri M. Deena Dayalan, Member

Date of Hearing: 09.04.2013
Date of order: 19.12.2013

In the matter of
Maintaining and ensuring integrated, secured grid operation in Southern Region in terms of regulation 5.2 of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 and compliance of regulation 5.2 (n) and 5.4.2 (e) of the same as amended vide its First Amendment Regulations 2012, by providing adequate load relief through AUFR and df/dt schemes during contingencies.

And

In the matter of

Southern Regional Load Dispatch Centre, Bangalore …. **Petitioner**

Vs

1. Chairman and Managing Director, APTRANSCO, Vidyut Soudha, Hyderabad-082
2. Managing Director KPTCL, Cauvery Bhavan, Bangalore-560 009, Karnataka
3. Chairman KSEB, Vaidyuthi Bhavanam, Pattom, Trivandrum- 695 004, Kerala
4. Chairman TANTRANSCO, 144, Anna Salai, Chennai-600 002, Tamil Nadu
5. Secretary (Power) Electricity Department of Puducherry, Puducherry-605001
6. Chief Engineer, SLDC, APTRANSCO, Vidyut Soudha, Hyderabad-500 082
7. Chief Engineer (Elec), SLDC, KPTCL, Race Course Cross Road, Bangalore
8. Chief Engineer, SLDC,KSEB, Kalamasery, Ernakulam Dist.
9. Director (O) SLDC, TANTRANSCO, Chennai
10. Superintending Engineer-I, Electricity Department, Puducherry, Puducherry

……..Respondents

Member Secretary, SRPC, Bangalore

….. Proforma Respondent

The following were present:

Shri V. Suresh, SRLDC
Shri Satbir Singh, SRPC
Shri Anand K. Ganeshan, KPTCL
Shri S. Vallainayagam, Advocate for TANTRANSCO

ORDER

Consequent to the major grid disturbances in the Northern Region on 30.7.2012 and 31.7.2012, Southern Regional Load Despatch Centre has filed this Petition with the following prayers:-

(a) "Direct all the STUs/SLDCs in the Southern Region to ensure identifying and connecting the feeders with AUFR and df/dt relays that provide availability of declared quantum of relief at any point of time so as to take care of contingency, if any.

(b) Direct all the SLDCs of the Southern Region to monitor through the SCADA system at SLDC and also extend the data of AUFR and df/dt load relief identified feeders to SRLDC SCADA for continuous monitoring by SRLDC.

(c) Direct all the STUs/SLDCs of the Southern Region for strict compliance of Regulation 5.2 (n) and 5.4.2 (e) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulation, 2010 (hereinafter referred to as "the Grid Code") as amended vide its First Amendment Regulations 2012.

(d) Direct the SRPC Secretariat for strict implementation of AUFR and df/dt with effectiveness to the extent of declared load relief quantum in compliance of Regulation 5.2 (n) of the Grid Code.

(e) Pass such other order or directions as deemed fit in the circumstances of the case.

2. Gist of the submissions by the petitioner is as under:

(a) There was a major grid disturbance in Northern Region at 02.33 hrs on 30.7.2012. Subsequently, there was another grid disturbance at 13.00 hrs on 31.7.2012 resulting in collapse of Northern, Eastern and North-Eastern regional grids.

(b) The Enquiry Committee constituted by Ministry of Power to analyze the causes of these disturbances and to suggest measures to avoid recurrence of such disturbance in future had submitted its detailed report on 16.8.2012. The summary of recommendations given by the Committee also emphasis as follows:

> "Primary response from generators and operation of defense mechanisms, like Under Frequency & df/dt based load shedding and Special Protection Schemes, should be ensured in accordance with provisions of the grid code so that grid can be saved in case of contingencies. "

(c) That the quantum of relief required through AUFR and df/dt operation from each constituent's control area, during contingencies is reviewed and discussed time to time in the Protection Co-ordination Committee (PCC) meetings and Operation Co-ordination Committee (OCC) meetings of SRPC. The details of load relief at prescribed frequency settings as finalized and agreed in 70th OCC meeting of SRPC is tabled below:

Load connected for Relief in MW on AUFR operation in SR (till 31st October 2012)						
Description	**AP**	**KARNATAKA**	**KERALA**	**TAMIL NADU**	**PUDUCHERRY**	**SR**
Stage- I @ 48.8 Hz	866	534	240	842	18	2500
Stage-II@ 48.5 Hz	1206	703	127	1071	29	3136
Stage-III @ 48.2 Hz	1373	901	457	1207	34	3972
Total (Implemented)	3445	2138	824	3120	81	9608
Load connected Relief in MW on df/dt operation in SR (till 31st October 2012)						
	1767	593	175	559	0	3094

Load connected for Relief in MW on AUFR operation in SR (w.e.f 1.11.2012)						
Description	**AP**	**KARNATAKA**	**KERALA**	**TAMIL NADU**	**PUDUCHEERY**	**SR**
Stage- I @ 49.0 Hz	882	718	215	835	34	2684
Stage-II@ 48.8 Hz	1256	895	300	1036	36	3523
Stage-III @ 48.5 Hz	1424	732	342	1208	22	3728
Total (Implemented)	3562	2345	857	3079	92	9935
Load connected Relief in MW on df/dt operation in SR (w.e.f. 1.11.2012)						
	1767	901	175	559	0	3402

Description	**Setting up to 31st October 2012**	**Settings w.e.f 1st November 2012**
AUFR setting		
Stage-1:	48.8 Hz	49.0 Hz
Stage-2:	48.5 Hz	48.8 Hz
Stage-3:	48.2 Hz	48.6 Hz
df/dt setting		
Group-1:	49.3 Hz 0.3 Hz/sec fall of freq	49.9 Hz 0.2/sec
Group-2:	49.5 Hz 0.25 Hz/sec (Proposed in PCC and in principle agreed in emergency TCC)	49.9 Hz 0.1 Hz/sec

(d) All the constituents furnished the feeder-wise details of loads that are identified and connected with AUFR and df/dt relays in their control area in compliance of Regulation 5.4.2 (e) of the Grid Code matching the quantum agreed in the SRPC Board meeting held 1.6.2012.

(e) Though the SR constituents furnished the feeder-wise details, during the real time operation on the occasions of contingencies, the actual relief

realized was far below the declared quantum. During such instances, the SR system frequency excursion was at critical level.

(f) The matter is taken up in every Protection Co-ordination Committee (PCC) meetings and Operation Co-ordination Committee (OCC) meetings SRPC and all the constituents are asked to ensure availability of adequate relief as declared by them.

(g) In view of consistent under-performance of AUFR and df/df in the Southern Region, SRLDC began feeder-wise monitoring of the earmarked feeders through SCADA system on continuous basis with effect from 23.9.2012. If is observed that the flow on many such identified feeders is very much lower than the declared quantum of relief from the respective feeder. As a result, available load relief for safeguarding system security during contingencies through AUFR and df/df of each control area is about 20% - 50% of the declared quantum. The same has been reported to the secretariat of Southern Regional Power Committee (SRPC) periodically. The summary of observation is tabled below:-

Declared Load Relief Vs Actual Load observed during 23.9.2012 to 30.11.2012								
Control Area	**Declared Relief as per-Constituent**	**Declared Relief considering the Feeders which are available for Monitoring at SRLDC SCADA**	**Load flow in MW observed in the identified feeders for AUFR and df/dt**			**Actual load available for relief as % of declared load**		
			MAX	MIN	AVG	MAX	MIN	AVG
Andhra Pradesh	5129	3796	2053	662	1197	55	13	29
Karnataka	2531	2085	1314	69	948	63	3	43
Kerala	961	685	396	119	254	57	17	34

Tamil Nadu	3600	3150	1916	739	1234	54	21	38
Puducherry	90	52	54	6	30	107	7	52
Southern Region	12311	9769	4614	2209	3635	47	22	35
***The above details are as per the SCADA values for the feeders monitored at SRLDC**								

(h) The issue of non-availability of adequate loads in the identified feeders was regularly taken-up in the Operation Co-ordination Committee (OCC) meetings of SRPC as well as PCC and TCC meetings of SRPC. All the constituents were asked to identify further feeders giving realistic load available for relief through AUFR and df/dt for meeting the system contingencies.

(i) The Southern Regional Grid is being operated with many aspects that compromise the grid security, such as

(I) The defense mechanism like RGMO/FGMO is absent/insignificant in most of the major generating units.

(II) Over loading of critical transmission lines that may affect n-1 credible contingency in case of tripping of any transmission elements in the main stream.

(III) Large step change in the drawal schedule due to large change in quantum of buy/ sell in short term open access at the hour boundary/time block boundary.

(IV) Manual connection/disconnection of large block of load during load changeover, withdrawal of Hydro, etc. particularly at, the hour boundary.

(V) The time required for manual correction of demand side by the constituent is significantly high where as the power system contingent events occur in the order of milli seconds to seconds.

(j) Adding to the above, inadequate performance of, Safety-net. (i.e. AUFR and df/dt) with available load relief far below the declared load relief, highly endangers the grid security.

3. Respondents No.1 and 6 (APTRANSCO) vide affidavit dated 29.1.2013 replied to the petition and made following submissions:

(a) The petitioner has submitted that load relief realized on UF and df/dt load shedding schemes from constituents is far below the expected levels at 30% average of the declared relief for Southern Region considering the maximum expected load relief. This observation of petitioner was made when the Southern Region demand was around 25000 MW whereas defense mechanism is designed considering a maximum regional demand of 35000 MW.

(b) The Under Frequency (UF) and df/dt relays are periodically tested by APTRANSCO every six months and the healthiness of the relays is being ensured. Monthly reports on UF and df/dt relay operations and data related to load relief obtained, feeder details, time of interruption in the event of trippings, etc. are being communicated to SRPC regularly.

(c) The UF and df/dt relays existing in all the sub-stations were inspected by PGCIL engineers during September 2012 and are observed to be generally in order in APTRANSCO system.

(d) It is also relevant to submit that even as per SRLDC submissions that the system frequency has not fallen below 48.80 Hz (Stage-I UFR condition) when there was a loss of around 2200 MW due to grid disturbance in Karnataka on 3.4.2012.

(e) Earlier, during October, 2012, APTRANSCO clarified to SRPC and SRLDC that the actual relief was at 50% and not 30%, which is due to non-availability of RTU on some of the locations and could not be seen by SRLDC in SCADA. In the ULDC scheme, provision of SCADA was made for 220 kV sub-stations level only.

(f) Further, as the average load on feeders is likely to vary over 24 hours cycle of a day, in the event of a grid contingency, the relief from the defense mechanism will vary as per the time of occurrence of such a contingency. If all the relief is realized always, then also the defense mechanism will aggravate the frequency parameters as it results in consequential high frequency during low load conditions. Therefore, the conclusion of SRLDC that inadequate relief realized is compromising the grid security is not justifiable.

(g) APTRANSCO is taking all measures to ensure the healthiness and availability of AUFR and df/dt load shedding scheme on all the declared feeders, at any given time, for safe and secure grid operation.

(h) Most generating units are working on RGMO or FGMO except one unit of RTPP wherein RGMO would be made operational by 2013.

4. The petitioner vide its rejoinder affidavit dated 15.2.2013 has made the following submissions in response to the reply by APTRANSCO:

(a) APTRANSCO has mentioned that it considered maximum load relief on feeders while it has to consider the average value of the feeder load.

(b) APTRANSCO has mentioned that matching feeders were identified as and when the quantum is revised by SRPC. However, APTRANSCO does not periodically review the real value (Average Actual Flow) of load on each feeder and ensure availability of quantum matching with the declared value.

(c) The quantum of Load Relief required through AUFR and df/dt was arrived at by SRPC based on the average maximum demand value considered by SRPC while computing AUFR relief requirement was about 27000 MW and not 35000 MW as indicated by APTRANSCO. Thereby the detail indicated by APTRANSCO in this reply is not correct. However, it is further submitted that the maximum demand met by Southern Region was 30543 MW on 22nd January, 2013.

(d) It is not appropriate for APTRANSCO to justify their action (Violation of Regulation 5.2 (n) of the Grid Code) of maintaining lesser load relief than the declared quantum knowingly, just because the frequency has not fallen below 48.8Hz in the recent past.

(e) APTRANSCO has clarified and confirmed that the load available for relief was about 50% of the declared quantum only. This amounts to violation of Grid discipline.

(f) It is a known fact that the load in any feeder will vary continuously. However, the matter of concern is that at any point, the maximum load available for relief was not more than 50% of declared quantum as admitted by the respondent itself.

(g) In the case of RGMO response in the AP system, it is observed that there is significant deviation between actual response and the expected response. The RGMO responses of thermal units are almost insignificant. The RGMO response of Hydro units in AP system is also not to the desired level. All the constituents including APTRANSCO were requested for strict compliance of Regulation 5.2 (e) of the Grid Code in all the OCC and TCC meetings of SRPC. The same is submitted to the Commission through periodic report from NLDC.

(h) APTRANSCO is yet to implement the Automatic Demand Management Scheme. APTRANSCO names the remote tripping facility of feeders through manual intervention from APSLDC as Automatic Demand Management Scheme, which is not correct.

5. Respondent No. 7 viz. KPTCL made following submissions vide affidavit dated 29.1.2013:

(a) KPTCL has implemented 3 stage AUFR and df/dt for load relief scheme as per the Grid Code norms

(i)	At 49Hz	-	Load relief of 718 MW
(ii)	At 48.8Hz	-	Load relief of 895 MW
(iii)	At 48.6Hz	-	Load relief of 732MW

(b) Further, KPTCL has implemented df/dt relay settings at 49.3 Hz with 0.3 Hz per second drop of frequency to an extent of 901 MW at various 110kV and 66kV lines sub-stations in the State.

(c) All the above mentioned relays were checked and inspected by PGCIL and SRPC engineers from September, 2012 to December, 2013 and found to be in good working condition.

(d) SRLDC is stating that the load relief obtaining through UFR, df/dt relays is around 35-50% of the expected levels of the declared capacity by the Southern Regional Committee. However, the Southern Regional frequency has not fallen below 49 HZ and only on a few occasions, stage 1 UFR and df/dt relays have operated, and the system was brought to normalcy within few minutes.

(e) Automatic disconnection scheme: Automatic loads management scheme in accordance with Regulation 5.4.2 (d) of the Grid Code is implemented from July, 2012. This scheme provides immediate relief of 350 MW and in this scheme, identified 110kV and 66kV feeders will automatically be opened through remote operation from SLDC. The details of feeders are already furnished to SRLDC, SRPC and CERC.

(f) Further, KPTCL has fully implemented SCADA system in all generating stations, sub-stations, and feeders up to 11kV, also IPPS, NCE and solar units are covered under this scheme. Based on the above mentioned system, SCADA, SLDC is maintaining the grid on real time for smooth functioning of grid operation and is also monitoring the amount of load relief obtained during operation of UFR and df/dt relays.

(g) The details as directed by CERC in the format attached along with Record of Proceedings in Petition No. 221/MP/2012 will be furnished shortly after obtaining details from the field and relay testing groups.

(h) Till date, SLDC/KPTCL has not received any violation message for over drawal from the Central Grid for the past 4 years. SLDC/KPTCl is making every effort to ensure compliance with Regulations 5.2 (n) and 5.4.2 (e) of the Grid Code and is managing the load as per this Commission's direction.

6. The Respondent No. 8 viz. KSEB has made the following submissions vide affidavit dated 19.3.2013:

(a) As regards complying with Regulation 9 of the CEA (Grid Standard) Regulations, 2010 and Regulation 5.2 (n) of the Grid Code, KSEB has implemented the under frequency relay schemes and rate of change of frequency relay schemes long back and keeps on modifying the setting of these relays as per the plan made by the Southern Regional Power Committee (SRPC). Protection system mechanism such as Under Frequency (UF) relays and df/dt protection is always operational and in a healthy

condition as far as KSEB system is concerned. The status of AUFR relays and df/dt relays connected to various feeders in Kerala system as on 4.2.2013 has also been annexed to the submissions.

(b) Further, the settings are being revised by KSEB based on the plan made by the Southern Regional Power Committee meetings. AUFR settings in Kerala system were revised based on the recommendations of the 19th TCC and 20th SRPC meetings held on 27th and 28th of September, 2012. The revised settings which came into effect from 1.11.2012 are tabled below:

AUFR	Previous Settings	Revised Settings
Stage-1	48.8 Hz	49.0Hz
Stage-2	48.5Hz	48.8Hz
Stage-3	48.2Hz	48.6Hz

7. The Respondent No. 9 viz. TANTRANSCO has made following submissions vide affidavit dated 11.2.2013.

(a) TANTRANSCO has envisaged the following protection schemes as formulated by SRPC:

(i) Defence Mechanism

(ii) Regulatory measures scheme

(iii) Feeders connection for additional load shedding

(b) The details of the schemes which are also updating them as per study results to ensure present Grid condition are explained in the succeeding paragraphs:

(i) Defence Mechanism

I. Under Frequency Load shedding scheme

Load relief in this scheme is 3120, MW distributed in three stages

Group	Frequency Setting adopted from 01.11.2012	Quantum of Load Relief in MW
I	49.0 Hz/Instantaneous	842
II	48.8 Hz/Instantaneous	1071
III	48.6 Hz/Instantaneous	1207
Total		**3120**

However, currently the load shedding, Restriction and Control measures are in force throughout the State, hence the actual load on the feeders have been reduced and the present load relief in the UFR scheme is 2620 MW i.e. about 84% of originally envisaged load relief as listed below:

Group	Frequency Setting adopted from 01.11.2012	Quantum of Load Relief in MW
I	49.0 Hz/Instantaneous	591
II	48.8 Hz/Instantaneous	1024
III	48.6 Hz/Instantaneous	1005
Total		**2620**

In response to the petitioner's submission that the load relief realized on the UF and df/dt load shedding schemes from Tamil Nadu is far below the expected levels at 38% average of the declared relief considering the maximum expected load relief, TANTRANSCO has pointed out that Tamil Nadu with an acute shortage of 4000 MW and infirm wind generation of 4000 MW in the wind season, is maintaining the Grid discipline only by demand side management by carrying out load shedding throughout the

24 hrs in rotation. This has been attributed for the dynamic nature of the loads on the feeders identified for AUFR and df/dt. The realization of the declared quantum of relief at all times is impracticable. However, in the prescribed dates by the petitioner Tamil Nadu had imparted a relief of 275 to 446 MW during contingencies. Even during the Grid collapse in Northern Grid, on 31.07.12, it was ensured that all the feeders under the above scheme had tripped and safeguarded the Southern Region Grid along with other SR constituents.

The relays provided for these schemes are also being tested annually and load relief is being ensured as and when specified condition arises as said above.

The quantum of relief expected will be achievable only when the SR demand is about 35000 MW. But as such the SR demand has been restricted to 25000 MW due to load shedding and the quantum of load relief due to defense mechanism will also shrink according to the quantum of load shedding carried out in each constituent.

The actual fact as above has been already addressed to the ED/SRLDC vide letter dated 8.11.2012 enclosing the details of actual load along with the load restriction on 6.10.2012, in the identified feeders for UF inter trip for Stage I to Stage III. The sum of the existing load and the load shedding at that time is almost 90% to 100% of the actual relief to be obtained during UF relay actuation.

The inspection of UF relays was done by PGCIL and the remarks have been attended by TANTRANSCO and suitable corrective measures have been taken and communicated to SRPC.

Third-party Protection- audit was also carried out in the Southern Grid by the four member team constituted with officials of SRPC, PGCIL, Owner STL and other STL from October, 2012 to December, 2012 and steps are being taken to implement the recommendations made by the audit team.

II. df/dt scheme:

The Rate of fall of frequency Scheme f+df/dt is implemented at alarm: settings at 49.5 Hz Instantaneously with rate of fall of frequency 0.3 Hz/sec. with a trip at 49.3 Hz Instantaneously with rate of fall of frequency is 0.3 Hz/sec, and the load relief connected under this scheme is 617 MW. There was a proposal from SRLDC for a further load relief of 624 MW at 49.5 Hz + 0.2 Hz with an alarm setting at 49.8 Hz + 0.2 Hz. As per SRPC's direction additional load relief scheme is proposed for a quantum of 624 MW for the condition, Alarm: 49.8 Hz with rate of fall of frequency is 0.2 Hz/sec and to trip: at 49.5 Hz with rate of fall of frequency 0.2 Hz/sec. The additional load relief scheme will be done in about 4 months.

In the meanwhile, the matter has been discussed in the Protection Audit Core Committee, formed with members from all the constituents of

Southern Region and held at Bangalore on 31.8.2012. The Committee suggested setting for the scheme in two stages as Group I: 49.9 Hz with rate of fall of frequency is 0.2 Hz/sec. Group II: 49.9 Hz with rate of fall of frequency is 0.1 Hz/sec. This is yet to be concurred by higher level Committees of SRPC.

III. Islanding Schemes:

The Islanding schemes of Tamil Nadu Grid are proposed in three stages:

Stage-I

In the first stage, the scheme will be designed to isolate the Tamil Nadu Grid along with Pondicherry from rest of the Southern Grid at a frequency of 48.0 Hz/0.6sec.

Stage-II

In the second stage, the generating stations will be isolated into three groups with matching loads at a frequency setting of 47.8Hz/0.6 sec as below.

- ETPS-NCTPS stage 1 and 2 -Vallur-GMR-MAPS Block.
- Neyveli TSl-Neyveli TS2-STCMS-MTPS-Mettur Hydro-PP Nallur-Smalpatty-PUSHEP block.
- TTPS-Kundha-other Hydro units-GTS generation block.

Stage-III

In the third stage, the backup islanding of each generating station will be considered with minimum loads in the block and house load operation of units wherever possible at a frequency of 47.6 Hz/0.6sec. Even if the units on bar trips on mismatch, the units under house load can be brought to bars with minimum time of outage.

Backup islanding scheme for Metro area is implemented in Ennore Thermal Power Station (ETPS), North Chennai Thermal Power Station (NCTPS) and GMR independent Power Project.

IV. SPS schemes:

The SPS suggested by SRPC in Tamil Nadu, namely Talcher -Kolar and si - S2 bid area are in service.

In respect of Talcher-Kolar HVDC Inter-trip Scheme: Trip signal 1 and 2 designed for 2000 MW being evacuated from Talcher Stage-2 to Southern Grid through 400 kV Talcher - Kolar HVDC Poles I and II. Designated Load reliefs from Tamil Nadu for Trip signal 1 is 551 MW and for Trip signal 2 it is 167 MW. Logic has been developed by SRTS II, to simulate Trip signal 3 for enhanced power transfer from 2000 MW to 2500 MW through Talcher – Kolar HVDC link. Expected load- relief from Tamil Nadu is 144 MW. The scheme logic is being developed by SRTS II.

As per SRPC and SRLDC instructions, all necessary special protection schemes for inter-State line and ICT loading have been implemented by Tamil Nadu for the 400kV Soolagiri-Salem line.

Apart from all the above said protection schemes, Tamil Nadu has evolved certain additional load shedding schemes to provide relief to the Grid whenever there is dip in frequency by identifying interruptible loads to ensure Grid Security. The same has already been deliberated in order dated 7.12.2011 in Petition No. 208/SM/2011.

(ii) Regulatory Measures Scheme:

This scheme provides a load relief of about 657 MW. 110kV Radial feeders were identified and these feeders will be tripped by the over drawing constituent, through ULDC at connected SLDCs. This is done through SCADA by the Shift- in- Charge from SLDC as and when SRLDC issues instructions to prevent Grid collapse in Southern Regional Grid.

(iii) Feeders connected for additional load shedding:

110 kV feeders identified to issue load shedding for short duration up to 20 minutes, on rotation basis to improve the Southern Grid frequency under distress condition. Three groups of feeders with 3 sub-groups of 250 MW. Each sub-group to be tripped for 20 minute duration. All the feeders have been connected for tripping through ULDC at the concerned SLDC.

The present status of RGMO implementation in Generating units of Tamil Nadu is given below:

Sl. No.	Name of the Station	Current status of the RGMO
1.	Tuticorin Thermal Power Station	RGMO was implemented in Units IV and V (KWU units, 14.9.2011 and 14.11.2011 respectively. Units I,II,III operated on FGMO with Manual Intervention of RGMO
2.	North Chennai Thermal Power Station	RGMO was implemented in Units I,II and III (KWU units) 21.2.2012, 7.12.2011 and 12.9.2012, respectively
3.	Mettur Thermal Power Station	All the four LMW 210 MW units are operated on FGMO with Manual Intervention of RGMO.

Such all measures which are mandated for security of Grid is being regularly executed and audited by SRLDC in all Southern Region State Transmission utilities.

(c) The petitioner has submitted to extend the data of AUFR and df/dt load relief identified feeders to SRLDC through SCADA for continuous monitoring by SRLDC. The study on the feasibility of the scheme for providing data of load relief feeders at SLDC, and also at SRLDC will be made on the present communication facilities.

8. Based on the above, TANTRANSCO has urged that all the protection systems with defense mechanisms are in fully operational condition and monitored regularly. It has been contended that the protective systems are responding and acting accordingly to ensure protection to Grid during contingencies.

9. The Respondent No. 9, viz. SLDC, TANTRANSCO vide affidavit dated 8.4.2013 in response to Record of Proceedings dated 14.2.2013 has reiterated some of the submissions in the earlier affidavit and has also made the following fresh submissions:

(a) As insisted by SRLDC, TANTRANSCO has identified an additional quantum of load for each setting as below:

UFR Group	Declared Quantum in MW	Existing Load in MW	Additional Identified Load in MW	Total in MW
49.0 Hz	842	606	246	852
48.8 Hz	1071	1049	77	1126
48.6 Hz	1207	970	234	1204
Total	**3120**	**2625**	**557**	**3184**

(b) Annexing the list of feeders identified for the same, TANTRANSCO has clarified that only the average quantum of load has been taken in above identified feeders.

(c) In addition to the above 'f+df/dt' load relief scheme, a quantum of 617 MW is already available. Additional load relief for a quantum of 624 MW has been identified and to be implemented as the setting for df/dt has been recently concurred by Protection Co-ordination Sub-committee of SRPC.

(d) The feeders for the relief of Talcher - Kolar Inter Trip signal III has already been identified for 144 MW communicated to SRLDC.

10. During the hearing dated 14.2.2013, the Commission directed that the issue shall be discussed at the RPC level meeting to decode the quantum of load which shall be increased to give desired result in a time bound manner. The Commission

also directed SRLDC to submit a quarterly report regarding progress of increase in quantum of relief.

11. Further, during the hearing dated 9.4.2013 representative of SRLDC submitted as under:

(a) SR Constituents have initiated action in response to Record of Proceedings dated 14.2.2013.

(b) In the Protection Committee meeting of SRPC, all SR constituents agreed and confirmed the quantum finalized by SRPC as appropriate.

(c) Andhra Pradesh and Tamil Nadu have agreed to consider feeder-wise average load for their declaration. They have identified additional feeders, wherein suitable relays are yet to be installed. However, both these States have to furnish the updated list of feeders with revised quantities. Action plan for bridging the gap of balance quantity in a time bound manner.

(d) KPTCL has identified additional feeders, but is yet to confirm the declaration considering minimum/ average load of respective feeders as well as furnish the updated list with revised quantum on each feeder. KSEB monitors for maximum and average value of load available in the identified feeders. However, the declaration is still based on maximum value and it results in 40%- 60% of availability of loads. Particularly, in the case of Kerala, the difference between maximum and minimum load as well as minimum load duration is significantly high. Therefore, it may be appropriate to consider minimum load available for relief from such feeders.

12. In addition to important grid security measures like df/dt & UFR, petitioner also requested compliance of other provisions of the Grid Code like avoiding large quantum of change in generation and load at hour boundaries.

13. We have heard the parties and perused the pleadings. We are in agreement with the petitioner that there is a need to review and estimate the actual load on the feeders and the constituents should consider average load in the feeders for computation of target relief on identified feeders. As sufficient load relief has not been achieved, the respondents are directed to identify more feeders for installation of UFR and df/dt relays and submit the details to SRPC.

14. We would like to emphasize that no complacency shall be accepted for ensuring safety and security of the Grid. Also according to Enquiry Committee constituted by the Ministry of Power, the response from generators and operation of defense mechanism like Under Frequency and df/dt based load shedding and special protection schemes should be ensured in accordance with provisions of the Grid Code so that Grid can be saved in case of contingencies. Further, as the SR Grid is going to be integrated with NEW Grid, urgent action by the respondents is all the more essential.

15. In this connection, Regulation 5.2 (n) and 5.4.2 (e) of the Grid Code is reproduced below for ease of reference:

> 5.2 (n) "All SEBS, distribution licensees / STUs shall provide automatic under-frequency and df/dt relays for load shedding in their respective systems, to arrest frequency decline that could result in a collapse/disintegration of the grid, as per the plan separately finalized by the concerned RPC and shall ensure its effective application to prevent cascade tripping of generating units in case of any contingency. All , SEBs, distribution licensees, CTU STUs and SLDCs shall ensure that the above under-frequency and df/dt load shedding/islanding schemes are

always functional. RLDC shall inform RPC Secretariat about instances when the desired load relief is not obtained through these relays in real time operation. The provisions regarding under frequency and df/dt relays of relevant CEA Regulations shall be complied with. SLDC shall furnish monthly report of UFR and df/dt relay operation in their respective system to the respective RPC.

RPC Secretariat shall carry out periodic inspection of the under frequency relays and maintain proper records of the inspection. RPC shall decide and intimate the action required by SEB, distribution licensee and STUs to get required load relief from Under Frequency and df/dt relays. All SEB, distribution licensee and STUs shall abide by these decisions. RLDC shall keep a comparative record of expected load relief and actual load relief obtained in Real time system operation. A monthly report on expected load relief vis-a-vis actual load relief shall be sent to the RPC and the CERC."

5.4.2 (e) "order to maintain the frequency within the stipulated band and maintaining the network security, the interruptible loads shall be arranged in four groups of loads, for scheduled power cuts/load shedding, loads for unscheduled load shedding, loads to be shed through under frequency relays/ df/dt relays and loads to be shed under any System Protection Scheme identified at the RPC level. These loads shall be grouped in such a manner, that there is no overlapping between different Groups of loads. In case of certain contingencies and/or threat to system security, the RLDC may direct any SLDC/ SEB/distribution licensee or bulk consumer connected to the ISTS to decrease drawal of its control area by a certain quantum. Such directions shall immediately be acted upon. SLDC shall send compliance report immediately after compliance of these directions to RLDC."

16. The matter of increasing AUFR relief and implementation of df/dt settings have been discussed at various Forums of SRPC. In the special TCC meeting held on 21.8.2013 the State-wise quantum of relief was firmed-up as in table below and was decided to be implemented by all constituents by 15.10.2013:

Constituent	**Frequency Setting for Trip (in Hz)**			
	49.2	**49.0**	**48.8**	**48.6**
Andhra Pradesh	809 MW	812 MW	822 MW	825 MW
Karnataka	576 MW	578 MW	586 MW	588 MW
Kerala	204 MW	205 MW	208 MW	209 MW
Tamil-Nadu	740 MW	744 MW	753 MW	756 MW
Puducherry	21 MW	21 MW	21 MW	22 MW
Total	**2350 MW**	**2360 MW**	**2390 MW**	**2400**

17. All SR constituents are directed to identify the additional feeders and install UFR, df/dt relays to ensure the relief as decided by SRPC from time to time. We direct all constituents to submit compliance report duly certified by SRLDC and SRPC of implementation of quantum of relief by AUFR as per table above and proper functioning of df/dt relays within one month of issuing this order. We also make it clear that failure in this regard will amount to non-compliance of the directions of this Commission and render the constituent liable for proceedings under Section 142 of the Electricity Act, 2003 and other relevant provisions, against the Heads of defaulting entities.

18. Further for monitoring of operation and relief by these UFR and df/dt relays SLDCs are directed to map these relays on the SCADA system within three months of issuance of this order. SRPC/SRLDC shall submit a compliance report in this regard within four months of issuing this order.

19. We direct SRLDC and SRPC to coordinate and monitor the progress and compliance of Commission's directions and ensure compliance of Regulations 5.2 (n) and 5.4.2 (e) of the Grid Code and report instances of non-compliance.

20. With this, Petition No. 263/MP/2012 stands disposed of.

Sd/-
(M. Deena Dayalan)
Member

sd/-
(V. S. Verma)
Member