

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 264/MP/2012**

**Coram:**

**Shri V.S. Verma, Member**

**Shri M.Deena Dayalan, Member**

**Date of Hearing: 7.3.2013**

**Date of order: 3.1.2014**

**In the matter of**

Maintaining security of the interconnected Power System of India in terms of Regulation 5.2 of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 and compliance of Regulation 6.4.8 of the IEGC read along with Regulation 111 of the CERC (Conduct of Business) Regulation 1999.

**And**

**In the matter of**

Western Regional Load Dispatch Centre,  
F-3, M.I.D.C Andheri (East)  
Mumbai- 400093

.... **Petitioner**

**Vs.**

1. Maharashtra State Electricity Transmission Co. Ltd.,  
Thane- Belapur road,  
P.O. Airoli, Navi Mumbai-400093
2. Gujarat Urja Vikas Nigam Ltd,  
Sardar Patel, Vidyut Bhawan,  
Race Course Road, Vadodra- 390007.
3. MP Power Transmission Company Ltd,  
Nayagaon, Rampur, Jabalpur-982008
4. Chhattisgarh State Power Transmission Co. Ltd.,  
Danganiya, Raipur, Chhattisgarh-492013
5. Goa Electricity Department,  
Vidyut Bhawan, Panaji, near Mandvi Hotel,



Goa- 403001.

6. Electricity Department, Dadra Nagar Haveli,  
U.T. Silvassa-396230

7. Electricity Department, Daman and Diu,  
Daman- 396210

.....**Respondents**

1. Western Regional Power Committee, Mumbai
2. Executive Director (WRTS-1), Power Grid Corporation of India Ltd
3. Executive Director (WRTS-2), Power Grid Corporation of India Ltd

.... **Proforma Respondents**

**The following were present:**

Shri N Nallarasan, NLDC, POSOCO  
Ms. Jyoti Prasad, POSOCO  
Shri P Pentayya, WRLDC  
Shri Naresh Kumar, NRPC  
Shri Antim Jain, MPPKVVCL  
Shri K.K. Parbhakar, SLDC, MPPTCL  
Shri Vikas Sharma, J&K PDD  
Shri Sanjay Bhagwat Kr.,

**ORDER**

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

"(a) Direct all the STUs/SLDCs of the Western Region to forecast their demand and make adequate arrangements to avoid dependence on Unscheduled Interchange for meeting their demand or for injecting short term surplus power, irrespective of the frequency.

(b) Direct all the STUs/SLDCs of the Western Region to implement automatic demand disconnection scheme as mandated in the regulation 5.4.2 (d) of the IEGC and submit the details of the same to CERC/RPCs/RLDCs.

(c) Direct all the STUs/SLDCs/Regional Entities of the "Western Region to comply with Regulation 5.2 (j) of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (hereinafter Grid Code).



(d) Direct all the STU/SLDCs of the Western Region to give their inputs to implement the Grid Security Expert System and direct the WRPC secretariat should actively associate themselves in getting these schemes implemented in terms of NLDC letter ref. POSOCO/NLDC dated 11<sup>th</sup> September 2012 to Member (GO&D), CEA.

(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) The petitioner, Western Regional Load Despatch Centre (WRLDC) is constituted under Section 27 (1) of the Electricity Act, 2003 as an apex body to ensure integrated operation of the power system, in the Western Region. By virtue of Government of India Notification dated 27<sup>th</sup> September, 2010 POSOCO is operating WRLDC w.e.f. 1.10.2010.

(b) The CEA manual on transmission planning criteria defines rare contingencies as temporary removal of complete generating station or complete substation (including all the incoming and outgoing feeders and transformers) from service, HVDC bi-pole and stuck breaker condition. The interconnected system would be able to withstand such rare contingencies only if there is adequate redundancy in the system, the automatic controls (primary response and PSS in generating units, controllers in FACTS devices etc.) are available, the safety net (UFR, UV-LS, df/dt, SPS) is adequate/robust and the manual action by the operators is fast and effective.



(c) There are large fluctuations in the grid parameters such as frequency, voltage and line loadings on account of large changes in the scheduled and actual drawal (>100 MW) by the State Utilities at the hour boundary attributable to the following reasons:

- (i) Manual connection/disconnection of large block of load at the hour boundary.
- (ii) 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.

(d) The Enquiry Committee set up by Ministry of Power to investigate the above grid disturbances had observed that inadequate response by the SLDCs to control Unscheduled Interchange was one of the contributing factors for the grid disturbance in July, 2012. The report of the Committee had also stated that the primary response from the generating units and the actual relief through the under frequency/rate of change of frequency based load shedding was inadequate during both the grid disturbances. Thus the grid is vulnerable to failures due to large fluctuation in grid parameters on account of rare contingencies or large fluctuation in drawal coupled with absence of automatic controls and adequate protective system safety net in the grid.

(e) Regulation 5.4.2 (b) of the Grid Code mandates that the SLDC/SEB/distribution licensee and bulk consumer shall ensure that



requisite load shedding is carried out in its control area so that there is no over-drawal when frequency is 49.7 Hz or below. It has been observed that the over-drawal by certain regional entities is very large when the frequency is between 49.8 - 50.2 Hz. Under these conditions, if there is a contingency (such as loss of generating units), the system frequency would rapidly fall to insecure level in the absence of automatic control actions. Thus, in the absence of automatic controls on generation/ load, the grid would be vulnerable till the time adequate corrective actions are taken by the regional entities.

(f) Regulation 5.4.2 (a) and 6.4.7 of the Grid Code mandate that the SLDC/SEB/distribution licensee and bulk consumer shall initiate action to restrict the drawal of its control area, from the grid, within the net drawal schedule whenever the system frequency falls to 49.8 Hz. At times, the utilities wait for the system frequency to deteriorate below 49.8 Hz before initiating any manual corrective actions. Thus, the efforts to restore the system to secure zone often get delayed because the overdrawing utilities express difficulty in instant regulation of their drawal. Under such circumstances the petitioner is left with no alternative but to take regulatory steps to disconnect EHV feeders from the inter-state level !In a meshed system where an entity has a multiple drawal points, such physical disconnection of few feeders at the interstate level has only a limited effect in reducing the drawal.

Moreover such disconnections at the EHV level may disrupt the power supply of vital installations/priority load such as traction, hospital etc.

(g) Regulation 6.4.6 of the Grid Code mandates that the deviations from the drawal schedules by regional entities shall be within the limits specified by the Commission on UI regulations and shall not cause system parameters to deteriorate beyond permissible limits and shall not lead to unacceptable line loading. Such security constrains are already listed by WRLDC and also discussed with the regional entities in various meetings.

(h) Further, Regulation 5.4.1 of the Grid Code also mandates the concerned SLDC's to effect reduction of demand in the event of insufficient generation/inadequate transfers from external interconnections/Breakdown of transmission lines / congestion in Intra-State/Inter-State transmission system. Besides, the concerned regional entities are to regulate their demand / over-drawal beyond the limits as mentioned in the UI Regulations of the Commission.

(i) Regulation 5.4.2(d) of the Grid Code also stipulates that respective States/SLDCs shall formulate and implement state of the art Demand Management Schemes for their systems. Hence, it is Imperative that the respective SLDCs implement the above.

(j) Further, Regulation 6.4.8 of the Grid Code mandates that the SLDCs/STUs/Distribution Licensees shall regularly carry out necessary



exercises regarding short-term demand estimation for their respective States/area, to enable them to plan in advance as to how they would meet their consumers' load without overdrawing from the grid. In view of the above, the petitioner has been urging the respondents to make adequate arrangements from the organized market and avoid reliance on Unscheduled Interchange to meet their consumer load or to inject their surplus power irrespective of the frequency. Restriction of drawal/injection close to the schedule is required to avoid the grid from exposure to insecure operation arising from the considerable time taken by the regional entities to reduce the large Unscheduled Interchanges (under-drawal / over-drawal) when called for to arrest the fast deterioration in grid parameters in the event of grid contingencies.

(k) In view of the circumstances elaborated above, the petitioner has been taking the following actions in the interest of grid security:

(i) Directing the regional entities to maintain their drawal/injection as per the schedule even when the grid frequency is within the band of 49.8-50.2 Hz.

(ii) Issuing verbal/written messages and SMS to the concerned authorities for suitable, intervention in maintaining grid discipline and/or taking corrective actions during contingencies.

(iii) Issuing Message-A, Message-B and Message-C for persistent and large quantum of Unscheduled Interchange from the grid.



(iv) Carrying out suo-motu revisions in the schedule under perceived threat to grid security.

(v) Physical disconnection of EHV feeders in case of persistent overdrawal/indiscipline or delay in response from the utilities.

(1) Apart from the above, the petitioner has taken following actions in its efforts to ensure security of the interconnected system:

(i) Close supervision and vigil of the system parameters.

(ii) Taken up with the STU/CTU for improving the availability of real-time data at the RLDC/SLDC.

(iii) Taken up with the RPC for improving the coordination of planned transmission/generation outage.

(iv) Taken up with CTU/STU for strengthening the protection system and implementation of SPS for certain foreseen contingencies.

(v) Taken up with the CTU for enabling the Power Oscillation Damping controllers in FACTS devices such as SVC, TCSC and HVDC.

(vi) Taken up with the generating units for tuning PSS/AVR and primary response.



- (vii) Computing and archiving the Frequency Response Characteristics of each control area for large changes in grid frequency.
  - (viii) Exploring the possibility of field testing of Governor/PSS.
  - (ix) To control over voltages by maximizing reactive power absorption so that opening of lines can be avoided.
  - (x) Taken up an exercise to assess the transfer capability for each State control area.
  - (xi) Computed the operating limits for all EHV lines in consultation with the CEA/CTU.
  - (xii) Submission of report on the list of feeders for automatic demand disconnection.
- (m) CTU has prepared a draft proposal for "Grid Security Expert System" (GSES) to CEA. The GSES envisages the following:
- (i) Remote demand disconnection from the SLDC/RLDC.
  - (ii) Real-time assessment of the quantum of load relief available through safety net.
  - (iii) Supervision of healthiness of the safety net (UFRLS, UVLS. df/dt LS) from remote locations.

(iv) The GSES cut down the response time during emergencies. It would also enable the grid operators to assess the Security margins required to be maintained in the system. NLDC has given its technical inputs vide its letter ref POSOCO/NLDC dated 11<sup>th</sup> September 2012 to Member (GO &D), CEA. Inputs which are vital for finalizing the scheme and implementing it quickly, have been sought from the State utilities and RPCs on the following aspects:

- Identification of feeders for the automatic demand disconnection
- Updated list of feeders installed with under frequency/under voltage, df/dt relays.

3. SLDC, Gujarat vide affidavit dated 5.2.2013 has submitted the following in response to Commission's order dated 14.1.2013 as under:

(a) Installed capacity of Gujarat State as on 31.12.2012 is as under:

(Figures in MW)

State Sector	Private Sector	Central Sector	Wind Farm	Solar	Biomass	Total Gujarat
4995.57	6824.50	4742.75	3006.33	809.40	31.20	20409.75

(b) Following six Distribution Companies are supplying power to the consumers in the State:

- (i) Paschim Gujarat Vij Company Limited (hereinafter referred as 'PGVCL')

- (ii) Uttar Gujarat Vij Company Limited (hereinafter referred as 'UGVCL')
- (iii) Madhya Gujarat Vij Company Limited (hereinafter referred as 'MGVCL')
- (iv) Dakshin Gujarat Vij Company Limited (hereinafter referred as 'DGVCL')
- (v) Torrent Power Limited-Ahmadabad (hereinafter referred as 'TPAEC')
- (vi) Torrent Power Limited-Surat (hereinafter referred as 'TPSEC')

(c) Out of above Distribution Companies, the first four are carved out from the erstwhile Gujarat Electricity Board and looking after Distribution of Electricity in the Gujarat State. TPAEC and TPSEC are private Distribution Companies looking after distribution of electricity in Ahmedabad and Surat cities, respectively.

(d) Actual maximum demand established during last five years is given hereunder:

S No.	Name of Company	Actual Maximum Demand in MW				
		Year-2008	Year-2009	Year-2010	Year-2011	Year-2012
1	PGVCL	2998	3316	3323	3745	4152
2	UGVCL	2196	2299	2567	2410	2820
3	MGVCL	970	982	1305	1412	1423
4	DGVCL	1400	1599	1741	1773	1974
5	TPAEC	942 (2008-09)	1003 (2009-10)	1112 (2010-11)	1272 (2011-12)	1300 (2012-13)
6	TPSEC	503 (2008-09)	530 (2009-10)	566 (2010-11)	557 (2011-12)	572 (2012-13)

(e) Power Purchase Allocation is made by Gujarat Urja Vikas Nigam Limited (GUVNL) and Torrent Power Limited (TPL). Looking to the growing demand of the Distribution Companies, GUVNL has revised the PPA allocation. Current year allocation details for DISCOMs are as under:

<b>S No.</b>	<b>Name of Company</b>	<b>Present PPA allocation in MW</b>
1	PGVCL	5893
2	UGVCL	4570
3	MGVCL	2693
4	DGVCL	4976
5	TPAEC	1335
6	TPSEC	

(f) Each DISCOM has its own load management unit/load control center. They are empowered to regulate their demand as per availability. All DISCOMs are forecasting their demand on day ahead basis and submitting to SLDC, which also carries out demand estimation on daily basis, monthly basis and yearly basis. To maintain adequate availability to meet peak demand of the State all through the year, SLDC is finalizing annual unit outage planning for State Generating Stations keeping adequate margin for forced outages. SLDC is exercising supervision on all DISCOMs drawal and taking adequate corrective measures so that DISCOMs adhere strictly to their drawal schedule to avoid dependence on Unscheduled Interchange for meeting their demand irrespective of the frequency.

(g) As regards the efforts that have been made to comply with Regulation 5.4.2 of the Grid Code, in regard to Automatic Demand

Management Schemes (ADMS), SLDC, Gujarat has taken up the matter with all DISCOMs. A meeting with higher level officials of all DISCOMs was called on 2.2.2012 to discuss about implementation of ADMS by DISCOMs. It was explained and emphasized that such automated management shall bring grid discipline, curtail overdrawal during low frequency conditions, improve financial health of DISCOMs, but it has to be judicious with planning, proper load management and above all with public awareness, so that implementation is successful. On 24.3.2012, 1<sup>st</sup> Operation Co-ordination meeting was held with all generators and DISCOMs wherein detailed discussions were held on ADMS.

(h) In the meeting, SLDC informed that the real time schedule/drawal data of each DISCOM is already available on SLDC website with update time of 2 minutes and the same can be utilized by DISCOMs to devise the necessary logic for ADMS. It was also made very clear that the under frequency relays and df/dt relays are meant for system safety and security only and not for routine operation like load management. In the meeting, the representatives from TPAEC and TPSEC stated that they have identified the feeders category wise for implementation of ADMS. On 20.08.2012, 2<sup>nd</sup> State Operation Co-ordination meeting was held with all generators and DISCOMs to discuss various issues related to grid operation. Detailed discussions on implementation of ADMS were held in the meeting. SLDC enquired on the latest update and course of action by all DISCOMs for

implementation of ADMS. It was observed that all DISCOMs are yet to make significant progress in the matter so far.

(i) As regards Regulation 5.2 (j) of the Grid Code, there are more than 170 Nos. of users in the State, participating in Short Term Open Access. The Change in their injection/ drawal schedule directly affects Gujarat drawal schedule. The collective actions of all Users/SLDC to adhere to their schedule are causing variation of more than 100 MW at Gujarat notional periphery.

(j) Only one user, viz. Essar Steel Limited causes sudden variation in its load by more than 100 MW, because it has variable steel furnace and rolling mills load. Whole plant is based on DC-Electric arc furnaces (4 Nos.) and AC-arc furnaces (2 Nos.). Each furnace is having load profile of 0 to 100 MW based on melting stage. For refining stage, they have 10 Nos. furnaces of load profile 0 to 25 MW. For finishing the steel products, there are 2 Nos. rolling mills having load variation of 10 to 70 MW. So, during entire process, there is a load variation of 100-125 MW with grid.

(k) Cumulative effect of the fluctuating Renewable Energy generation, fluctuating load of steel industries and collective action of all Users to adhere to their schedule, causes deviation of around 100-150 MW.

(l) SLDC, Gujarat received SCADA system from PGCIL under Unified Load Despatch and Communication (ULDC) Scheme. Therefore, PGCIL is requested to apprise the SLDC regarding the proposal submitted to CEA for Grid Security Expert System (GSES) and also the details of inputs that they may require for implementation of the same.

4. Uttar Gujarat Vij Company Limited (UGVCL) and Paschim Gujarat vij Company Limited (PGVCL) have submitted similarly worded affidavits dated 13.2.2013. Gist of their submissions in response to Commission's order 14.1.2013 is as under:

(a) UGVCL and PGVCL are engaged in the business of distribution of electricity, it is mandated for them to follow the instructions passed through State SLDC.

(b) During the meeting of State Operation Co-ordination Committee, the State Load Despatch Centre (SLDC) had directed all the Discoms to implement the '*Automatic Demand Disconnection Scheme*' for ensuring grid security.

(c) Accordingly, UGVCL and PGVCL have worked out the Automatic Demand Disconnection scheme by way of identifying and prioritizing the loads to be disconnected on rotational basis at the time of overdrawal during low frequency beyond specified limit.

(d) Priority for disconnection at the time of overdrawal during low frequency beyond specified limit has been worked out. In case of UGVCL and PGVCL, most of 11/22kV feeders emanate from 66 kV sub-stations. Therefore, for the purpose of Demand Disconnection in case of exigency and to get immediate load relief, UGVCL has divided all 66kV Sub-Stations falling under the distribution licensee area of UGVCL/supplying power to UGVCL in four groups as under:

- Group-1 and group 2: (Low Priority): Supplying power to Agriculture consumers, Jyotigram consumers (House Hold Consumers) and other "non-industrial consumers".
- Group-3: (Intermittent priority): Supplying Power Supply to Industrial areas/zones.
- Group-4: (High Priority): Supplying power supply to "Civil Hospital", "Railway", etc.

Therefore, the first priority for Disconnection of load has been assigned to sub-stations falling under "Group 1 and Group 2", followed by Group 3 if required and so on. It is also considered that "Disconnection" shall be operative in rotational manner. Further, UGVCL has also fixed and notified the days for observing the non compulsory "Staggered Holiday" for each Districts of the state. Therefore, in case of exigency, "Demand Disconnection" for the given





day can be exercised in this district observing non compulsory "Staggered Holiday" without prior information to these consumers. Priority of disconnection shall be set according to the day of "Staggered Holiday". The above action of prioritized disconnection itself will be sufficient to relieve the load for meeting exigency.

(e) Further, for the purpose of Automatic Demand Disconnection, a scheme has been conceptualized for implementing the "Advance Metering Infrastructure" using "Smart Meter Technology" along with "Tripping Mechanism" to be installed at "66 KV Sub-Station" Level. The "Smart Meters" are capable of "Two Way Communication" compatible to GPRS, RF, Zigbee, Programmable Logic Controller (PLC) etc. mode of Communication.

- Under this scheme, Master Control Station can be set up at the location of Area Load Dispatch Centre (ALDC) communicating through PLC based system. The drawal of the company vis-à-vis Grid frequency and other related parameters will also be monitored. In case of exigency, trip signal (linked to the frequency) can be sent to the "Smart Meters: installed at respective 66 KV Sub-Station(s). On receipt of signal from the Master Control Station, the Smart meter shall communicate to "Tripping Mechanism" for Disconnection. On account of Smart Meters installed at 66 KV sub-station, the "Real Time" Demand

of respective sub-station and thereby the load that will be relieved on account of tripping will be known in advance, at Master Control Room so that further quantum of Demand to be disconnected can also be decided.

- However, detailed techno-commercial study is required for effective implementation of the scheme. Further, consultation with SLDC and STU viz. GETCO and their concurrence are necessary for implementation of the scheme.

(f) Further, a contingency scheme has been prepared in compliance of the directive issued by CERC in the past and the same is already in place to meet the event of exigency arising in respect of the function of load dispatching of distribution licensee. The exigency in the nature of demand/supply deficit may occur either due to increase in load from demand side or reduction in supply from generator end due to forced/planned shutdown of generation stations/transmission constrains. Under the scheme, UGVCL as a "grid user" has planned to mitigate the exigency arising on account of significant deficit scenario by way of supply and demand side management as under:

- (i) **Supply Side Management:** The actual maximum Demand established during last five years is given here under:

UTTAR GUJARAT VCL		PASCHIM GUJARAT VCL	
Year	Maximum Demand (MW)	Year	Maximum Demand (MW)
2008	2196	2008	2998
2009	2571	2009	3316

2010	2567	2010	3323
2011	2412	2011	3745
2012	2891	2012	4152

Allocation of power to the company from the existing Power Purchase Agreement is made by Gujarat Urja Vikas Nigam Limited (GUVNL), a holding company. Further, GUVNL is reviewing the allocation of power from time to time taking into consideration the demand and supply scenario. Looking at the growing demand of both UGVCL and PGVCL, GUVNL has revised the PPA allocation to UGVCL and PGCVL.

(ii) **Demand Side Management:** Area Load Dispatch Centre (ALDC) under the UGVCL has been operating at Gandhinagar. Area Load Dispatch Centre (ALDC) under the PGVCL has been operating at Jetpur, district Rajkot. At ALDC, SCADA based real time data display system is in place, thereby, the real time generation data and drawal by the company along with current frequency level, applicable UI rate, and corresponding implemented schedule of Company etc are displayed on monitor. If the Grid frequency so demands both the companies have their load curtailment priority, briefly described here under.

- **Agricultural Category:** Entire load of the agricultural category has been segregated from the non-agriculture load. Time schedule to each group is fixed in such a way that almost same demand is maintained throughout the

supply schedule. Maximum demand established during the year 2012 to this category was 1970 MW for UGVCL and 2200 MW for PGCVL. In the event when system condition so warrants, company has empowered system operator to resort to load curtailment of agriculture category.

- **Jyotigram Yojana (JGY) and Urban Category:** As stated herein above, load of rural category consumers have been segregated, through Jyoti Gram Yojana (JGY) into agriculture and non-agriculture category. In case of exigency, load of these categories of feeders can be shed on rotation basis.
- **Industrial Load:** UGVCL and PGCVL are having actual maximum demand of this category to the extent of 750 MW and 1050 MW respectively. District-wise staggered holiday is fixed for industrial category consumers. However, if situation so warrants, the companies have planned for imposing compulsory holiday for the Industrial category consumer and an additional staggered holiday is also imposed if system condition warrants so.
- **Additional Measures for immediate relief:** The DISCOMs have identified the feeders having high distribution loss from all the categories i.e. Urban, JGY,

Industrial and Agriculture dominant. In case of exigency and for getting immediate relief, load of such identified feeders can be curtailed for the time being.

5. Torrent Power Limited in affidavit dated 6.2.2013 has submitted the following in response to Commission's order dated 14.1.2013:

(a) As a company engaged in the business of distribution of electricity, TPL is mandated to follow the instructions issued by the State Load Despatch Centre (SLDC).

(b) During the Gujarat State Operation Co-ordination Committee Meetings, the State Load Despatch Centre (SLDC) had directed all the Discoms to implement the 'Automatic Demand Disconnection Scheme'.

(c) Accordingly, TPL has prioritized the loads within both the Ahmedabad and Surat licensee areas in order to identify the load which is required to be disconnected on rotational basis at the time of over drawal during low frequency.

(d) Further, TPL has initiated the process of preparing specification for inviting offers for supply of required Programmable Logic Controller (PLC) for both Ahmedabad and Surat supply areas and requisite provision in the budget has been made. The PLC will be dovetailed with the existing SCADA (Supervisory Control and Data Acquisition) based load monitoring and control system to enable the licensee to



implement automatic demand management system as per the following schedule:

- (i) Finalization of specification and tendering –End of February 2013.
- (ii) Receipt of offers and Purchase order placement –April 2013.
- (iii) Supply of required PLC hardware-July 2013.
- (iv) Engineering and programming of PLC logic scheme-September 2013.
- (v) Testing and Commissioning –October 2013.

(e) Further, TPL's commitment to comply with the Regulation 5.2 (j) of the Grid Code is confirmed.

6. Maharashtra State Electricity Distribution Company Limited (MSEDCL) in its affidavit dated 22.3.2013 has submitted the following in response to Commission's order dated 14.1.2013:

(a) Fluctuations in the Grid Parameters: UI Regulations and the Grid Code allow overdrawal within prescribed limits in normal situations and therefore, the mechanism of overdrawal within the prescribed limits may be allowed. However, Utilities should also maintain discipline and avoid over-drawal to the extent possible.

(b) With reference to Regulation 5.2 (j) of the Grid Code and prayer clause (c) of the petition, MSEDCL has submitted that the change in



drawal by the State utilities must not cause sudden variation in load by not more than one Hundred MW (100 MW) without prior notice to or consent of RLDC as per the limit prescribed under the Grid Code. Distribution Companies should strictly comply with the provisions of the Grid Code and instructions of SLDC and maintain grid discipline. In case of non-compliance, SLDCs should take necessary action from the point of view of grid security and in accordance with the provisions of the Electricity Act, 2003 and the Grid Code including disconnection of feeders, if necessary. In order to maintain discipline and to prevent any damage to costly equipment, reduction in output by more than one hundred (100 MW) should not be allowed without prior approval of WRLDC except under an emergency.

(c) **Handling of Contingencies, overloads and Huge Variations from Schedules:** MSEDCL supports WRLDC's view of requirement of faster response due to lack of automation. However, all State Utilities are not fully equipped with the modern automation. Before putting any automation system in place, all the technical and system constraints need to be addressed through appropriate technology. The automated system needs to be Advance Software based, thereby giving automatic load relief and performing other functions as and when required. However, since such advanced automated system involve capital, such proposals need to be discussed at the appropriate forums such as WRPC, WRLDC meetings with constituents of the Region and

comments, suggestions and recommendations from the constituents must be taken before placing such system in operation.

(d) In regard to Regulation 5.4.2 (b) of the Grid Code, the Utilities should avoid over-drawal during low frequency (49.7 Hz or below) and confine to the limits prescribed in UI Regulations and the Grid Code under normal situations. State Utilities should maintain self discipline by restricting their over-drawal from the grid to facilitate maintaining the grid frequency within desired range.

(e) Further, SLDCs should disconnect the feeders, if it is strictly required to do so. SLDCs need to be suitably prepared to disconnect the feeders in the State networks in the event of over-drawal to ensure grid security.

(f) As regards Regulation 6.4.8 of the Grid Code, MSEDCL has supported the petitioner's submission that SLDCs /STUs/Distribution Licensees shall plan for short-term arrangements and should decide in advance about how the consumers load will be met without overdrawing from the grid.

7. Gist of the reply on behalf of MP Poorv Kshetra Vidyut Vitran Co. Ltd (MPPKVVCL) under its affidavit dated 7.3.2013, submitted in response to Commission's order dated 14.1.2013 is as under:

(a) **Forecasting of demand and arrangement to avoid dependence on UI:** MPPKVVCL, is forecasting its demand on hourly,





daily, weekly, monthly basis generally quite accurately. The same is regularly and closely being monitored by MPLDC and MPPMCL. Accuracy level of demand forecasting is generally above 95%. Demand forecasting is initiated through 11kV feeders at district level in control area. For this, a web-based application has been developed in-house, where local field officers of the district enter hourly loads of each 11 kV feeder on daily basis, to arrive at demand forecasting of that particular district. The demand data so compiled is then fine-tuned at Discom control centre. Thus, the accuracy of forecast is normally high as it takes care of all the possible happenings/likelihoods at grass roots level itself. MPPKVCL, normally maintains its demand within given schedule in order to avoid any UI charges by managing loads on hourly basis. However, in case of any overdrawal, the same is limited by unscheduled load shedding in control area in a set pattern of degree of priority and vice-versa.

**(b) Implementation of Automatic Demand Disconnection**

**Scheme:** The identification of 33 and 11kV feeders for installing Automatic Demand Disconnection Scheme is under progress. All 33 and 11kV feeders are classified into various groups, considering area/loads to be fed along with its nature. In case of contingency, required load relief is being provided to the system as soon as possible (within 10 minutes time).

(c) MP,SLDC has provided guidelines and concept paper to implement Automatic Demand Management Scheme (ADMS). The MPPKVVCL, Jabalpur is trying to locate agency who can prepare PLCs to suit requirement of the scheme prepared by MP,SLDC.

(d) It is proposed that in first phase, PLCs shall be installed on identified 33 kV feeders emanating from EHV sub-station, for which the MPPTCL, Jabalpur is being pursued separately since it comes under control area of MPPTCL. After successful implementation of pilot project, it will be installed on maximum possible feeders. The major hurdle may be absence of VCBs and compatible relays in 33/11 kV sub-station for auto operation on 11kV feeders.

(e) MPPKVVCL, Jabalpur is implementing Meter Data Acquisition System (MDAS) to monitor all 11 kV feeders, which is under progress. The MDAS will not only improve the visibility of 11kV network but will also provide real time status of the 11kV feeders, so that effective monitoring and control is ensured.

(f) During 22<sup>nd</sup> meeting of WRPC on 26.2.2013 at Gandhinagar, WRPC has decided to form a committee consisting of members from Discoms, SLDC and WRLDC of WR to reach a consensus for deciding the logics and further course of action for implementation of the Automatic Demand Management Scheme. It was also decided that this would be done in next two months time and put up for final discussion/approval in 23<sup>rd</sup> WRPC. In view of above, MPPKVVCL,

Jabalpur be allowed to operate the system without automatic demand disconnection till such time the common methodology across the Discoms of the State is decided. Desired relief from the MPPKVCL, Jabalpur, whenever needed under system distress conditions would be given within 5 to 15 minutes as per the quantum of load relief required.

(g) MPPKVCL, Jabalpur is promptly taking action required for safe and smooth operation of the system. All the provisions of the Grid Code are being complied with responsibility in general and management of loads in case of contingency in particular.

(h) The GoMP has planned to provide 24 hrs power supply to all non-agricultural loads/households by June 2013. Few districts already have started 24 hrs supply as per said commitment. The energy requirement has also been assessed accordingly and all the arrangements regarding availability are in place.

8. Madhya Pradesh Power Transmission Company Limited (MPPTCL) has vide affidavit dated 7.3.2013, submitted in response to Commission's order dated 14.1.2013, submitted as under:

(a) In the State of Madhya Pradesh, the Discom and MP Power Transmission Co. Ltd interface points are at secondary side (33 kV level) of EHV transformers installed at 132 kV sub-station and above. The 33 kV feeders emanating from EHV sub-stations have been categorized in different groups based on the priority for disconnection



of demand in case of system distress condition. These groups have also been designed in view of Regulation 5.4.2 (d) of the Grid Code for demand response (lower tariff for interruptible load). At present as per the Grid Code, the rotational load shedding is taken in case of overdrawal at 49.7Hz frequency. In case of MP State overdrawal, the load of the Discom drawing power more than scheduled is disconnected within 10-15 minutes.

(b) MP Govt has taken ambitious project of Feeder Separation under Atal Jyoti Abhiyan with investment of more than ₹ 1500 crore. The project includes separation of Irrigation and village load on the 11kV feeders with erection of new 11 kV feeders and allied electrical infrastructure.

(c) To provide 24 hrs supply to every willing household in the company, elaborate arrangements have been made in compliance with the Grid Code, MP Electricity Grid Code 2004 and MP Electricity Balancing and Settlement Code.

(d) The automatic demand disconnection involves huge capital investment by way of retrofitting of switchgear and other infrastructure whether at 33kV or at 11kV feeder level. As the company is already incurring losses and investing huge amounts in various loss reduction schemes, the West Discom is not in a position to bear such huge additional expense on account of automatic demand disconnection. Further the cost of automatic demand disconnection will be passing



through in Tariffs to the consumers. Due to increase in fuel charges the power purchase costs are rising steadily, it will be difficult to load such expense on consumer tariffs.

(e) Further, the Discom understands that for rotational "automatic demand management scheme" at 33 kV or 11 kV feeder level, the Discom need to enter the details of 33 kV or 11 kV feeders which are planned for relief (voltage level at which the scheme is proposed) by hard punching in the module, the input to which would be overdrawal of the State and accordingly the Discom's share of the load to be switched off, frequency and time for which the overdrawal is allowed. These inputs would be from SCADA. If by any reason supply to such feeders is already OFF then the desired relief may not be obtained. Therefore, with web based 33 kV feeder real time data acquisition system in place which was to be completed by June 2013, getting exact relief as per the system requirement will be more effective and the same would be obtained within 5 to 15 minutes.

(f) The Discom is required to manage the demand such that the supply hours to the consumers could be ensured with quality power supply. With the implementation of automatic demand disconnection scheme at frequency 49.7 Hz, the consumer load which is not planned for disconnection (As per day wise rotation plan) will be disconnected frequently as the quantum of relief actually obtained under this scheme does not involve any data acquisition.



9. SLDC, Madhya Pradesh vide its affidavit dated 13.2.2013, has submitted the following in response to the Commission's order dated 14.1.2013:

(a) The automatic controls (PSS in generating units) and safety net (UFR, df/dt, SPS) Schemes are in place in MP and are periodically monitored. As regards controllers in FACTS devices, over voltage protection in transmission lines, over fluxing protection in transformers, under voltage and over voltage protection in capacitors is in place and is in working condition. However, static reactors/capacitors are available which can be operated manually as per system requirement.

(b) As regards absence of primary frequency response from generating stations (RGMO), eight (8x125 MW) units of Indira Sagar Hydra Power Station has RGMO operational. Similarly, RGMO in 8x65 MW units at Omkareshwar Hydro Power Stations shall be available as soon as permission to fill up the reservoir above its MDDL is granted by appropriate authorities. The RGMO in 1x500MW unit of Sanjay Gandhi TPS of MPPGCL has recently stopped working which shall be put up into operation as soon as the fault is rectified. Other thermal (5 Nos) and Hydro units (26 Nos) of MPPGCL do not have FGMO implemented. In Suo-Motu Petition No. 191/2011 for non-compliance with the regulation 5.2 (f) of the Grid Code regarding restricted governor mode of operation by the generating stations, MPPGCL vide its reply dated 13.2.2012 has narrated the difficulties being faced in



implementation of RGMO in its coal based generating units and the hydro generating units. MPPGCL has prayed to the Commission to :

- Condone the delay in implementation of RGMO in respect of units No. 1 to 4 of SGTPS, Birsinghpur and Unit No. 5 of ATPS, Chachai and extend the period for implementation of the same till end of September 2012.
- Exempt the MPPGCL from implementing RGMO in respect of unit No. 6 to 9 of STPS, Sarni.
- Exempt the units of Hydel Power stations of MPPGCL from implementing RGMO upto October 2013.

(c) As regards the rare contingencies/exceptional grid events occurred in Western Region during 1st Aug 2012 to 31st Oct 2012 and mentioned in the petition, explanation of MP, SLDC is as under:

- (i) **Failure of Safety net:** It is alleged that on 20.8.2012, the grid frequency touched 48.8 Hz and no adequate load relief was provided through AUFL. It may be appropriate to mention that AUFL scheme has been implemented in MP grid which is regularly updated. The referred incidence may have occurred on account of transient touching of frequency at 48.8 Hz. None of the relays in MP system have picked up this incident due to minor variation in Western Area.

(ii) **Rare Contingencies/Grid incident/Grid Disturbance:**

None of the Grid incidences/Grid Disturbances are related to MP network.

(iii) **Mal-operation/Non-operation of the protection:**

The MPPGCL have been requested by SLDC to upgrade the protection scheme at STPS into numeric relays.

(iv) **Frequency Response Characteristics:**

Status of RGMO has already been given.

(v) **Slow response time because of manual action:**

SLDC, MP quickly responds to the sudden emergencies arising out of various system contingencies and take appropriate manual action through the Hydel generating stations for quick response to safeguard the system. MP, SLDC has conducted Black Start Mock Drill at its 4 No. Hydel Power stations and the results have been quite encouraging. A mock drill of system restoration in the event of complete black out was also performed in a workshop attended by about 80 no. engineers from the State and other WR entities. During the grid disturbance on 31st July 2012, SLDC, MP has not only taken out about 400 MW capacity Hydel units, but also restored about 400 MW load within a span of 5 to 10 minutes in order to control



the rising frequency. The restoration processes in MP are well documented and are available in the Control Rooms of SLDC and State entities.

(vi) **SPS Non-operation:** Load Dropping schemes in the event of ICT loadings have been provided and are operational in the State of M.P. at 400kV sub-stations namely Bhopal, Indore, Nagda and Bina.

(vii) **Unusual Event:** The scheduling through SSP is being done as per the D/C furnished by Narmada Control Authority and the power is requisitioned by MP in SSP units as per its requirement. The machines at SSP operate as per the reservoir level due to limiting of maximum level by the Apex Court. The reservoir operation is also governed by the Sardar Sarovar Reservoir Regulatory Committee, as per NWDT award.

(viii) In order to avoid sudden load variation by more than 100 MW, SLDC, MP has taken up the matter with the distribution licensees of Madhya Pradesh for computation of accurate demand forecast and accordingly, steps are being taken regularly to avoid such hour boundary variations by either switching of load to hour boundaries or suggesting the state entity for suitable adjustment in power trading. Presently implementation/ normalization of load shedding is being done in small steps by the distribution licensees. Problem of large

variation in load at hour boundary has been controlled to large extent by MP. Efforts are being made for further smoothening the fluctuations in the load.

(d) SLDC, MP adheres to Regulation 5.2 (j) of the Grid Code and due care is taken to minimize sudden variation in load through the practices.

(e) SLDC, MP is preparing scheme for carrying out "response test mock drill" to control critical loading on 400 kV Satpura-ISP lines. The mock drill is scheduled to be completed by end of January, 2013. The experience gained from this response test mock drill will provide inputs to curtail time delay in taking corrective action to restore the grid parameters to safe limits.

(f) SLDC, MP has identified 29 Nos 132 kV non-industrial non-traction radial feeders in the state which can be hand tripped in case of persistent overdrawal by the state entities causing threat to grid.

(g) Although adequate attention is being accorded to the issue, looking at the complexity of issue the Hon'ble Commission may direct the NLDC/RPCs to formulate the scheme so that the same could be implemented in a time bound manner.

10. WRLDC has filed the present petition seeking implementation of certain provisions of the Grid Code and security measures. During the hearing on 7.3.2013, the representative of WRLDC submitted that the issues were



discussed in the WRPC meeting held on 12.2.2013. In the meeting, detailed discussions were held on implementation of ADMS and time for implementation of ADMS will be finalized in the next meeting. Also, in the submission given by Chhattisgarh State Power Transmission Company Limited (CSPTCL) it is given that the scheme was discussed in WRPC and necessary steps are being taken as per the Commission's directions.

11. We have considered the submission of petitioner and respondents. The relevant regulations considered are given below:

(a) Regulation 1.5 the Grid Code "Compliance Oversight" provides as under::

*"(i) RLDCs shall report to the Commission, instances of serious or repeated violations of any of the provisions of the Grid Code and incidences of persistent non-compliance of the directions of the RLDCs issued in order to exercise supervision and control required for ensuring stability of grid operations and for achieving the maximum economy and efficiency in the operation of the power system in the region under its control.*

*(ii) The Regional Power Committee (RPC) in the region shall also continuously monitor the instances of non-compliance of the provisions of IEGC and try to sort out all operational issues and deliberate on the ways in which such cases of non-compliance are prevented in future by building consensus. The Member Secretary RPC may also report any issue that cannot be sorted out at the RPC forum to the Commission. The RPC shall also file monthly reports on status of UI payment and installation of capacitors by states vis-a vis the requirement/targets, as decided in the RPC.*

*(iii) The Commission may initiate appropriate proceedings upon receipt of report of RPCs or RLDCs referred to in (i) and (ii) above respectively.*

*(iv) In case of non-compliance of any provisions of the IEGC by NLDC, RLDC, SLDC, RPCs and any other person, the matter may be reported by any person to the CERC through petition.*



(v) *Notwithstanding anything contained in these regulations, the Commission may also take suo-motu action against any person, in case of non-compliance of any of the provisions of the IEGC. “*

(b) Regulation 5.3 of Indian Electricity Grid Code "Demand Estimation of Operational Purposes" provides as under:

*"(a) This section describes the procedures/responsibilities of the SLDCs for demand estimation for both Active Power and Reactive Power.*

*(b) The demand estimation is to be done on daily/weekly/monthly/ yearly basis for current year for load - generation balance planning. The SLDC shall carry out system studies for operational planning purposes using this demand estimate.*

*(c) Each SLDC shall develop methodologies/mechanisms for daily/weekly/monthly/yearly demand estimation (MW, MVAR and MWh) for operational purposes. Based on this demand estimate and the estimated availability from different sources, SLDC shall plan demand management measures like load shedding, power cuts, etc. and shall ensure that the same is implemented by the SEB/distribution licensees/SLDCs. All SEBs/distribution licensees shall abide by the demand management measures of the SLDCs and shall also maintain historical database for demand estimation.*

*(d) Each SLDC shall carry out its own demand estimation from the historical data and weather forecast data from time to time. All distribution licensees and other concerned persons shall provide relevant data and other information as required by SLDC for demand estimate.*

*(e) While the demand estimation for operational purposes is to be done on a daily/weekly/monthly basis initially, mechanisms and facilities at SLDCs shall be created at the earliest but not later than 1.1.2011 to facilitate on-line estimation of demand for daily operational use for each 15 minutes block.*

*(f) The monthly estimated demand by the SLDC shall be provided to RLDC and RPC for better operation planning.*

*(g) The SLDC shall take into account the Wind Energy forecasting to meet the active and reactive power requirement.*

*(h) In order to facilitate estimation of Total Transfer Capability/Available Transfer Capability on three month a head basis, the SLDC shall furnish estimated demand and availability data to RLDCs."*

(c) Regulation 6.4.8 of Indian Electricity Grid Code "Demand Estimation of Operational Purposes" further provides as under:

*"The SLDCs/STUs/Distribution Licensees shall regularly carry out the necessary exercises regarding short-term demand estimation for their respective States/area, to enable them to plan in advance as to how they would meet their consumers' load without overdrawing from the grid."*

12. As per Regulation 1.5 and 5.3 of CERC (Indian Electricity Grid Code) Regulations, 2010, it is the responsibility of concerned RPC to continuously monitor the instances of non-compliance of the Grid Code and sort out all operation issues and deliberate on various issues to avoid non-compliance by the stakeholders. All the Discoms of Gujarat are forecasting their demand on day a head basis and are submitting the same to SLDC, which also carries out demand estimation on daily, monthly and yearly basis. MPPKVCL is forecasting demand on hourly, daily, weekly and monthly basis with accuracy of the order of 95%. However, MSEDCL, CSPTCL and MPPTCL have not made any submission in regard to forecasting of demand. We, therefore, direct the STUs/SLDCs i.e. MSEDCL, CSPTCL and MPPTCL to forecast their demand in accordance with Regulation 5.3 of the Grid Code and make adequate arrangements to avoid dependence on Unscheduled Interchange for meeting their demand or for injecting short term surplus power, irrespective of the frequency. WRPC is also directed to underline the need for demand estimation to the constituents. We also direct the STUs/SLDCs of

Western Region to facilitate on-line estimation of demand for daily operational use for each 15 minutes block as per Regulation 5.3 of the Grid Code.

13. CSPTCL, has vide its submission dated 6.3.2013 has submitted that the agenda on the issue of ADMS brought before WRPC in its 22<sup>nd</sup> meeting held on 26.2.2013. After discussion TCC recommended the following:

- (i) The implementation of GSES and ADMS were agreeable in-principle.
- (ii) As the Automatic Demand Management Scheme is a subset/part of GSES and therefore it was recommended that the same will be implemented along with GSES.
- (iii) Settings of frequency based defense mechanisms and quantum of load shedding etc., needs to be co-ordinated with other regions of the NEW Grid.
- (iv) Manual load shedding, Automatic load shedding by demand management and load shedding under Automatic Under Frequency Load shedding (AUFLS) and df/dt of GSES requires to be co-ordinated to avoid overlap and have clear distinction between manual actions and automatic control actions.

Further, details and directions regarding implementation of Automatic Demand Management Scheme will be dealt in Petition No. 208/SM/2011.



14. Regulation 5.2 (j) of the Grid Code provides as under:

"5.2 (j) Except under an emergency, or to prevent an imminent damage to a costly equipment, no User shall suddenly reduce his generating unit output by more than one hundred (100) MW (20 MW in case of NER) without prior intimation to and consent of the RLDC, particularly when frequency is falling or is below 49.7 Hz. Similarly, no User / SEB shall cause a sudden variation in its load by more than one hundred (100 MW) without prior intimation to and consent of the RLDC. All users and SEBs shall ensure that temporary over voltage due to sudden load rejection and the maximum permissible values of voltage unbalance shall remain within limits specified under Central Electricity Authority (Grid Standards) Regulations, 2010."

Based on the submissions, we find that all Western Region constituents except CSPTCL have been complying with Regulation 5.2 (j) of the Grid Code. Accordingly, we direct CSPTCL to comply with Regulation 5.2 (j) of the Grid Code.

15. The petitioner has also prayed for directions to all STUs/ SLDCs of Western Region to give input and issues related to GSES. We find that the issue of Grid Security Expert System is being separately dealt with in Petition No. 265/MP/2012. Necessary actions/ directions as deemed appropriate shall be provided while dealing with the aforementioned petition.

16. The matter should be brought to the notice of the Commission in accordance with Regulation 1.5 (ii) of the Grid Code by WRPC/ WRLDC in this regard.

17. With this, Petition No. 264/MP/2012 stands disposed of.

Sd/-

**(M.Deena Daylan)**  
Member

sd/-

**(V. S. Verma)**  
Member

