CENTRAL ELECTRCITY REGULATORY COMMISSION

NEW DELHI

Adjudication Case 6/2009

Coram:
Shri V.S.Verma, Member and Adjudicating Officer

Date of hearing: 19.2.2010 **Date of order: 27.4.2010**

In the matter of

Maintaining grid security of the Southern Regional Grid by curbing overdrawals and effecting proper load management by TNEB**.**

And in the matter of

Tamil Nadu Electricity Board, Chennai
Member-Secretary, Southern Regional Power Committee, Bangalore
..Respondent

Following were present:

1. Shri V.Suresh, SRLDC
2. Shri V.Chandran, TNEB
3. Shri M.L.Batra, Member-Secretary, SRPC
4. Ms. Joyti Prasad, NRLDC

ORDER

Southern Regional Load Despatch Centre (SRLDC) had filed Petition No. 232/2009 alleging over-drawal at low frequency by the first respondent during the period from 9.10.2009 to 15.10.2009, despite issue of A,B,C and D messages under Section 29 of the Electricity Act, 2003 (the Act) read with para 5.4.2 (b) of the India Electricity Grid Code (the Grid Code). Details of the frequency profile and over-drawal by TNEB are as under:

Frequency Profile of SR during 9.10.2009 to 15.10.2009

	SR Frequency			% Time Frequency			
DATE	**MAX**	**MIN**	**AVG.**	**<49.2**	**<49.5**	**49.2–50.3**	**>50.3**
9.10.2009	49.94	**48.58**	49.33	**13.3**	76	86.7	0
10.10.2009	49.88	**48.58**	49.33	**14.7**	73.5	85.3	0.
11.10.2009	50.23	**49.19**	49.58	**0**	23.8	100.0	0
12.10.2009	50.08	**48.96**	49.49	**2.6**	42.7	97.4	0
13.10.2009	50.13	**48.64**	49.67	**11.6**	63.0	88.4	0
14.10.2009	50.01	**48.58**	49.24	**28.6**	87.2	71.4	0
15.10.2009	50.03	**48.88**	49.36	**7.9**	73.3	82.1	0

Overdrawal by TNEB during 9.10.2009 to 15.10.2009

Frequency- - >	**< 49.2Hz**			**< 49.5Hz**		
Date	**in MU**	**% OF SCH**	**MAX in MW**	**in MU**	**% OF SCH**	**MAX in MW**
9.10.2009	2.25	35.06	**1054**	10.47	35.84	1073
10.10.2009	2.04	27.32	**865**	8.52	30.39	1070
11.10.2009	0.05	29.84	**595**	6.52	38.24	1277
12.10.2009	0.43	18.86	**699**	4.49	15.63	1070
13.10.2009	1.77	18.60	**857**	7.69	18.93	935
14.10.2009	5.06	22.96	**974**	11.55	21.18	974
15.10.2009	0.58	6.03	**430**	3.24	6.88	502

2. According to the petitioner, with a view to curtailing over-drawl and ensuring grid discipline, four distinct category of messages were issued for alert operation / violation of Grid Code and Central Electricity Regulatory Commission (Unscheduled Interchange charges and related matters) Regulations, 2009 which are as under:

Date	**A**	**B**	**C**	***D**
9.10.2009	20	9	1	75
10.10.2009	19	10	1	73
11.10.2009	2	0	0	38
12.10.2009	9	4	0	42
13.10.2009	20	10	1	67
14.10.2009	26	13	4	83
15.10.2009	15	5	0	34
Total	**111**	**51**	**7**	**412**

(i) Category “A” message were issued when frequency was less than 49.20Hz and over drawal is more than 50MW or 10% of the schedule whichever is less

(ii) Category “B” message were issued when frequency was less than 49.20 Hz and over drawal was between 50 to 200MW for more than 10 minutes or 200 MW for more than 5 minutes

(iii) Category `C` message was issued 15 minutes after the "B" Message, when frequency continued to be less than 49.20Hz and over drawal was more than 50 MW or 10% of the schedule whichever is less.

(iv) Category `D` message was issued for UI during any time block exceeding 12% or 150 MW, whichever was less at frequency below 49.5Hz.

3. As there was insufficient response to SRLDC’s instructions by the respondent to curtail over-drawal, even after advising to open out the radial feeders, physical regulation of power supply was also imposed by the petitioner, during this period, by disconnecting 400 KV Salem Inter-connectors, 220 KV Hosur - Sulagiri lines and Udumalpet ICTs, after giving adequate time for corrective action, to safeguard the grid security. It was also submitted that the criticality of grid condition was continuously taken up with all levels of TNEB officials. SRLDC, SE (O), SRPC and Member Secretary, SRPC requested TNEB to adhere to the schedule. CMD, Power Grid vide its letter dated 15.10.2009 had also requested Chairman, TNEB to personally intervene for restricting over-drawal from the grid within the schedule particularly during low frequency condition so that safety and security of the grid to be maintained.

4. The Petitioner had also submitted that despite several requests made by SRLDC and SRPC forum, the first respondent did not develop a contingency plan to counter the generation shortfall caused due to loss of wind energy.

5. The Commission, vide its order dated 30.11.2009 directed that the proceedings be taken against the respondent in accordance with the prescribed procedure and appointed me as the Adjudicating Officer under Section 143 of the Act for holding an enquiry into the allegations against the respondent.

6. Notice under Rule 3 of the Procedure for holding inquiry by Adjudicating Officer Rules, 2004 was issued by me on 4.12.2009in response to which, the respondent furnished its reply under affidavit dated 23.12.2009 sworn by Shri R.Kathirvel, Secretary with the respondent. On consideration of the cause shown, I decided to hold enquiry into the allegation of non-compliance of the directions of SRLDC by the respondent.

7. I was required to complete the proceedings within a period of 60 days from the date of my appointment by order dated 30.11.2009. However, the period stands extended by another 60 days with the approval of the Commission. The inquiry was completed on 19.2.2010, within this extended time. Thereupon, TNEB was directed to file some details, subject to which, orders were reserved. Having gone through the pleadings and heard representative of the parties, I proceed to dispose of the matter.

8. The Respondent has enumerated following circumstances in regard to over-drawl during 9.10.2009 to 15.10.200, namely:.

(a) Demand had gone up to 10211 MW due to unusual hot weather conditions and early festive seasons;

(b) Forced outage of the generating units in the State and Central Sector had aggravated the power shortage situation and contributed to fall in operating frequency.

(c) Installed capacity of wind generation in the State is around 4552 MW. Wind generation which was in the range 818 MW to 1748 MW before 9.10.2009 suddenly dropped and went down to as low as 8 MW to 85 MW on 14.10.2009. Installed capacity of hydro station in the State being only 2186.5 MW was inadequate to meet the peaking loads. The installed capacity of non-irrigation hydro generation is 1325 MW only to compensate the sudden drop of wind as well as load variation in the grid.

(d) The variation in wind energy is wide, swift and unpredictable. This uncertainty in wind generation makes the load-generation balance management difficult. The scheduling of power from external sources at a huge price would have not only added to financial burden of TNEB but also would not have served the purpose, had the wind generation continued past 9.10.2009.

(e) In the absence of inter-connection of the Southern Region with the rest of the country, Southern Region is unable to take advantage of the daily and seasonal variations and benefit from the surplus power available in the rest of the grid.

(f) The generation from existing Central Sector Generating Stations has been low due to various reasons like fuel shortage etc. Further, the delay of Kudankulam Atomic Power Station and NLC TPS-II Expansion also restrict power availability to the State.

(g) The tripping of Talcher-Kolar HVDC on 13/14.10.2009 further aggravated the availability of power.

9. The respondent has further detailed the following measures taken by it to maintain load generation balance, namely:

(a) Various restrictions and control measures like 20% power cut on HT industries and commercial establishments, restriction on 3 phase supply to agricultural consumers and rotational load shedding in rural and urban areas had been placed since 13.6.2009 in order to balance the load and generation;

(b) The Load shedding quantum was increased. The maximum load shedding quantum reached up to 1945 MW;

(c) To maximise power availability, the quantum of power purchase from traders, other States and Power Exchanges was increased and all generation resources were harnessed to maximum extent possible;

(d) TNEB is actively contemplating to establish a pumped storage power station in Kundah with a capacity of 500 MW. With this TNEB hopes to overcome, to some extent, the effect of the variations in wind generation and to meet the peak demand.

(e) TNEB has implemented all the measures as suggested by Member-Secretary SRPC.

10. In response to the respondent`s above stated submissions, the petitioner in its reply dated 15.1.2010 has pointed out the following, namely:

(a) The respondent admits the contraventions as well as non-compliance of SRLDC directions and has attributed them to forced outage of generating units in the region and the sudden fall in wind generation.

(b) Due to forced outages of ISGS units during 9.10.2009 to 15.10.2009, reduction in entitlement of respondent was about 69 MW-195 MW .There were also forced outages in respondent's State generating units at MTPS, NCTPS and TTPS during 9.10.2009 to 15.10.2009 by about 210 MW-420 MW at various instances. However, the total impact due to outages of State owned units and the ISGS units during the subject period is about 500 MW or below while the value considered in the Load Generation Balance Report (LGBR) of the State was about 420MW.

(c) The respondent forecasts wind generation based on the historical data base available with it and its experience. Wider deviation from the forecast values is inevitable in the present scenario. Considering the fact, SRLDC was taking up with TNEB through OCC, TCC forums of SRPC as well as SRPC Board level, to formulate a special contingency plan by TNEB on the demand side management to mitigate impact of sudden reduction in wind generation within its control area.

(d) In response to SRLDCs initiative, respondent assured to develop a contingency plan and until then, for mitigating the contingencies due to sudden fall of wind generation by taking up additional manual load shedding such that there would not be any over-drawal at frequency below 49.2Hz. Under such circumstances, citing fall of wind generation as a reason for violation of IEGC, would not also be appropriate.

(e) In the Load-Generation Balance forecast furnished by respondent, the wind generation considered for the month of October 2009 was of the order of 840 MW with average of about 22.16 MU per day. Wind generation fell down

below the forecast value from 9.10.2009 onwards up to 0 MW and 1 MU per day.

(f) Load shedding quantum by respondent increased only on 9/10.10.2009 compared to previous days, but over-drawal quantum of respondent touched more than 850 MW on these days and frequency was hovering below 49.2Hz for more than 27% of the time. This clearly indicates that though respondent had taken some action on the demand side management, the same was belated and inadequate and thus lead to sustained low frequency condition endangering the grid security. This situation could have been averted if respondent had implemented an automatic load disconnection scheme, as proposed by the petitioner, to meet the contingencies due to sudden fall in wind generation and safeguard grid security.

11. After hearing both the parties on 18.1.2010, the petitioner was directed to file the details of wind generation in Tamil Nadu during 9.10.2009 to 15.10.2009. The respondent also was directed to file the details of action taken by it when frequency was below 49.5 Hz. as well below 49.2 Hz. . The respondent was also directed to file the details of actions taken by it in response to B, C and D messages issued by the petitioner and the details of load shedding during the period in question.

12. The respondent has filed its reply under affidavit dated 11.2.2010 in response to the petitioner's submission dated 15.1.2010. The submissions in brief are as under:

(a) TNEB had taken action on the instructions of the petitioner. Actions taken on specific instructions from SRLDC have been submitted.

(b) Additional measures like manual load shedding, making the supply to agricultural consumers from three phase to two phase, disconnecting the agricultural feeders, extending the duration of rotational load shedding, increasing generation, procuring extra power from Naptha based stations and tripping the feeders were resorted to for improving frequency condition.

(c) As a result of the measures taken by TNEB frequency improved within a few minutes in the same time block or within next one to four time blocks.

(d) On the advice of petitioner, the respondent opened the radial feeders to provide a total load relief of around 333 MW.

(e) TNEB was deprived of a total quantum of power of 500 to 970 MW due to forced outages during 9.10.2009 to 15.10.2009. This was higher than the provisions of 420 MW made towards forced outage in the LGBR.

(f) The wind generation which was in the range of 818 MW to 1748 MW before 9.10.2009 suddenly dropped to as low as 8 MW to 85 MW on 14.10.2009. Such reduction jeopardized the operation of the grid besides making the planning process extremely difficult.

(g) The load shedding quantum was increased by the respondent from 11.10.2009 to 14.10.2009 from 14.59 MU to 18.45 MU. The power purchase quantum was from 16.8 MU to 28.48 MU during that period.

13. In response to the direction, the petitioner, vide its affidavit dated 9.2.2010 submitted the following information relating to the period 9.10.2009 to 15.10.2009, namely:

(a) Time-block-wise wind generation data.

(b) Significant instances of persistent overdrawl by TNEB.

(c) Minute wise details of overdrawl by TNEB below 49.2 Hz.

(d) Details of messages issued by SRLDC

14. During the hearing on 19.2.2010, the petitioner submitted that the respondent in its reply dated 9.2.2010, had acknowledged the fact that it took four time blocks to curtail its overdrawal and bring back the frequency above 49.2 Hz. It was also mentioned that respondent had not shown any progress for implementation of special schemes for mitigating loss of generation due to sudden fall in wind generation, though it was persistently taken up by SRLDC and SRPC Secretariat in various meetings of SRPC since July, 2009. The representative of the petitioner, referring to the respondent's submission dated 9.2.2010, stated that the action taken by the respondent were either inadequate or belated or both. He contended that the instances referred to by the respondent in its replies on remedial action were few but the number of instances of persistent violation of grid discipline by the respondent were more that 40, during the period in question.

15. The representative of respondent submitted that all possible action on SRLDC directions was taken directions and the frequency was brought above 49.2 Hz in a short span of time. However, he admitted that at times the actions taken were not sufficient and also that the actions taken were not intimated to the petitioner. Regarding the procedure for deciding and implementing load shedding, the representative of the respondent stated that for normal load shedding, scheme was prepared in advance and implemented accordingly. During contingency, the load shedding instructions were to be passed to field sub-stations through sub-LDCs, which used to take time to implement the actual load shedding. He also stated that sometimes qualified personnel were not available to implement the load shedding

immediately as per instruction by SLDC/sub-LDC. In response to query as to how they contacted the sub-stations, he stated that it was through P&T telephone. On the specific query about the time required for effecting load shedding after the message was passed by SLDC, the representative of the first respondent stated that it took normally about 5 minutes but sometimes it was 10 to 15 minutes or even more.

16. During the hearing, when enquired about the automatic scheme for demand management and pre-decided procedures for dealing with system contingency situations, the representative of the first respondent stated that though there was a scheme for daily rotational load shedding, which was done manually; there was no automatic demand management scheme for contingency measures. On a query about the availability of Power Line Career Communication (PLCC) for communicating instructions from SLDC to the field sub-stations for implementing the load shedding, it was informed that it was not always available and normal P&T telephone was used for communication which delays the implementation of the instruction for load shedding.

17. Member-Secretary, SRPC has submitted that the main reason behind the over drawal by the State was inadequate capacity addition. He stated that increase in installed capacity in the State during 2004-05 to 2009-10 was only 427 MW (excluding wind) in comparison to the increase in peak demand by 3376 MW during the same period. Member Secretary, SRPC has suggested measures including short-term purchase of power, contingency plan for variation in wind generation, establishment of base load generating stations, installation of gas based generating station for operational flexibility, control of demand from SLDC, expediting the Kundah VII pumped storage plant and more judicious use of Kadamparai pumped

storage machines to compensate for wind generation variations to avoid over-drawl by the State.

Observations on the submissions by the Petitioner and Respondent:

18. From the foregoing, it transpires that during 9.10.2009 to 15.10.2009 the Southern Regional grid was operating under precarious conditions, with repeated dipping of the frequency to dangerous levels, even below 49.0 Hz. During this period, the respondent had overdrawn from the grid in contravention of the directions of the petitioner and the decisions in many Regional Power Committee meetings for taking measures to curb overdrawl during low frequency conditions. The respondent has not denied the allegation of the petitioner regarding overdrawl from the grid at low frequency, but has only enumerated many reasons for overdrawl such as unexpected loss of wind generation, forced outage of units, less declaration of ISGS etc. It was also claimed that all possible actions were taken to curb overdrawl and comply with the direction of the petitioner. The respondent however, admitted that the actions taken by it on the directions of the petitioner were not intimated to the petitioner and also that in some instances actions were not adequate.

19. From the information available on record it is observed that during 9.10.2009 to 15.10.2009, 111 numbers of “A” messages (issued when frequency was less than 49.20Hz and over drawal was more than 50 MW or 10% of the schedule whichever is less) , 51 number of “B” messages (issued when frequency was less than 49.20 Hz and over drawal was between 50 to 200MW for more than 10 minutes or 200 MW for more than 5 minutes) and 7 numbers of “C” messages (issued 15 minutes after the "B" Message, when frequency continued to be less than 49.20Hz and over drawal was more than 50 MW or 10% of the schedule whichever is less)

were issued to respondent . It is pertinent to mention that “A” message is considered as an alert message under clause 6.4.7, “B” message as violation of clause 6.4.7 of the Grid code and “C” message is considered as violation of Clause 5.4.2.(b) and 6.4.12 of the Grid Code and Section 29 (1) of the Act.

20. It is also observed that out of total 51 “B” messages and 7 “C” messages issued during 9.10.2009 to 15.10.2009,the respondent filed information about action taken on 17 “B” messages and 7 “C” messages. It is observed that action was taken only on 8 “B” messages and 2 “C” messages and that effect was also reflected on the grid frequency. However, there were several instances of messages i.e. 34 of “B” messages for which there is no record of action, out of which on 12 instances the overdrawl was heavy and / or continued for several minutes when frequency below 49.2 Hz. Further, there were certain instances of messages i.e. 8 of “B” messages and 5 of “C” messages for which some action were mentioned but these actions were not adequate to curb overdarwl from the grid. 24 Specific instances of issue of “B” or “C” messages which involve large quantity of overdrawl and /or for a comparatively longer duration at low frequency for which either no action has been mentioned or the actions mentioned were inadequate are discussed in detail as under:

(i) **“B” Message No. 2236 at 0215 Hrs. on 9.10.2009 -** There is no record of any action from the respondent. The wind generation was about 590 MW during the corresponding hour against the estimation of 840 MW as per Load Generation Balance Report (LGBR) and forced outage was about 490 MW against the anticipation of 420 MW. Thus, availability was reduced by about 320 MW due to these two factors but as per information submitted by respodent , there was no load shedding during this period and the overdrawl

was about 700 MW. In spite of caution messages i.e. “A” messages, issued at 0055 hrs. and 0209 hrs. , for which also there is no record of action submitted, the overdrawl continued . Over-drawal continued even after receipt of “B” message by the respondent. Frequency improved at 0226 hrs slightly but remained below 49.5 Hz. till 0344 and overdrawl of 600-800 MW continued..

(ii) **“B” Message No. 2239 at 0317 Hrs. on 9.10.2009 -** There is no record of any action from the respondent. The wind generation was about 490 MW during the corresponding hour against the estimation of 840 MW as per Load Generation Balance Report (LGBR) and forced outage was about 490 MW against the anticipation of 420 MW. Thus, availability reduced by about 420 MW due to these two factors, but as per information submitted by the respondent, there was no load shedding during this period. In spite of caution messages i.e. “A” messages, issued at 0309 hrs., for which also there is no record of action submitted, the overdrawl continued . After “B” message also the overdrawl continued for about 15 minutes at frequency less than 49.2 Hz.. Frequency was below 49.2 Hz. from 0306 to 0332 Hrs. and the overdrawl was about 600-800 MW. Frequency improved at 0332 hrs. but overdrawl continued with increased quantum up to 1000 MW.

(iii) **“B” Message No. 2241 at 0527 Hrs. on 9.10.2009 -** Availability reduced by about 1000 MW due to forced outage and loss of wind generation but as per information submitted by respondent, there was no load shedding during this period. In spite of caution messages i.e. “A” messages, issued at 0522 hrs. the overdrawl continued. After “B” message also the overdrawl to the tune of 900-1000 MW continued. Frequency improved at 0530 hrs. but

overdrawl continued with quantum up to 1000 MW. Some action including making three phase to two phase supply for agricultural consumer and 40 MW manual load shedding at 0525 is mentioned. The action was not adequate as there was no reduction in overdrawl.

(iv) **"B" Message No. 2243 at 1215 Hrs. on 9.10.2009 -** After "B" message also the overdrawl to the tune of 500-600 MW continued. Frequency improved at 2225 hrs. but overdrawl continued with quantum up to about 700 MW and frequency again dipped below at 1238 hrs. and 1248 hrs. Some action e.g. making three phase to two phase supply for agricultural consumer and extension of load shedding period has been mentioned by the respodent but due to inadequate action by the respondent , overdrawl continued and "B" message was again issued at 1253 hrs when frequency was below 49.5 from 1201 hrs. to 1300 hrs.

(v) **"B" Message No. 2250 at 2220 Hrs. on 9.10.2009 -** A message was issued at 2214 hrs. However, over-drawal increased after issuing of "A" message .Action for termination of three phase supply to agriculture at 2230 hrs has been mentioned, indicating action if at all after 10 minutes. Overdrawl of 800 MW was reduced up to 600 MW after "B" message. Loss due to wind generation was only 270 MW from the anticipated quantum of 840 MW , but overdrawl was 800 MW. Forced outage was about 490 MW. Planned load shedding 667 MW but no manual load shedding has been mentioned. Due to inadequate action, "C" message was issued at 2235 hrs. Frequency improved at 2245 hrs. Even thereafter overdrawl continued up to a quantum of 600 MW for a long duration. Evidently, the above action was inadequate

and belated for the then prevailing grid conditions i.e. frequency below 49.2 Hz. from 2213 to 2244 hrs and quantum of overdrawl up to 800 MW by the respondent.

(vi) **"B" Message No. 2252 at 0650 Hrs. on 10.10.2009-** Before this "B" message the alert, "A" message was issued at 0644 hrs. Overdrawl increased after both these messages Although frequency improved and went above 49.2 Hz. for 6 minutes from 0701 to 0706 hrs, overdrawl increased further, resulting in issue of " A" message again at 0707 hrs and "B" message at 0714 hrs. No action was mentioned for the "B" message at 0650 hrs.. Frequency went above 49.2 Hz. at 0722 hrs. but remained below 49.5 Hz. till 0859 hrs. and overdrawl by the respondent also continued between 300-500 MW.

(vii) **"B" Message No. 2256 at 0920 Hrs. on 10.10.2009 -** Frequency was below 49.2 Hz. from 0917 hrs. to 0940 hrs. Action in the form of extending the load shedding hours has been mentioned. Although there was reduction in overdrawl from about 680 MW to 480 MW, nevertheless it continued resulting in issue of "B" message again at 0933 hrs. After second "B" message overdrawl further reduced up to 420 MW. Against the planned load shedding to the tune of 1470 MW, no manual load shedding has been mentioned. While, some action has been mentioned after the first "B" message, overdrawl continued with increased quantum of up to 900 MW when grid frequency hovered almost continuously below 49.5 Hz. for a long duration.

(viii) **"B" Message No. 2259 at 1251 Hrs. , and Message No. 2260 at 1429 Hrs. on 10.10.2009 -** During this period, the frequency was below 49.2

Hz. from 1247 hrs. to 1502 hrs except slight improvement from 1400 to 1406 hrs. (still remaining below 49.5 Hz.) . “B” message was issued at 1251 when overdrawl was about 566 MW, which reduced to around 500 MW at 1304 when “C” message was issued. After issuing of “C” message, overdrawl further reduced to 350 MW at 1316 hrs.. Subsequently, the overdrawl again increased to 640 MW at 1332 hrs. and then reduced gradually to 200 MW at 1359 hrs. Overdrawl to the tune of 150 – 450 MW continued up to 1502 hrs. During this period, at 1429 hrs “ B” message was again issued when overdrawl was about 190 MW, but overdrawl continued even with increased quantum up to 450 MW. No information about action taken on these “ B” messages has been mentioned, except that of availing share of Kerala State Electricity Board at Kayamkulam at 1300 hrs. in regard to “C” message at 1304 hrs. No manual load shedding has been mentioned for these messages.

(ix) **“B” Message No. 2276 at 2226 hrs. on 13.10.2009 -** Continuous overdrawal was in the range of 400-700 MW from 2213 to 2353 hrs. when frequency below 49.2 Hz. , except improvements in frequency intermittently for 1 to 3 minutes. No information has been submitted about action taken on alert messages (A messages) at 2215, 2251 and 2306 hrs.. Some action e. g. picking up of IPP generation has been indicated but the action was evidently inadequate for reducing overdrawl because overdrawl continued after B message also . Planned load shedding of 600 MW and no manual load shedding against generation loss of more than 1250 MW due to loss of wind generation and forced outages has been indicated by the respondent. After 2253 hrs. there was marginal improvement in frequency, which however,

remained below 49.5 Hz. till 0258 hrs. on 14.10.2009. Besides, there was continuous overdrawl by the respondent to the tune of 500-800 MW during that period.

(x) **"B" Message No. 2277 at 0704 Hrs. on 14.10.2009 -** There was continuous overdrawl of 400-800 MW from 0623 to 0744 hrs. when frequency was below 49.2 Hz., except improvements in frequency for 6 minutes duration from 0640 to 0645 hrs. (still remaining below 49.25 Hz.) . Some action e.g. increase in generation has been mentioned but it was inadequate for reducing overdrawl consequent to issue of "C" message at 0714 hrs. Even after "C" message overdrawl to the tune of 400-750 MW continued for 30 minutes.

(xi) **"B" Message No. 2278 at 1037 Hrs. on 14.10.2009** – It is seen that there was continuous overdrawl from 1034 to 1146 hrs. to the tune of 300-970 MW when frequency was below 49.2 Hz.., except improvements in frequency intermittently for 1 to 3 minutes. When Frequency was below 49.5 Hz. since 0956 hrs. and TNEB's overdrawl was 450-700 MW, no action has been mentioned on the "B" message. Planned load shedding was 800 MW but no manual load shedding, against generation loss of more than 1600 MW, due to loss of wind generation and forced outages, has been mentioned. It has reported that physical regulation by opening of Salem inter-connector 1&2 was implemented by the petitioner at 1115 hrs.

(xii) "B" Message No. 2280 at 1212 Hrs. & Message No. 2282 at 1247 Hrs. on 14.10.2009 - Frequency was below 49.2 Hz. from 1208 hrs. to 1226 hrs. and again 1242 hrs to 1257 hrs. During the above period there was

improvement in frequency profile, which however, remained below 49.5 Hz. Further, overdrawl increased from about 400 MW to about 700 MW MW after first “B” message was issued, necessitating issue of the second “B” message . After issue of second “B” message, the overdrawl was reduced but it remained above 470 MW till 1257 hrs. The generation loss was about 1400 MW from due to wind generation and forced outages but planned load shedding mentioned was about 600 MW . No action on these messages has been mentioned by the respondent.

(xiii) **“B” Message No. 2289 at 1612 Hrs. on 14.10.2009** – It is seen that there was continuous overdrawl from 1607 to 1732 hrs. to the tune of 400-700 MW when frequency below 49.2 Hz., except improvements in frequency intermittently for 1 to 4 minutes, still remaining below 49.5 Hz..No action has been mentioned on the “B” message. Planned load shedding was 800 MW but no manual load shedding, against generation loss of more than 1400 MW due to loss of wind generation and forced outages has been reported.

(xiv) “B” Message No. 2292 at 1811 Hrs. & Message No. 2293 at 1837 Hrs. on 14.10.2009 - Frequency was below 49.2 Hz. from 1806 hrs. to 1823 hrs. and again 1832 hrs to 1855 hrs. During this period, the frequency marginally improved but continue to remain below 49.5 Hz. Overdrawl momentarily reduced after issuing of first “B” message but again increased leading to issue of second “B” message . After second “B” message, Although overdrawl reduced after second “B” message, the quantum remained more than 100 MW and “C” message had to be issued at 1852 hrs.. No action on the “B” messages has been reported by the respondent. During this period,

frequency dipped to 48.58 Hz. Frequency remained below 49.0 Hz. for a long duration of about 25 minutes. Physical regulation by opening of ICT-2 and ICT-3 ,at Udumalpet , at 1817 hrs. and 1822 hrs. respectively had to be resorted to by the petitioner.

(xv) **"B" Message No. 2297 at 2228 Hrs. and Message No. 2298 at 2302 Hrs. on 14.10.2009 -** There was continuous overdrawl from 2211 to 2316 hrs. to the tune of 400-700 MW at frequency below 49.2 Hz., except for slight improvement in frequency for 5 minutes during 2241 to 2246 hrs, still remaining below 49.28 Hz. No action has been reported on the "B" message. It has been mentioned that manual load shedding was done with a relief of 350 MW at 2225 hrs. and IPP generation was increased . However, overdrawl of around 700 MW continued and again "B" message was issued at 2202 hrs. After the issue of "B" message, overdrawl reduced to 460 MW at 2316 hrs when frequency slightly improved. However, no information has been submitted by the respondent in regard to action taken on "B" message. Further, overdrawl increased and remained between 500-600 MW till 2400 hrs. when frequency was still below 49.5 Hz. There was no load shedding , while generation loss was about 1400 MW due to loss of wind generation and forced outages.

(xvi) **"C" Message No. 578 at 2235 Hrs. on 9.10.2009 -** "B" message was issued at 2220 hrs. Overdrawl of 800 MW marginally reduced to 600 MW after issue of the "B" message. Due to inadequate action and continuous overdrawl by respondent, "C" message was issued at 2235 hrs. During this period loss due to wind was only about 270 MW from the anticipated quantum

of 840 MW , but overdrawl was 600-800 MW. Planned load shedding was about 600 MW. The respondent in its reply has submitted that manual load shedding was carried out for a quantum of 667 MW. However, in the load shedding details provided by them on 19.2.2010, the planned load shedding of 667 MW has been indicated. This reflects that there was no manual load shedding on receipt of "C" message. On perusal of overdrawl pattern, it is evident that the over drawl of about 600 MW continued till 2253 hrs and then reduced up to about 450 MW at 2258 hrs. After issuing of "C" message, the frequency was below 49.2 Hz. for about 10 minutes and below 49.5 Hz. for about 23 minutes. The action mentioned was inadequate and delayed in view of the prevailing grid conditions i.e. frequency was below 49.2 Hz. from 2213 to 2244 hrs .

(xvii) **"C" Message No. 579 at 1304 Hrs. on 10.10.2009 -** "B" message was issued at 1251 hrs. After issuing the "B" message, overdrawl of 566 MW was marginally reduced to 500 MW. Due to inadequate action and continuous overdrawl by respondent, "C" message was issued at 1304 hrs. The respondent has reported some action including, tripping of feeders at 1329 hrs., which was 25 minutes after issuing of "C" message. On perusal of the overdrawl pattern, it is evident that the overdrawl reduced temporarily to about 350MW at 1316 hrs. but again increased up to about 640 MW at 1332 hrs. Later it reduced to about 200 MW at 1359 hrs.. During the period i.e.1247 hrs. to 1359 hrs. the grid frequency remained below 49.2 Hz. The frequency improved for a brief while (still remaining below 49.5 Hz.) and then again went below 49.2 Hz. at 1407 to 1502 hrs. The overdrawl by the respondent during this period was also continued up to about 450 MW. The

action reported by the respondent was inadequate and belated in view of the prevailing grid conditions i.e. frequency below 49.2 Hz. for a period of more than 2 hours.

(xviii) **"C" Message No. 581 at 0714 Hrs. on 14th October,09 -** "B" message was issued at 0704 hrs. There was continuous overdrawl of 600-800 MW from 0623 to 0735 hrs. at frequency below 49.2 Hz., except for improvement in frequency for 6 minutes duration from 0640 to 0645 hrs. (still remaining below 49.25 Hz.) . Some action e.g. picking up of hydro generation has been mentioned but it was inadequate for reducing overdrawl. It is seen that even after "C" message, overdrawl continued for 30 minutes.

(xix) **"C" Message No. 582 at 1052 Hrs. on 14.102.009 -** "B" message was issued at 1037 hrs. when overdrawl was 770 MW. This increased to 920 MW when "C" message was issued. Overdrawal remained above 500 MW till 1128 hours. The frequency was below 49.2 Hz. from 1034 hrs to 1146 hrs, except for slight improvement for 1 to 3 minutes (but remaining below 49.27 Hz.) . Due to inadequate action and continuous overdrawl by the respondent, again "B" message was issued at 1145 hrs. The respondent had taken some action including, increasing generation and manual load shedding of 360 MW. The action taken by the respondent was inadequate and was delayed under the then prevailing grid conditions i.e. frequency below 49.2 Hz. for a period of about 50 minutes after issuing of "C" message. During the above period, overdrawl by the respondent was about 300 - 970 MW.

(xx) **"C" Message No. 583 at 1629 Hrs. on 14.10.2009 -** "B" message was issued at 1612 hrs. when overdrawl was about 556 MW. The overdrawl was

increased up to 603 MW when “C” message was issued., which remained above 500 MW till 1728 hours . Thus, the overdrawl of 500 MW or above (upto 700 MW) continued for about 1 hour after issuing of “C” message. The frequency was below 49.2 Hz. from 1607 hrs to 1732 hrs, except for slight, intermittent, improvement for 1 to 3 minutes, nevertheless remaining below 49.32 Hz.. The respondent has submitted some actions including, increase in generation and making supply two phase for agricultural consumers. The action taken by the respondent was inadequate and delayed in view of the prevailing grid conditions i.e. when frequency was below 49.2 Hz. for a period of about 1 hour after issuing of ”C”: message and overdrawl by the respondent was about 500 - 700 MW. Physical regulation by opening of Hosur- Sulagiri line and ICT-1 at Udumalpet was resorted to at 1701 hrs. and 1730 hrs. respectively.

21. In addition to the above mentioned messages and instances, there were some instances of direction by SLDC as “B” messages for which no action has been indicated by the respondent. In these instances, either the frequency improved or the overdrawl quantity was small. Further, there were certain instances of “B” and “C” messages for which some action was taken by the respondent to reduce overdrawl.

22. The respondent has attributed loss of wind generation as a prime reason for overdraw. I am not able to agree. The respondent is expected to make arrangements for tackling such contingencies. The documents available on record bear testimony to the fact that several times in different forums the respondent was repeatedly requested and advised to formulate special schemes to deal with such situation but to no avail. Consequently, the grid security was jeopardized by

overdrawing heavily and continuously from the grid to compensate for the loss of generation due to wind. Further, the respondent in its reply dated 23.12.2009 has submitted that it had 1325 MW non-irrigation hydro generation to compensate the sudden drop of wind as well as load variation in the grid. The respondent ought to have used this capacity for mitigating the sudden loss of wind generation, which was up to about 800 MW during the period (As per submission dated 15.1.2010 by SRLDC , from 1st to 8th October,09 the maximum MW wind generation was 750-930 MW and during 9th to 15th October,09 ,it was 80-570 MW) . Needless to add that loss of generation due to wind cannot be a legitimate reason for taking some one else's power as well as putting whole grid in danger .

23 Loss of generation due to forced outages has also been shown as a reason behind the overdrawl. From the documents placed on record by the parties, it is noted that reduction in entitlement of the respondent was about 70-200 MW due to forced outages of ISGS units but the loss of generation due to forced outages of the State units was 210 - 840 MW, during the period in question . Some State sector generating units were out since many days before the subject period (e.g. since28.9.2009 to 5.10.2009). It is evident from the above, that the reduction in availability of power due to forced outages was mainly due to outage of State sector units. Further, forced outages to the limited extent at any point of time have to be dealt with by all the constituents. The forced outage, which again is mainly attributable to the respondent, cannot justify overdarwl and that too at low frequency. The respondent has cited the absence of inter-connection of the Southern grid with the rest of the country, to have seasonal load variation advantage ,as one of the reasons leading to overdrawl. However, the respondent could have entered into bilateral arrangements, in advance to procure power from the States of

other regions to get benefit from seasonal variation of load across the country. Further, the less power availability form Central Sector generation due to reasons like fuel shortage and the tripping of transmission lines etc. affect all the beneficiaries and is not exclusive to the respondent. Accordingly, the respondent cannot cite it as a justification for overdrawing from grid to meet its load at the cost of other beneficiaries and the grid security.

28. The respondent claims to have taken all possible steps to reduce the overdrawl and comply the petitioner's directions. However, the analysis of the data available on records reveals that on many instances either no action was taken or the action taken was inadequate. There were many instances when the response was delayed. The reason behind it may be the delay in response from the field sub-station at distribution level from which load shedding is actually implemented. From the submissions made in the proceedings, it emerges that the response of the respondent was in many cases delayed due to non-availability of faster communication methods like PLCC as well as non-availability of suitable staff to implement the SLDC direction. This shows the non-seriousness/ non-preparedness of the respondent towards the grid security of the integrated regional grid also. Due to this approach, the petitioner was compelled to take the extreme measures of physical regulations of power supply by opening of lines and ICTs during the subject period. To reduce the delay in response and to ensure timely load shedding there has to be an automatic demand management scheme in place to deal with contingencies.

29. I am in agreement with the Member Secretary, SRPC that the main reason behind the current situation is inadequate generation capacity addition in the State

for base load as well as planning of the management of variation due to wind generation through pumped storage hydro plants and other means. There is an urgent need to add base load generating units as well as generating units like gas based and hydro which can be brought on bar in short time. The operation of existing pumped storage units must be ensured immediately and the new pumped storage plant must be expedited to deal with the loss of wind generation. The State must plan accordingly.

30. Lack of accurate demand estimation and planning to meet load accordingly seems to be one of the main reasons behind the present situation. The respondent must use the state of the art technologies for forecasting of wind generation and also short-term as well as long- term demand estimation and for planning the load generation balance. Based on forecasting, only the most reliable quantum of wind generation should be taken for Load Generation Balance instead of taking the maximum wind generation capacity as per historical data.

31. Based on the above discussion and analysis, I am satisfied that the respondent has failed to comply with the directions of SRLDC though mandated to do so by virtue of subsection (1) and (2) of Section 29 of the Act on each of the instances. The violations of the directions are of repetitive nature that put the security of the grid in jeopardy, besides resulting in unlawful gain by the petitioner at the cost of other Sates who were deprived of their legitimate share. Considering the totality of the circumstances, I impose token penalty amounting to Rs. one lakh for each of the 24 instances of non-compliance with the directions of SRLDC. The penalty shall be deposited before 30.4.2010.

32. With the above, the petitioner and respondents are directed to comply as under:

(a) Appropriate action shall be taken for non-compliance of SRLDC directions on the specific instances discussed in para 2.4 above.

(b) The respondent shall refrain from overdarwl from grid at low frequency conditions and shall abide by the stipulated norms in Grid Code and UI Regulations.

(c) The respondent shall take necessary steps to implement automatic demand management schemes to deal with the emergency situations like sudden loss of wind generation or forced outages etc., within six months from the date of this order and monthly progress report in this regard shall be submitted to SRLDC and SRPC. SRPC shall inform the Commission about any deficiency in the action taken by the respondent. vis-a-vis the directions given by the Commission.

(d) The respondent shall take immediate steps to carry out exercises for short-term and long- term demand estimation and for plan in advance to meet these demands. The demand estimates and the plan to meet this demand shall be regularly monitored in the OCC meeting of the SRPC. SRPC shall report any deficiency to the Commission.

(e) The respondent shall take immediate steps to utilize the existing pumped storage units to mitigate the loss of power generation from wind.

(f) The respondent shall take long-term measures like addition of generation capacity to meet its demand and to deal with the situations like loss of wind generation. The plan of action in this regard shall be submitted to the SRPC within one month from the date of this order and the

implementation of the plan shall be monitored regularly by SRPC. The SRPC shall report deficiency, if any in the action to the Commission.

Sd/=
(V.S.VERMA)
Member and Adjudicating Officer