

Grid Disturbance on 2nd January, 2001 in the Northern Region.

**Hearing dated 15-01-2001
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Restoration of Grid Disturbance in the Northern Region

**Hearing dated 16-01-2001
Pages 14-18**

**BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Enquiry No.1/2001

Coram

1. Shri S.L. Rao, Chairman
2. Shri D.P. Sinha, Member
3. Shri G.S. Rajamani, Member

In the matter of

Grid Disturbance on 2nd January, 2001 in the Northern Region.

The following were present:

1. Shri B.Bhushan, Director (O), Powergrid
2. Shri S.R. Narasimhan, Manager, Powergrid
3. Shri Alok Roy, Addl. GM, NRLDC, Powergrid
4. Shri V.K. Agarwal, DGM NRLDC
5. Shri V.K. Saxena, Add. CE, RVPNL
6. Shri H.S. Sahai, CE, BBMB
7. Shri R.K. Sehgal, Director, P.R, BBMB
8. Shri A.K. Gupta, Director, EE, Min. of Railways
9. Shri Z.S. Dahiya, Director(Tech), HVPN,
10. Shri M.L. Jain, SE (SO), HVPN,
11. Shri A.K. Anand, CE (Coordination), PSEB
12. Shri S. Verma, Jt. Director, HERC
13. Shri Santosh Kumar, M.S, NREB
14. Shri V.J. Talwa, SE(O), NREB
15. Shri Y.P. Singh, Member (Tech), DVB
16. Shri S.K. Behl, Chief Engineer, DVB
17. Shri A.K. Saxena, Dy. Director (Com), CEA
18. Shri A.S. Arora, Addl. S.E., PSEB
19. Shri B.N. Ojha, Director (Op), NTPC
20. Shri Shyam Wadhera, GM(Comm), NTPC
21. Shri K.K. Garg, AGM (Comm), NTPC
22. Shri Rajesh Kumar, Sr. Manager, NTPC
23. Shri Harsh Gupta, ACS-cum-Secy (HPP&Power), & Chairman HPSEB
24. Shri V.K. Srivastava, EE, UPPCL
25. Shri R.P. Gupta, Sr. A.E., UPPCL
26. Shri R.Y. Singh, Addl. Gen. Mgr, NPCIL
27. Shri Milind Kumar, Advocate, PDD,J&K ,

ORDER
(15-1-2001)

A major disturbance in Northern Grid on 2nd January, 2001 was reported by NRLDC. Taking notice of this grid disturbance suo motu proceedings have been initiated by the Commission to enquire into the incident in furtherance of the function of “regulation of inter-state transmission” entrusted to it under clause (c) of Section 13 of the Electricity Regulatory Commissions Act 1998. The ambit and scope of the enquiry is restricted to role of various functionaries in ensuring compliance of the provisions of IEGC.

2. It has been brought to our notice that pole-2 of Rihand-Dadri HVDC line has been out of operation since 14th December, 200 because of failure of converter transformers. However, pole-1 of Rihand-Dadri HVDC bipolar line developed certain faults on 1-1-2001 at about 23.21 hrs. Therefore, the line was put on reduced voltage mode of operation and the power flow on this line was consequently reduced. It has been reported that in view of prevailing high frequency situation of above 51.0 Hz. in Northern Regional grid, NTPC stations at Singrauli and Rihand were instructed by NRLDC to back down generation. However, Singrauli STPS continued to operate at around 1500 MW and did not back down despite these instructions by NRLDC. Meanwhile, 400 kV Obra-Pank line belonging to UPPCL tripped at 0130 Hrs. on 2nd January, 2001. Subsequently, 400 kV Panki-Muradnagar line, 400 kV Panki-Kanpur-II line and an ICT tripped at Panki since 400 kV Bus “A” at Panki sub-station of UPPCL developed a fault. Anpara TPS was also reported to have been instructed to back down initially at 0318 Hrs., but these instructions were not complied with. The collapse of the grid is attributed to the cumulative effect of these incidents.

3. During the proceedings of this enquiry, Shri Bhanu Bhushan, Director (Operations), Powergrid Corporation of India Ltd., who has to our knowledge,

been assigned the task relating to the CTU functions made the following statements:-

- (a) When asked by the Commission regarding the steps taken by the CTU to ensure compliance of the instructions issued by RLDC, he stated that under the law “RLDC is an apex body” for the purpose of performance of integrated operation of power system in the region, implying thereby that CTU has no role in ensuring enforcement of directions issued by RLDC in integrated operation of regional grid.
- (b) His other response was that without enforcing free governor operations and commercial mechanism, it was not possible to enforce grid discipline.

4. In order to appreciate the contention raised by Shri Bhanu Bhushan on behalf of the CTU, it is necessary to have a look at the relevant statutory provisions as contained in Section 55 of the Electricity (Supply) Act, 1948.

“ (1) Until otherwise specified by the Central Government, the Central Transmission Utility shall operate the Regional Load Despatch Centres and the State Transmission Utility shall operate the State Load Despatch Centres”.

“ (2) The Regional Load Despatch Centre shall be the apex body to ensure integrated operation of the power system in the concerned region”.

5. It is clear from the above provisions that the RLDC is the apex body for the integrated operation of the regional power system, and, therefore that its instructions must be complied with by all the concerned parties. Further, it is also clear from Section 55(1) that the Central Transmission Utility shall “operate” all the RLDCs, by which is clearly meant that the CTU is in a position of supervision and control over the regional load despatch centres. Under Section 27A(1) of the Indian Electricity Act of 1910, the Central Government has notified Powergrid Corporation of India Ltd. as the Central Transmission Utility. It is clear, therefore, that Powergrid Corporation of

India in its capacity as the Central Transmission Utility, has to exercise the overall supervision and control over the RLDCs. In organisational terms this would mean among other things, that the CTU comes to the support of the RLDC when the RLDC is not able to get its instructions fully or partially implemented by the parties to whom the instructions are given. We are, therefore, not convinced by the submission made on behalf of CTU that it cannot play any role in enforcing instructions issued by RLDC for integrated operation of the regional grid. This is notwithstanding the fact that chapter 2 of the IEGC also explains the role of the CTU. In our order dated 30-10-1999 on petition No.2/99, we have already held that CTU owes a responsibility for the integrated operation of power systems in the regions. It appears that there is insufficient understanding within Powergrid Corporation of India Ltd. which has been notified as the Central Transmission Utility of its statutory role and functions.

6. All that the Commission can do is to point out its responsibilities to the central transmission utility. This is now reiterated. It is for the government as owner of the PGCIL, and which notified PGCIL as the CTU to ensure that PGCIL performs the functions that are implied under the authority given to it under the law over the RLDCs. The lack of understanding by PGCIL/CTU as to how it should exercise these powers, has in the judgement of the Commission, jeopardized the safe operations and security of the Electricity Grid. Government has to apply its mind and decide how it proposes to deal with this matter, if the country is to avoid the repeated grid collapses that have taken place. Even in the last six months, there was the collapse of the Eastern Grid in July 2000; and now the collapse of the Northern Grid in January, 2001.

7. The Commission heard the sequence of events leading to the collapse of the grid from Shri Alok Roy of the NRLDC, Shri Bhanu Bhushan representing the CTU, and Shri Santosh Kumar representing CEA. It was clear from the sequence of events narrated that:

- (a) The problem had existed since 14th December, 2000 on pole 2 of HVDC link between Rihand and Dadri in which there were failures of the converter transformers. While the Commission did not examine the technical issues involved nor the responsibility of the suppliers, what came out clearly during the hearings was the failure of equipment supplied by one supplier namely M/s. BHEL, while there was no failure whatsoever of the equipment supplied by the other supplier, namely M/s. ABB. Since the consequences of such failures are grave on the operation of the grid and the economy of the country, we consider it necessary to advise the central government to immediately explore ways of improving the quality of the existing equipment, without waiting any further for repairs which have not been successful for the last one year. CEA also presented that past performance of the same equipment has been reported as unsatisfactory during enquiring into eastern grid disturbances.
- (b) The conclusions as emerging from the presentations was that the failure of the Obra-Panki-Muradnagar 400 kV line owned by the UPPCL, triggered a cascade of further failures leading to the Northern grid collapse. There are two issues that the Commission chose to address:
- (i) The responsibility of the CTU for state government owned lines on which inter-state power is transmitted. In this connection, reference may be made to Section 2(e)(ii) of the Electricity Regulatory Commissions Act 1998 which defines inter-state transmission as follows:
- “the conveyance of energy across the territory of an intervening State as well as conveyance within the

State which is incidental to such inter-State transmission of energy”

- ii) It is clear that any state owned line on which inter-state electricity might pass, comes under the regulation of the regional load despatch centres. This point was disputed strongly by the representative of the CTU, Shri Bhanu Bhushan, and we would like to advise the central government to instruct the Powergrid which has been notified as the central transmission utility, to follow the law and to implement it without fail.

8. It was clear from the presentation of the CEA that maintenance of the line was unsatisfactory. The area apparently is heavily polluted and particularly when there is heavy fog as there was at this time, there was flash-over of insulators, which could have been avoided by periodic cleaning. This was apparently not done. The Indian Electricity Rules and recommendations of earlier such enquiries lay down procedures for proper maintenance of such equipment. The CTU should have monitored implementation, especially in such sensitive areas prone to pollution/fog. CTU must take responsibility for doing so wherever in its experience, the equipment is sensitive, and the state authority concerned somewhat negligent in maintenance.

9. The negligence in maintenance by the UPPCL led to the failure of the line and the subsequent events culminating in the collapse of the grid. This is a violation of the CERC's order on the IEGC and should attract penal provision. The Commission, however, proposes to exercise restraint in imposing penalty under Section 45 on the CMD of UPPCL for this negligence

but wishes to make it clear that this restraint will not be repeated. Any further instance of poor maintenance of transmission lines owned by the UPPCL on which inter-state power passes, will attract the heaviest penalty that the Commission can impose.

10. The RLDC claims to have instructed the UPSLDC to back down Anpara power station owned by UP Generation Corporation at 0318 hrs. and again at 0418 hrs. However, UPPCL has denied receipt of the first communication by Anpara or the SLDC. In the absence of definitive evidence, it is difficult for the Commission to take any action on what would otherwise have been a clear case of non-compliance of RLDC instructions. The Commission directs the CTU to immediately install tape recorders with timer facilities in the control rooms of the RLDCs, to record each telephonic conversation separately and reactivate them if they are already in existence. The Commission also suggests to the SLDCs that they should do the same in their control rooms in their own interest. The Commission also directs the RLDC to ensure that any instructions given to the SLDC or any other party in the inter-state transmission system, should be given only through the control room and not from any other part of the RLDC building. The Commission gives one month to the CTU to implement this system and suggests to the SLDCs that they may also do so within one month.

11. The figures below are tabulated from data provided by the NRLDC in its reply filed on 11-1-2001.

<u>Time</u>	<u>Scheduled generation</u>	<u>Actual generation</u>
Singrauli STPS		
1200 hrs.	1840 MW	1952 MW
0030 hrs.	1620 MW	1742 MW
0130 hrs	1540 MW	1631 MW
0400 hrs	1320 MW	1520 MW
Rihand STPS		
1200 hrs.	910 MW	984 MW
0030 hrs.	810 MW	908 MW
0130 hrs	730 MW	800 MW
0400 hrs.	730 MW	730-770MW

12. It is evident that during the period of crisis, Singrauli and Rihand STPS of NTPC had been generating in excess of the schedule given to them by RLDC. This itself is a violation of the grid code (Section 7.4.8 and 7.4.9 of IEGC page Nos.7-3 & 7-4) and deserves the maximum possible censure from the Commission. The Commission does not propose in this instance to impose the penalties under Section 45 that would apply for such a violation of the grid code but will not exercise similar restraint on future occasions and warns NTPC to ensure that it invariably follows the schedule given to it by the RLDC.

13. It is also clear from the data submitted to the Commission by both the CTU and the CEA that NTPC was less than fully compliant in backing down in generation to the extent it was instructed to do so by the RLDC at different times. The representative of NTPC Shri B.N. Ojha, Director, Operations, in his submission did not give any explanation for this non-compliance, but said

that “the stations concerned were in the process of backing down”. However, it was clear from the data submitted that the extent of reduction in generation was never achieved. Again, the Commission is exercising restraint under Section 45 in imposing penalties on NTPC which it will not do on future occasions if such non-compliance is repeated, and warns NTPC to follow all instructions given by the RLDC without demur or delay.

14. It was clear from the presentations made to the Commission that there was lack of time synchronization between the RLDC, the generating stations and the SLDCs. The Commission hereby instructs the CTU to instal a quick and simple procedure for such time synchronization

15. NTPC’s representative also argued at length that it was essential for the RLDC to control the state level generation as well as the other generation coming into the state if it was to exercise adequate control over the grid and maintain its security. The Commission is not satisfied about the need for this. The states have already been asked to provide their drawal schedules from the central generating stations and these have to be matched by the RLDC with the schedules for generation of the central generating stations. Clearly this will be done by the state only after taking into account their generation within the state. However, in view of the insistence of the NTPC, we direct the CTU to once more examine the necessity of implementing this suggestion during its current review of the grid code.

16. It appears from the presentation by the CTU that at a time of crisis when multiple telephone conversations were taking place at the same time and instructions given to different constituents of the system, the entries in the log book might be delayed and some times may not represent what actually transpired. We have already directed the installation of voice activated

recorders to ensure that there is evidence of specific instructions as given. The entries in the log books must also be made immediately once the conversation is over, and done accurately. For this purpose it might be useful for each person in the control room who is giving instructions to note down the time and the instructions and transfer them immediately once the conversation is over, into the log book. CTU is directed to take necessary action.

17. A major direction in the grid code is the restoration of free governor action in all thermal generating stations of 200 MW and above in each generating station. The CTU argued that this had not yet been made operational because the grid code said:

“that it will coincide with the date of implementation of the commercial mechanism mentioned in Section 7.1(d) for the respective region”.

However, it is very clear from even a cursory reading of this instruction that the applicable dates are as given and not contingent on the implementation or otherwise of the commercial mechanism, namely the Availability Based Tariff. In any case, in the interest of security of the grid, it is absolutely necessary to put the generating stations in free governor mode. The free governor actions should have been restored as indicated in the grid code over the last one year since the Grid Code was issued. Not having achieved this over more than one year after the issue of the Grid Code is a major failure of the CTU and the concerned generators. The Commission now directs the CTU and the concerned generators within one month, restoration of the operation of free governors in 500 MW stations. Other 200 MW to 500 MW units should be restored within three months. Any failure in this matter will be treated with the utmost seriousness by the Commission since it is an important factor according to CTU itself, responsible for violating the security of the grid.

18. IEGC had also laid down the restoration of automatic under frequency relays in the sub-stations in each state. This was apparently done only in Delhi and to a great extent has not been done in other states. We direct the CTU and concerned power utilities to restore automatic under frequency relays within a period of two months, and report progress. Compliance may be reported to the Commission at the end of each month, drawing the Commission's attention to those who are not complying.

19. It is apparent that the leadership of CTU/Power Grid is yet unclear about its role in relation to the RLDCs, at normal times and not just at the time of a grid collapse, and the support that should be given to help the RLDC get its decisions implemented. It appears from the record that the NRLDC has done as much as it could in giving instructions to SLDCs and other constituents to avoid the cascading effects that culminated in the grid collapse. They did this in an atmosphere of lack of past support and follow-up by CTU when NRLDC's instructions were ignored.

20. On numerous occasions and again at this enquiry, Shri Bhanu Bhushan on behalf of CTU/PGCIL has expressed inability to implement the Grid Code without the commercial mechanism, namely the ABT, which had been held up for review. The Commission has expressed its disagreement on this matter. Preparing daily schedules of loads and generation, laying down schedules for different constituents in the system, restoration of schedules if required, getting free governors into operation as also restoring under-frequency relays, and other matters in the grid code, do not need the commercial mechanism for implementation. The commercial mechanism will impose financial penalties on those who do not follow the schedules. But without it a lot can be done, and the full weight of the Commission's powers can be called upon to compel

the constituents to follow the schedules. The CTU/Powergrid has not taken this step till now.

21. The Commission can only place this matter before government and ask them to ensure that the leadership of the CTU/PGCIL is appropriate for implementing the Grid Code with full commitment. In the absence of this commitment, the RLDC's will continue to function in isolation, and attempts to improve grid discipline will remain paper exercises.

22. This order of the Commission puts in place various elements which are considered essential to prevent a recurrence of the grid collapse on 2nd January, 2001 in the North.

23. CTU, RLDCs, and all constituents of the inter-state transmission system in the country as a whole are required to implement the directions in this order over the country.

24. In exercise of powers under Section 50 of the Electricity Regulatory Commissions Act, 1998, the Commission delegates the function of carrying on further proceedings in this enquiry to a special Bench comprising of Shri D.P. Sinha and Shri G.S. Rajamani, Members who shall report the outcome of the proceedings before them to the Commission for appropriate action on the findings arrived at by the Special Bench. The further proceedings shall be conducted by the Special Bench on 16-01-2001 at 2.30 PM.

Sd/-
(G.S. Rajamani)
Member

Sd/-
(D.P. Sinha)
Member

Sd/-
(S.L. Rao)
Chairman

Dated 15th January,2001.

**BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Enquiry No.1/2001

Coram

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|---|----------------------------|
| 1 | Shri D.P. Sinha, Member |
| 2 | Shri G.S. Rajamani, Member |

In the matter of

Grid Disturbance on 2nd January, 2001 in the Northern Region.

The following were present:

1. Shri B.Bhushan, Director (O), Powergrid
2. Shri G.P. Singh, ED (NR), NTPC
3. Shri S.R. Yadav, AGM (US), NTPC
4. Shri Vishwaswroop, AGM(Gas), NTPC
5. Shri S. Krishnamurthy, AGM (NR), NTPC
6. Shri Alok Roy, AGM, NRLDC
7. Shri V.K. Agarwal, DGM, NRLDC
8. Shri S.R. Narsimhan, Mgr., NRLDC
9. Shri K.C. Agrawal, Dy. Manager, NRLDC
10. Shri M.S.Kalsi, Dy. Chief Engineer, Nuclear Power Corp. of India Ltd.,
11. Shri Milind Kumar, Advocate, PDD, J&K
12. Shri A.K. Anand, CE (Coordination), PSEB
13. Shri A.S. Arora, Addl, S.E., PSEB, Patiala
14. Shri V.K. Srivastava, EE, UPPCL
15. Shri R.P. Gupta, Sr. A.E., UPPCL
16. Shri Z.S. Dahiya, Director, HVPNL, Panchkula,
17. Shri M.L. Jain, SE (S.O.), HVPNL
18. Shri H.S. Sahai, CE, BBMB
19. Shri R.K. Sehgal, Director, P.R, BBMB
20. Shri P.P. Wahi, S.E. (O&M), BBMB
21. Shri S.K. Behl, CE, DVB,
22. Shri H.N. Lamba, XEN, DVB
23. Shri V.K. Saxena, Add. CE, RVPNL

ORDER
(Date of Hearing 16-1-2001)

The hearing on the causes of grid disturbance in Northern Region on 2.1.2001 was held by the Commission on 15.1.2001. It was decided that the steps taken towards restoration of the grid following the disturbance, would be heard by the Special Bench on 16.1.2001 at 1430 hrs. The Special Bench has accordingly proceeded to hear the matter.

2. The representative of NRLDC explained that as per the black start procedure of Northern Grid which had been issued in 1998, Singrauli was given start up power from Western Region at 0510 hrs., after the disturbance that took place at 0444 hrs. As per the black start procedure, the start up power was to be extended from Singrauli to Rihand and Anpara instantly. However, Anpara-Singrauli line was not holding and start up power could be extended to Rihand only at 0558 hrs. The representative of NRLDC stated that Anpara-Singrauli line could finally be charged only in the evening of 2.1.2001. He informed that the units at BBMB were started but there was delay due to some problem in the start up of Bhakra (R) unit. He explained the entire restoration process and said that the grid was finally integrated at 1332 hrs., but absolute normalcy in terms of meeting the load was achieved by 2115 hrs. In reply to a query from the Bench, the representative of NRLDC explained that the collapse of complete BBMB system at 1017 hrs had been the basic reason for the delay in restoration. He informed that except for the Rajasthan island connected to Udaipur, all other islands in the Northern Region had collapsed primarily due to load generation imbalance and lack of free governor operation.

3. We feel that Delhi island should have survived with BTPS, Rajghat, etc. The representative of NRLDC informed that the Delhi island is designed with 900 MW including BTPS and in case there is mis-match between load and generation, the island fails. The Bench asked if 900 MW for Delhi island was on the higher side keeping in view that the reliable capacity in the island may not add to that. The representative of NRLDC stated that islanding scheme had been decided in NREB forum with DVB and NTPC. The representative of DVB informed that despite a minor mis-match between generation and demand, Delhi island had collapsed probably due to voltage problem. In regard to the delay in start-up of gas based units, the representative of NRLDC informed that Faridabad gas units could not self start and Dadri gas units running on

house load, could not support/sustain supply of power to Dadri thermal units. However, Auraiya units had managed to come back into operation. The representative of NRLDC explained that there had been some problem with Singrauli-Pipri line. Also there had been delay in restoration of BBMB system and there was some problem in circuit breaker at Panipat. It was noted by the Bench that the Panipat breaker problem has been continuing since earlier grid disturbances and it was reported that recommendations in this regard by the earlier Enquiry Committee have not been complied with. Further, the hydro units in Ganga-Yamuna complex could not self start. The representative of UPPCL informed that Rihand (H) units were started at 0450 hrs but due to some problem at Anpara end, Pipri-Anpara line could not be charged. It was also informed that because of circuit breaker problem supply to railway traction could not be extended from Mainpuri.

4. In regard to the failure of islands, Director (Operations), POWERGRID (CTU) mentioned that islands can survive only if there is proper load generation balance. According to him, islanding is against the basic principle of integrated operation of the grid and in present circumstances no island can survive. Bench does not agree with this contention, especially in the light of clauses 6.2(b) and 6.2 (m) of IEGC Survival of islands in different areas in a large integrated grid spread over long distances can help in fast restoration and accelerate revival of the grid and thus reduce the duration of black out.

5. The representative of NTPC informed that Singrauli had received Western Region power at 0515 hrs and start up power was extended to Rihand at 0538 hrs. He further mentioned that Singrauli-Anpara line belonging to POWERGRID was charged from Singrauli end but it tripped. The first unit at Singrauli was put into operation at 0911 hrs while that of Rihand commenced operation at 0954 hrs. The 132 KV Singrauli-Pipri line belonging to UPPCL, had been charged from Singrauli end. The Bench inquired from NTPC the reasons for which Faridabad gas units could not be self started and the reasons for failure to extend start up power to Dadri thermal units from Dadri gas station. The representative of NTPC explained that the Faridabad gas units were on house load operation. The representative of NRLDC however informed that the Faridabad gas units could not be started because of some problem with the DG set. The representative of NTPC informed that the Dadri gas units were on house load operation following the grid disturbance but the ICT of gas station is to be first charged from an external source before extending start up power. Panipat-Dadri line was charged but it tripped from Panipat end on over- voltage. He mentioned that on the advice from NRLDC, the charging of ICT was tried with the gas units but transformer tripped with a heavy sound and the tripping had been due to heavy magnetizing current. In view of this, there was delay in extending start up power to Dadri thermal units. The

representative of CTU explained that basically there were two problems at Dadri gas station. The first problem is about the DG set; it has been recommended by an earlier enquiry committee that a new DG set should be installed since the existing one was of insufficient capacity to crank up the gas turbines. This has not been done. He, however, added that this problem was not experienced this time as the units were on house load. The second problem was due to the fact that the large 500 MVA transformer has high in-rush current during charging and this had caused the operation of differential relay protection. He suggested that a revised scheme for Dadri gas units has to be worked out by NTPC in consultation with Siemens.

6. The representative of BBMB informed that Panipat-Dadri line belongs to POWERGRID but Panipat sub-station belongs to BBMB. The equipment at Panipat end had been supplied by POWERGRID and the same has been erected by BBMB on deposit work basis. He informed that the protection scheme of Panipat sub-station was to be revised as per the recommendation of the Committee constituted under the Chairmanship of then Member (G&O), CEA, at the time of grid disturbance of December 1996. He, however, stated that POWERGRID is offering a protection scheme which is 15 years old and is obsolete, but BBMB is requesting for the state-of-the-art/latest protection scheme. He mentioned that the issue still remains unresolved.

7. The representative of RVPNL informed that they had acted in accordance with the NRLDC instructions. RVPNL system got islanded at the required time and thus were saved from a greater agony.

8. We find in the present case that the restoration time has been more than 10 hours. We are of the view that the full restoration of the grid should not take such a long time. The Bench directs the CTU to review the existing procedure for early restoration of the grid including black start in consultation with the parties concerned and submit a copy of the same to the Commission within three months. Appropriate studies shall be carried out to check black start recovery scheme so as to ensure the system's readiness for fast recovery of the grid after the disturbance. It should be ensured that the overall maintenance of the system is not lost sight of. The CEA was asked to compile a list of recommendations of the earlier Enquiry Committees and status of their compliance. The CTU shall ensure that these recommendations are complied with within six months and any help required for implementation of the same shall be sought from the Government. We note that the PGCIL has excellent potential for management of transmission

lines including their construction but as CTU, they have not been able to manage the grid in a satisfactory manner. Government may look in to this matter and take suitable steps as it is the Government which notified PGCIL as CTU under Section 27 A, under the amendment to Indian Electricity Act, 1910 .

Sd/-
(G.S. Rajamani)
Member

Sd/-
(D.P. Sinha)
Member

New Delhi
Dated the 16th January, 2001.