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NRLDC/ABT-NR/

Date: 16th June 2003

As per mailing list

SUB: Availability Based Tariff (ABT) regime in Northern Region – A feedback on the first six month period DEC 2002 – MAY 2003.

Dear Sir,

This report is third in the series of our feedback reports on the performance of the Northern Region under ABT regime. Through these reports, we attempt to provide a comprehensive analysis of different aspects related to system operation as enumerated below. The present report and the earlier reports are also available at our website (www.nrlcdc.org) on the home page under the link Reports/ABT Feedback.

- A. Frequency profile:** The Indian Electricity Grid Code (IEGC) mandates all regional constituents to ensure that the Grid frequency always remains within the 49.0 – 50.5 Hz band, the range within which steam turbines conforming to IEC specifications can safely operate. Analysis of the month-wise frequency data for the period Dec 2002 to May 2003 vis-à-vis the same period last year clearly indicates a remarkable improvement in the frequency profile in the post-ABT regime whereas the capacity addition in generation during the year has rather been insignificant (400 MW). The main reason for adverse frequency profile in January 2003 was the intense cold wave conditions (worst in 40 years as declared by Met department) coupled with some unscheduled outages. The full details in this regard have already been given in our earlier report. Figure-1 shows the month-wise percentage of time the frequency remained outside the IEGC band in the pre-ABT and post-ABT scenario.

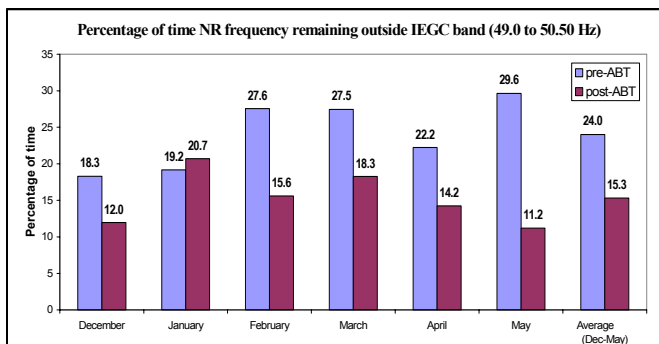


Fig.1

It is worth mentioning that a good antecedent frequency of 50.16 Hz along with underfrequency relay load shedding could avert a Grid collapse at 2342 hrs on 19th May 2003 when the entire Singrauli power station generating 2000 MW tripped due to a fault at its 132kV station bus, resulting in loss of auxiliary supply to the circulating water (CW) system at the power station. The system frequency dropped sharply from 50.16 Hz to 48.26 Hz and recovered within minutes to around 49.0 Hz and the system remained in tact.

- B. Voltage profile:** The voltage profile has also remained satisfactory in the last six months barring the period of severe load crash on the night of 18th / 19th February 2003, which was an exceptional event. The first set of reactive energy accounts for the period starting 1st Dec 2002 was issued by NREB secretariat on 28th March 2003. These are now being issued regularly on a weekly basis similar to the Unscheduled Interchange (UI) account. A reactive energy charge is expected to have a salutary affect on MVAR draws in comparison to the past years and NRLDC does not anticipate an operational problem on the low voltage front in the remaining period of this summer 2003.

C. Network loading and system security: The outages in the long distance transmission network during the period Dec 2002 – Feb 2003 had been mentioned in our earlier report. The period March 2003 – May 2003 was by and large normal with no outages or problems on the EHV long distance transmission network except for the outage of 400 kV Kanpur – Ballabgarh S/C line for a short period in May 2003 when the line went under forced outage due to collapse of a tower near Mainpuri. POWERGRID restored this line through the Emergency Restoration System (ERS). No transmission constraint was experienced on account of this outage.

Constraints were however experienced during April –May 2003 in evacuating the full output of URI power station during the period whenever one circuit of 220 kV Kishenpur – Pampore D/C line of PDD J&K went under forced outage. These circuits are the only major outlets for evacuating power from the Kashmir valley under high hydro conditions. In view of the fluctuating load in the Kashmir valley during this period, URI generation had to be frequently regulated taking into account the loading on 220kV Kishenpur – Pampore line. We have initiated a process for categorising the entire period of outage of one or both circuits of 220kV Kishenpur – Pampore as a transmission constraint and exempt URI power station from the Unscheduled Interchange (UI) mechanism, as only this would enable maximum utilisation of water at URI. The matter is under formalisation process.

D. Scheduling: As mentioned in our earlier report, the day ahead schedules and revisions thereof are being carried out in line with the IEGC provisions and complete information is being made available at the NRLDC website (www.nrldc.org) for access by the constituents. It is noteworthy to mention that merit order in generation is consistently being achieved through this process which shows that pithead stations are being scheduled almost to their full declared capability.

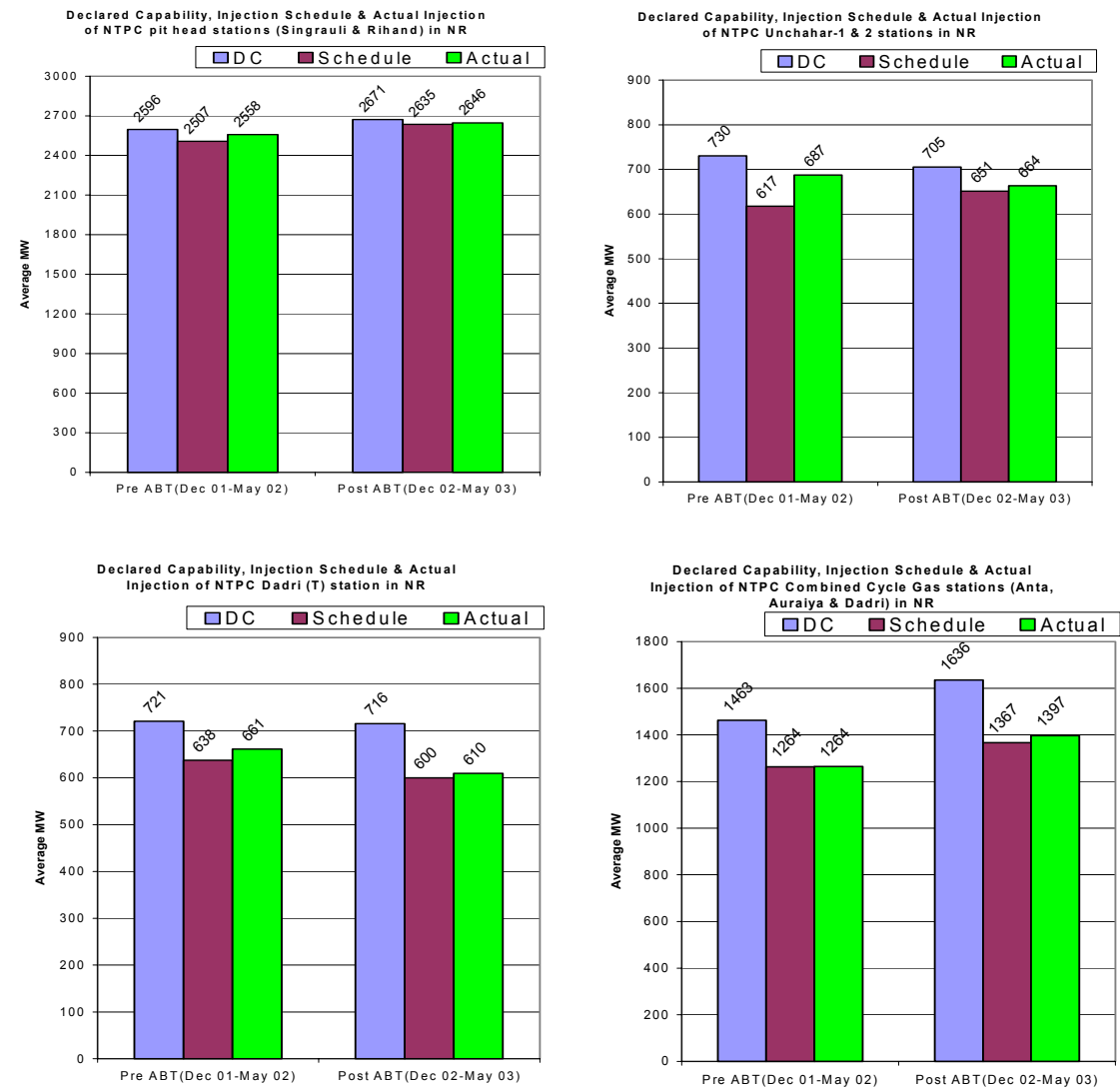


Fig.2

Figure -2 shows the declared capability, net injection schedule and actual generation comparison for the NTPC ISGS stations in NR during the period Dec 2002 – May 2003 with the corresponding period last year. It would be seen that the coal pithead stations having lower energy charges were scheduled much higher this year. Likewise, the generating stations at Unchahar having a moderate energy charge (of the order of 110 paise/KWH) received much higher schedule in the post-ABT scenario while Dadri (Thermal), a load centre based coal fired station having a higher energy charge (of the order of 150 paise/KWH) has been scheduled lower than last year's level. The combined cycle gas power stations were also scheduled higher as compared to last year. However, the capability available on liquid fuel has been scheduled to relatively lower levels depending on the requirement of constituents. For instance, combined cycle stations as a whole have been scheduled to 91 % of their declared capability during January 2003 (a high demand month) against only 72 % during March 2003 (a low demand month). Similarly requisition from liquid fuel in combined cycle stations has varied from a high of 71% in January 2003 to a low of 22% in March 2003. All the above substantiate the overall efforts in the region to achieve a better merit order operation.

The Availability Based Tariff (ABT) provides a commercial incentive to ISGSs to raise generation under low frequency and back down during high frequency conditions. The effect of this mechanism on NTPC ISGS is described separately in section G below.

- E. Bilateral agreements for trading:** Section 7.4.5 of the IEGC states that the SLDCs / STUs shall regularly carry out the necessary exercises regarding short-term and long-term demand estimation for their respective states to enable them plan in advance as to how they would meet their consumer's load effectively. Deviations from the schedule are priced appropriately based on the system frequency unlike a firm price for scheduled exchanges. Obviously, any SLDC cannot premise its operational planning on Unscheduled Interchanges (UI) and bilateral agreements provide a suitable hedging tool for this purpose.

In this context it is worth mentioning that the energy traded through bilateral exchanges for the period Dec – May in post-ABT scenario has been a staggering 1622 MU through nine (9) bilateral agreements per month on an average proving a substantial increase over the same in last years.

The trend upto now has mostly been in respect of long-term bilateral agreements on seasonal basis. The potential for short term trading (a day in advance or a few hours' notice) has not been exploited very much so far. In our earlier report we had stated that NRLDC is displaying on its website the details of unrequisioned power from ISGS on day-to-day basis to facilitate trading between the states or between ISGS and the states. NTPC and the states should take the necessary steps to further exploit the short term trading also.

ABT has been implemented in the Eastern Region with effect from 1st April 2003 while in North-Eastern Region, the same is expected to be implemented from 1st October 2003. With four out of five regions already in the ABT regime and the growing recognition of bilateral agreements as a hedge instrument, it is expected that more and more bilateral agreements would be executed. Considering the limited capacity of interregional links with NR, it is important that opportunities for bilateral trading within the region need to be fully exploited before going inter-regional.

- F. Actual generation by NHPC power stations vis-a-vis schedules:** NHPC stations have generally been scheduled to their full declared capability except in case of storage projects like Chamara where NRLDC had to intervene on some occasions in the interest of better system operation and to facilitate the utilisation of the water reserves during contingent conditions. As per clause 3.14 of the CERC's notification dated 26th March 2001 specifying the terms and conditions of tariff determination, a tolerance limit had to be specified by the Central Transmission Utility (CTU) within which the actual energy generation can vary vis-à-vis the declared energy. This is to prevent any under-declaration and availing of undue benefit of the Unscheduled Interchange (UI) mechanism by the generators. The issue was discussed in the Operation Co-ordination Committee (OCC) meeting of NREB in February 2003 and the Commercial Committee of NREB in March 2003. Based on this, the CTU has specified a tolerance of three (3)% vide its letter dated 23rd April 2003.

- G. Comparative study of actual generation by NTPC stations:** Considering that NTPC has the largest presence in Northern Region, an analysis has been made on the performance of all the NTPC ISGSs in NR.

From Figure-2 in section-D it would be observed that the actual generation of Unchahar-I & II and Dadri (Thermal) has reduced while generation at pithead and combined cycle stations has increased as compared to the corresponding period last year (pre-ABT period). However, cumulative generation of all NTPC ISGS stations in NR has increased by 2.8% in ABT period as compared to pre-ABT period. The performance of NTPC power stations at high frequency and low frequency conditions also have been analysed as brought out at Figure 3.1& 3.2.

From figure 3.1 it can be seen that in the pre-ABT scenario, there was large scale overgeneration above 50.3 Hz. Clearly, this additional generation was a waste leading to high frequency in the grid. In ABT regime, the stations have the incentive of saving on fuel cost by backing down generation at high frequency. Therefore in post-ABT regime, overgeneration at high frequency has considerably reduced resulting in economy and security of the grid.

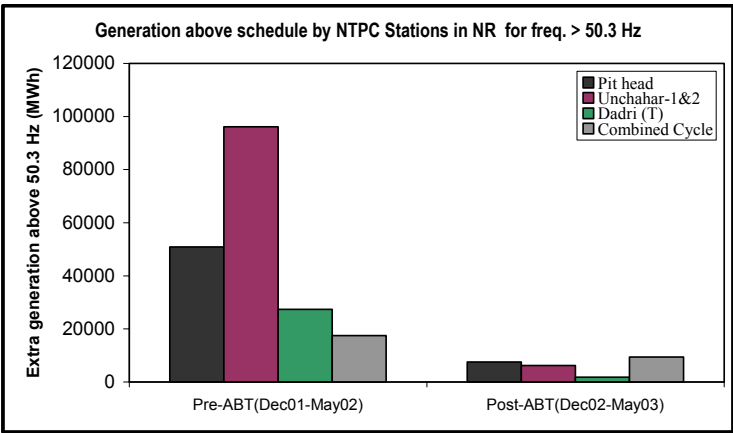


Fig.3.1

On the low frequency front, however, there has been stepping up of generation above the schedule only in case when the latter is less than the Declared Capability. From figure 3.2 it is evident that generation above schedule has considerably reduced in post-ABT as compared to pre-ABT regime except in case of combined cycle stations. Since pithead stations are already being scheduled to their full declared capacity, there have been almost no margin available to increase generation above schedule. The Combined cycle stations on liquid fuel and load centre stations, to whom schedules have been less than the declared capability due to relatively higher energy charge, were able to enhance generation and earn Unscheduled Interchange (UI) under such conditions.

We had stated in our 18th March 2003 report about how the benefit of overload capability and a lower than normative auxiliary consumption had been resulting in a higher ex-power plant sentout in the pre-ABT period. The same is not available now to the grid. For example, an additional 50-75 MW out of Singrauli plant under different operating conditions is not available to the grid as compared to pre-ABT regime generation in view of interpretations of certain provisions in the CERC's orders on ABT.

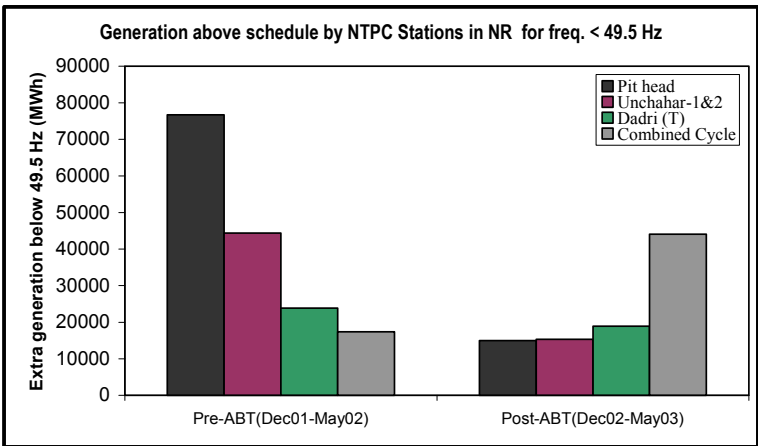


Fig.3.2

Thus, the actual generation in the post-ABT scenario at NTPC stations has been governed by the following factors:

- (i) Scheduling as per merit order resulting in a lower schedule for Dadri (T) and combined cycle stations on liquid firing.
- (ii) Voluntary backing down by stations above 50.3 Hz, which is prescribed by IEGC and disincentivised by the ABT mechanism.
- (iii) Bottling up of capacity beyond “installed capacity less normative auxiliary consumption” due to the present interpretation / confusion over Section 2.1 & 2.18 of the CERC's notification dated 26th March 2001 on the terms and conditions of Declared Capability (DC) vis-à-vis tariff.

As stated above, the first two actions are desirable from system viewpoint, the third is not and deserves to be resolved quickly.

H. Transfer of data from Special Energy Meters (SEMs) to NRLDC:

NTPC is still not forwarding to NRLDC / NREB the data from the standby meters installed on the high voltage side of Generator Transformers (GTs) and Station Transformers (STs). This is despite the decisions taken in various NREB forums in the past in consistence with the SEM metering philosophy.

With regard to transfer of SEM data from the respective stations to NRLDC, all the ISGS stations except RAPS-B of NPC are transferring the SEM data to NRLDC regularly. However the response from some state constituents is not very heartening. For instance, out of 126 meter locations belonging to states / BBMB only 32 locations are taking up this responsibility themselves (15 from BBMB, 10 from PSEB, 3 from PDD J&K, 2 from HPSEB and 1 each from RVPNL & HVPNL). The lack of interest by other state constituents in this area is a cause of concern. Constituents need to realise that the SEM data is an essential part for the timely and correct settlement of UI under ABT mechanism and is a collective responsibility.

I. UI Economics for constituents / Operation of Pool Accounts:

An analysis has been made on the cost each constituent has incurred or received towards UI during 1st January to 25th May 2003 from the 15 – minute data made available by NREB Secretariat. The weighted average UI rate both for the overdrawl and underdrawl periods in respect of different constituents have been worked out and graphically illustrated at Figure-4.1. As illustrated, a number of states have consistently reaped the benefit of UI mechanism. A similar graphical representation for ISGS stations in NR appears at figure-4.2.

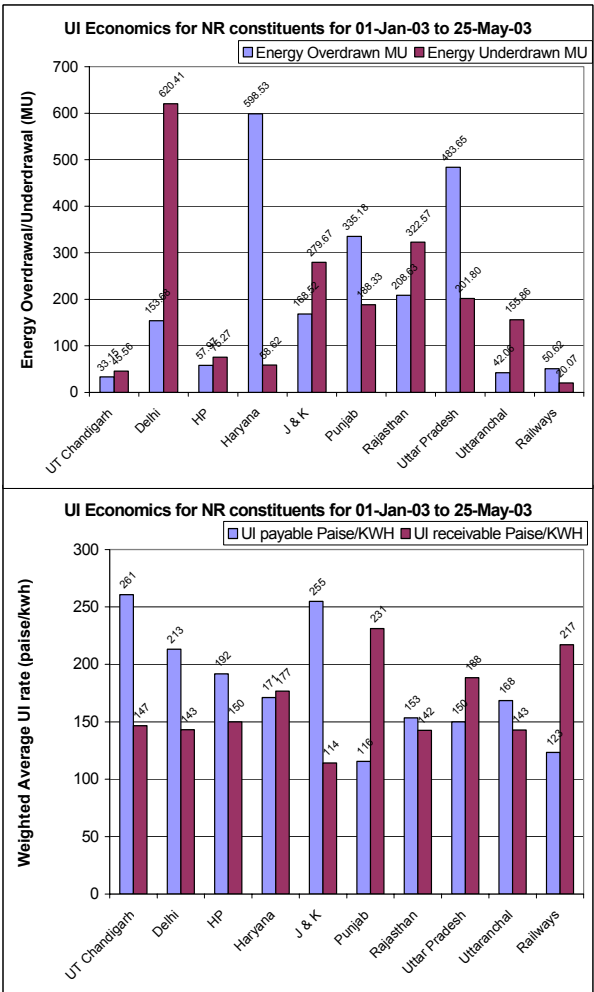


Fig.4.1

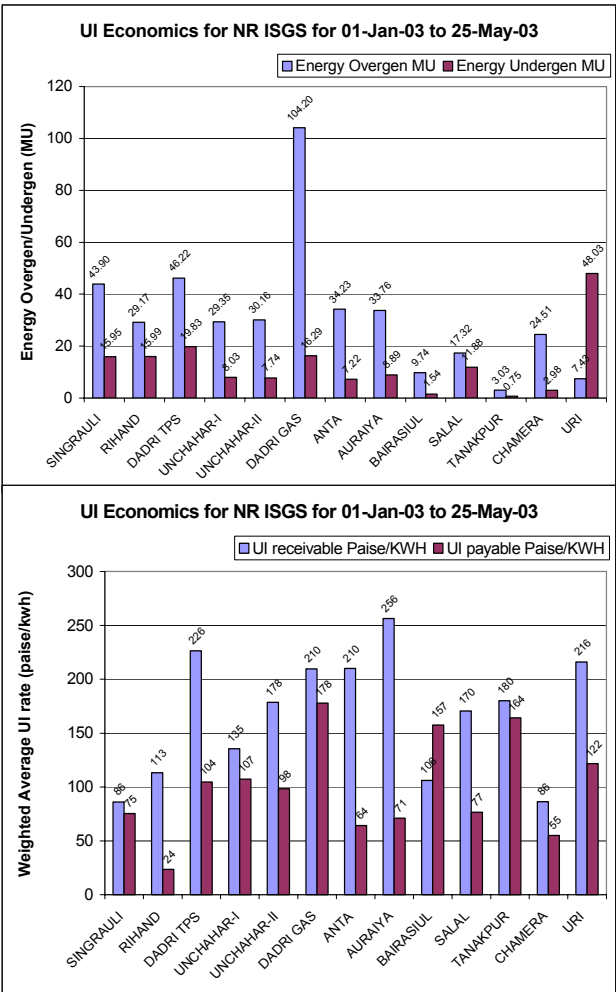


Fig.4.2

UI charge accounts and Reactive charge accounts for the week ending 1st June 2003 have also been issued. Outstandings against UI by J&K, MPSEB and BSEB have been adversely affecting the sentiments of an otherwise smooth-running ABT mechanism in the NR. NRLDC had filed petitions on the issue before the

CERC in March 2003 which were heard on 20th May 2003. MPSEB has since paid these amounts while BSEB has assured to pay the same by July 2003. Positive response from PDD, J&K is still awaited.

J. Current Situation:

The positive trends in the performance of Northern Region under ABT mechanism continues in increasing proportions as can be perceived from the operational data of the current month upto 15th June 2003. Whereas a regional peak demand of 20638 MW and a maximum daily energy of 457.7 MU were met during June 2002, the corresponding figures this year has already been much higher at 23015 MW and 483 MU respectively (met on 11th June 2003). Eventhough there has been a marked improvement in the frequency profile in the region in Post-ABT regime, large excursions in frequency still continue which is expected to be arrested by putting the generators in the region in free governor mode of operation. It is heartening to mention that all the constituents of NR have now resolved in the last TCC/Board meeting of NREB held on 13-14th June 2003 to adopt free governor mode of operation w.e.f. 1st October 2003.

We have attempted to give an objective and comprehensive assessment of the situation in the last six (6) months of ABT regime in Northern Region. The performance related data, reports, entire information related to scheduling and metering data/accounts are available and continuously updated on the website www.nrldc.org. The facilities on the website has further been enhanced by addition of several features e.g. a sound alert for every revision of schedule, latest status of UI pool account etc.

We hope that the above feedback on ABT would be useful in bringing about improvements in the system operation front. We look forward to your comments and suggestions on any of the above issues or any other related issue.

Thanking you,

Yours faithfully,

(ALOK ROY)
General Manager