Chapter-II

Performance reviews relating to Government Companies

2.1 Renovation & Modernisation and Refurbishment activities in Thermal Power Stations of Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited

Executive Summary

Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited was formed in 1980 for construction of new thermal power stations (TPS) in the State. As on 31 March 2009, the Company had seven TPS having derated capacity of 4,032 MW. Many units of these TPSs have crossed their useful working life of 25 years and some of them have been lying closed since long, creating acute shortage of power in the State.

Project planning and Report formulation

R&M and refurbishment activities involve identification of the problems of unit of TPS, preparation of techno economic viability reports, preparation of detailed project reports (DPR) to lay down benefits to be achieved from these works. Power Finance Corporation (PFC) sanctions loan equal to 70 per cent of the estimated cost of the activity against guarantee furnished by the State Government and rest of the fund is met through internal sources or loan from State Government. Ill planning of the Company led to non installation of major equipments during R&M and refurbishment shutdown period and non adherence of annual maintenance schedule in many instances in violation of CEA directives. The Company was unable to maintain sustainable levels of performance.

Execution of works

R&M and Refurbishment works of Rs 2363.52 crore were executed in Harduaganj, Panki, Parichha, Anpara 'A', Obra 'A' and B TPS. These works, along with supply of equipments/material were mostly awarded to BHEL on single quotation basis. Thus the purpose of getting the work done at competitive rates was defeated. Though negotiations were held with BHEL but basis for carrying out negotiations to keep the cost of works at lowest level could not be ascertained in the absence of competitive bidding. Instances of deficiencies in material procurement, poor quality of R&M works and delayed execution of refurbishment works were noticed.

Post R&M/ refurbishment Performance evaluation

The performance of TPSs after carrying out R&M/Refurbishment was much short than expected/envisaged. It indicated that R&M/refurbishment works were not carried out efficiently, economically and effectively. This resulted in loss of Rs 3031.11 crore during 2006-07 to 2008-09 on account of non achievement of norms.

Environmental Issue

Ministry of Environment and Forest (MoEF), Government of India launched (March 2003) the charter on Corporate Responsibility for Environmental Protection (CREP) for compliance of regulatory norms for prevention and control of pollution. The Charter provided for installation of new ESP, provisioning for dry fly ash handling and storage system, ash water recirculation system and opacity system for monitoring emission levels by December 2005. The Company, however, could not complete the said work in any of its TPS (September 2009). As a result, the Company could not get air and water consent from UPPCB for any of its TPS and the Company was penalized with additional water cess amounting to Rs 14.24 crore for 2008-09 alone.

Introduction

2.1.1 Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (Company) was incorporated for construction of new Thermal Power Stations (TPS) in the State. The Company constructed and operated only one power station - Feroz Gandhi Unchahar Thermal Power Project. This project was also transferred (February 1992) to National Thermal Power Corporation (NTPC) by the State Government towards the electricity dues of then Uttar Pradesh State Electricity Board (UPSEB). Subsequently, the responsibility of maintaining and operating TPSs in the State was transferred to Company on 14 January 2000 after unbundling of UPSEB in terms of UP Electricity Reforms Act 1999 and UP Electricity Reforms Transfer Scheme 2000.

As on 31 March 2009, the Company was operating seven TPSs having aggregate derated capacity of 4032 MW. The TPS wise details of the installed, derated capacity and their period of installation as on 31 March 2009 are as under:

Sl. No.	Name of TPS	Unit No.	Installed Capacity	Derated Capacity	Year of Commissioning
1.	Obra A	01	50	00[1]	June 1967
		02	50	50	February 1968
		03	50	00[2]	August 1968
		04	50	00[2]	June 1969
		05	50	00[2]	June 1971
		06	100	94	July 1973
		07	100	94	December 1974
		08	100	94	September 1975
2.	Obra B	09	200	200	January 1980
		10	200	200	January 1979
		11	200	200	December 1977
		12	200	200	March 1981
		13	200	200	July 1982
3.	Panki	03	110	105	November 1976
		04	110	105	March 1977
4.	Harduaganj	03	55	55	January 1972
		05	60	60	March 1977
		07	110	105	May 1978
5.	Parichha	01	110	110	March 1984
		02	110	110	February 1985
		03	210	210	November 2006
		04	210	210	December 2007
6.	Anpara A	01	210	210	March 1986
		02	210	210	February 1987
		03	210	210	March 1988
7.	Anpara B	04	500	500	July 1993
		05	500	500	July 1994
	Total		**4265**	**4032**	

At the time of handing over of TPS to Company (January 2000) all units were over due for undertaking refurbishment or Renovation and Modernisation (R&M) activities. R&M activities are aimed at overcoming problems in operating units caused due to generic defects, design deficiency and ageing by re-equipping, modifying, augmenting them with latest technology/systems. R&M activities are undertaken in TPS operating at Plant Load Factor (PLF[3]) of 40 per cent and above after assessing the performance and requirement of the units. Whereas refurbishment is aimed at extending economic life of the units by 15 to 20 years which have served for more than 20 years or operating at PLF below 40 *per cent*[4].

1 Unit No.1 of 50 MW became operational from May 2009.
2 Units deleted from operation.
3 Plant Load Factor (PLF) is the ratio of installed capacity of generation to actual generation.
4 As per Central Electricity Authority norms.

Company accordingly decided and planned for refurbishment of units completing 20 years or more life, and R&M of units completing more than 10 years of life and implementation of annual overhauling schedules strictly.

In 1999-2000 the PLF of Harduaganj TPS was 17.67%, Panki TPS 38.92%, Parichha TPS 28.96%, Obra 'A' TPS 22.83%, Obra 'B' TPS 45.20%, Anpara 'A' TPS 62.58% and Anpara 'B' TPS was 91.80%. In view of CEA guidelines refurbishment of Harduaganj, Panki, Parichha and Obra 'A' TPS should have been got done. Instead of undertaking refurbishment activities company planned R&M activities for Harduagaj, Panki, Parichha and Obra 'A' (Unit No. 6) TPSs. Details relating to units planned for R&M, actual date of start and completion of R&M works indicating expenditure incurred on these works have been incorporated in **Annexure-7.**

Organisational set up

2.1.2 The governance of the Company is vested in Board of Directors (BOD) comprising of a Chairman, one full time Managing Director (MD) and three Directors. The MD is the overall incharge of the Company and is assisted by Chief Engineers at Headquarters/TPS level. A General Manager supervises the R&M and refurbishment work at each TPS, monitored by R&M/refurbishment Wing of headquarters of the Company.

Scope of Audit and Sample Size

2.1.3 The present Performance Review conducted between July 2008 and April 2009, covered R&M activities at Anpara 'A', Harduaganj, Parichha, Obra 'A'(unit no.6) and Panki TPSs and Refurbishment of Obra 'A'(unit no. 1 to 5) & Obra 'B' TPS. The activities undertaken in six TPSs during the period 2004-05 to 2008-09, including supply, commissioning and operational performance during pre and post R&M and Refurbishment period have been covered in the review involving capital outlay of Rs 2363.52 crore **(Annexure-7).**

Audit Objectives

2.1.4 The main objectives of the performance review were to examine whether

- R&M and Refurbishment of TPS (units) was undertaken after establishing technical feasibility and economic viability;
- R&M/Refurbishment activities undertaken complied with guidelines prescribed in the matter by Central Electricity Authority (CEA)/Uttar Pradesh Electricity Regulatory Commission (UPERC)/Consultants.
- contracts were awarded in a competitive, fair and transparent manner and with due regard to economy.
- the projects were executed within the estimated project cost in time and quality was ensured in execution.
- the Renovated and Modernised/ Refurbished units delivered the envisaged benefits as per DPR.

Audit Criteria

2.1.5 Audit adopted the following criteria:

- Thermal Power stations generation reports

- Detailed Project Reports, Techno economic viability reports and consultants reports and targets set therein.
- Agreements of awards of contracts for Renovation and Modernisation and Refurbishment
- Standing technical orders of the Company and Central Electricity Authority for execution of works of Refurbishment and Renovation & modernization.

Audit Methodology

2.1.6 Audit adopted mix of the following methodologies at headquarters and TPS to analyse records/data for deriving audit conclusions:

- scrutiny of the guidelines issued by the CEA/UPERC/Consultant (NTPC)/State Government.
- examination of agenda and minutes of the Board of Directors (BOD) meetings.
- scrutiny of the tender documents and agreements
- scrutiny of the records relating to R&M and Refurbishment activities.
- interaction with the Management

Audit Findings

2.1.7 Audit findings emerging from performance review of R&M and Refurbishment have been discussed in the succeeding paragraphs. The Audit findings were reported to the Management in June 2009 and Exit Conference was held with the Management (August 2009). Replies received (July/September 2009) from the Management and views expressed in the exit conference have been taken into consideration while finalising the Review.

Project Planning and Report Formulation

2.1.8 R&M and refurbishment activities involve identification of the problems of unit of TPS, preparation of techno economic viability reports, preparation of detailed project reports (DPR) indicating scope of works, estimated costs, time period for completion of work and benefits to be achieved from these works. Necessary permission and clearance for R&M and Refurbishment activities from Uttar Pradesh Electricity Regulatory Commission (UPERC)/CEA/State Government were obtained. Residual Life Assessment (RLA) study was also conducted for all Refurbishment activities and in major R&M works. For Refurbishment and R&M activities Power Finance Corporation (PFC) sanctions loan equal to 70 *per cent* of the estimated cost of the activity against guarantee furnished by the State Government and rest of the fund is met through internal sources or loan from State Government. Audit observed that in case of Harduaganj and Anpara 'A' TPS benefits to be achieved after R&M activities were not analysed in DPRs of these TPS while in case of Obra 'A' (Unit No.6) DPR was not prepared to carry out R&M works.

Ill planning of the Company led to non-installation of major equipments during R&M and refurbishment shutdown periods and non adherence of annual maintenance schedules of TPSs in many instances in violation of CEA guidelines.

2.1.9 CEA, in consultation with Management identified (August 2002) Unit No.7 of Harduaganj TPS for refurbishment as the PLF of the unit was 32.66 *per cent* in 2000-01 and 27.32 *per cent* in 2001-02. The management, ignoring the CEA recommendations and guidelines instead undertook R&M of the unit during May 2005 to January 2006 incurring expenditure of Rs 27.60 crore thereon. The DPR did not set any norm of PLF to be achieved after R&M but according to the norms of UPERC it should have been 28 *per cent* in 2006-07, 40 *per cent* in 2007-08 and 2008-09. The unit could barely achieve 23.79 *per cent* PLF in 2006-07, 31.11 *per cent* in 2007-08 and 39.48 *per cent* in 2008-09. The Management eventually decided (March 2009) to carry out refurbishment of the unit at a further cost of Rs 290.00 crore. Thus, ill planned R&M activities led to avoidable expenditure of Rs 27.60 crore.

The Management stated (September 2009) that unit no.7 was very old. Reply is self-explanatory as Management was aware of the age and due to low PLF of the unit it needed refurbishment works instead of R&M works, which should have been undertaken as per guidelines of CEA.

2.1.10 In compliance to the directives (April 2003) of the Central Pollution Control Board (CPCB), Electro Static Precipitators (ESP) were to be installed/revamped at all TPSs. Board of Directors approved (December 2003) the proposal to install new ESPs in Obra 'A'(unit no.6) and Parichha TPS (unit no.1&2). The installation of new ESP requires a major shut down of machines for a period of 12 months.

The ESP, supplied by the firm during June 2007 to November 2008, is lying idle because its installation required further shut down of machines for 12 months which could not be planned by the Company (July 2009).

(i) Audit noticed (February 2009) that R&M scheme of Obra 'A' (Unit no.6) approved by the BOD in April 2005, did not provide for installation of new ESP despite CEA directing the management to install ESP during R&M period. The R&M of the said unit was completed in March 2008. Non installation of ESP now would cause loss of generation of minimum 333.74 MU valuing Rs 64.75 crore[1].

In Parichha TPS the R&M work of unit No.1 & 2 was taken up by the Company in May 2002 and completed in June 2006. The Company placed an order on BHEL in October 2006 for supply, erection, testing and commissioning of ESP along with Opacity monitors for Rs.40.50 crore, including commissioning charges of Rs.9.50 crore after completion of R&M work. The ESPs, supplied by the firm during June 2007 to November 2008, have been lying idle because the installation requires further shut down of machines which has not been planned by the Company so far (November 2009). Thus, poor planning led to blocking of funds of Rs. 31 crore incurred on procurement of ESP and would have to sustain generation loss of 567.94 MU valuing Rs 132.33 crore[2].

The Management stated (September 2009) that

- In case of Obra, for installation of new ESP, existing space was not sufficient. The reply is not convincing as committee constituted for Environmental Protection Scheme of Obra TPS had found foundation adequate and had recommended for utilizing existing foundation for erection of column of new ESP to save time and money.

1 Based on PLF of 40.54% (2006-07).
2 Based on PLF of 58.94% (2006-07).

- In Parichha TPS decision to install the ESP was taken by BOD in April 2006 and order for installation was placed in October 2006 while R&M work was completed in June 2006 hence it could not be installed during R&M period. The Reply is not convincing as the decision to install ESP was already taken by BOD in December 2003 but due to delay in processing of proposal of procurement of ESP it could not be installed during R&M period.

(ii) Steam and Water Analysis System (SWAS) analyses the quality of water used in Boiler and it is an essential system for monitoring the proper running of plant. The Company placed purchase orders in December 2006 and February 2007 on Instrumentation Limited, Kota for supply, erection and commissioning of SWAS in Harduaganj TPS for Rs 24.20 lakhs and Obra 'A' TPS for Rs 111.26 lakh. The systems were received in May 2007 and November 2007 respectively but were lying idle as the same could not be erected and commissioned (March 2009) Non erection and commissioning of system resulted in blockade of funds amounting to Rs 1.35 crore.

The Management admitted (September 2009) that SWAS equipment in Haraduaganj TPS has now been erected and expected to be commissioned by August 2009 (still incomplete, November 2009) while in Obra 'A' TPS it would be installed during major overhauling of Unit Nos.7 and 8. Delay in installation/non-installation of SWAS are indicative of lack of proper planning which caused blockade of fund of Rs.1.35 crore and non achievement of intended benefits.

Annual maintenance of units of all TPS was done at an interval of 3 to 4 years which caused continuous deterioration in the condition of machines and caused forced outages and frequent R&M.

2.1.11 To ensure long term sustainable levels of performance, it is important to adhere to periodic maintenance schedules. The efficiency and availability of equipment is dependent on the strict adherence to annual maintenance and equipment overhauling schedules. Non adherence to schedule carry a risk of the equipment consuming more coal, fuel oil and a higher risk of forced outages which necessitate undertaking R&M works. These factors lead to increase in the cost of power generation due to reduced availability of equipments which affect the total power generated.

Audit observed (January 2009) that annual maintenance of units of all TPS was done after a delay one to four years **(Annexure-8).** The delayed maintenance caused continuous deterioration in the condition of machines causing forced outages[1] and frequent R&M. The consequent increased consumption of oil, coal and loss of generation of power have been discussed elsewhere in the performance review.

Execution of Work

R&M and Refurbishment works amounting to Rs 2363.52 crore were awarded to BHEL on single quotation basis which defeated purpose of getting work done at competitive rates.

2.1.12 R&M and Refurbishment works amounting to Rs 2363.52 crore in Harduaganj TPS, Panki, Parichha, Anpara 'A', Obra 'A' and 'B' TPS were executed through BHEL on single quotation basis. Thus the aim of getting the work done at competitive rates was defeated. Though negotiations were held with BHEL but basis for carrying out negotiations to keep the cost of works at lowest level could not be ascertained in the absence of competitive bidding. R&M activities included work related to Boiler, Turbine Generator, Bowl Mills, 6.6 KV Auxiliaries, Breakers, C&I equipment and coal handling plants equipments. These equipments are to be procured or got rectified from original

1 Forced outages is closure of plant in excess of prescribed limit due to break down in the system.

manufacturer or other manufacturers who can provide modified version of equipments for the obsolete equipments/spares of the original plant aimed at improvement in PLF, Plant availability factor, reduction in fuel consumption and auxiliary consumption which further improve the environmental conditions also. Instances of deficiencies in material procurement, poor quality of R&M works and delayed execution of refurbishment works noticed during the course of Audit are as under.

Material Procurement

2.1.13 Procurement of material should have been done after making proper assessment of material required in accordance with purchase manual to make purchase procedure transparent. Audit observed non compliance of standards of purchase in following procurement for R&M and Refurbishment activities.

The Company invited (April 2001) tenders for procurement of oil servometers of governing and interceptor valves from PFC approved vendors for Panki TPS. In response BHEL and SKODA (Original equipment manufacture) participated in the tender. While finalising the tender, Price Bid (Part-II) submitted by SKODA was not considered on the ground of non-submission of earnest money in the desired shape and order was placed (February 2002) by the Company on BHEL for Rs 70 lakh. Audit noticed (March 2009) that in case of other two tenders floated for procurement of L.P. rotor and Barring gear assembly, Price Bid (Part II) of SKODA was opened (October 2002) and their rates were found lower by Rs 0.49 crore (Rs 6.80 crore – Rs 6.31crore) and Rs 0.34 crore (Rs 0.70 crore – Rs 0.36 crore) i.e. constituting 7.7 *per cent* and 97 *per cent* respectively as compared to rates offered by BHEL though the firm had not submitted the earnest money in desired shape in these tenders too. This indicated that the Company did not follow a uniform procedure for finalisation of tenders and as a result, failed to obtain competitive rates.

The Management stated (September 2009) that in case of tenders for LP Rotors and Barring gear assembly, SKODA submitted earnest money in one or other form whereas in case of servomotor the firm did not submit the earnest money. The reply is not convincing as the firm in both the cases did not submit the earnest money in requisite shape.

The Company decided (March 2003) to procure the rotor from BHEL at negotiated cost of Rs 6.80 crore which resulted in purchase of rotor at higher cost leading to excess payment of Rs.0 49 crore.

2.1.14 The offers for procurement of LP rotor for the turbine of 110 MW of Panki TPS were invited (April 2001) from PFC approved vendors. In response two firms viz. SKODA, Original Equipment Manufacturer (OEM) and BHEL submitted their offers. BHEL quoted (July 2001) Rs. 7.18 crore whereas according to the Price Bid submitted by SKODA the total cost in case of general import was Rs.7.77 crore including custom duty at the rate of 50.80 *per cent* and in case of purchase for power project under R&M scheme the cost was Rs. 6.31 crore including custom duty at the concessional rate of 21.80 *per cent* provided the payment was made in foreign currency. However, the Company decided (March 2003) to procure the rotor from BHEL at negotiated cost of Rs. 6.80 crore.

The decision of the Management not to place the order to avail the benefit of concessional rate of custom duty, resulted in purchase of rotor from BHEL at higher cost leading to excess payment of Rs. 0.49 crore.

The Management stated (September 2009) that as per prevailing standard practice and norms of the company it was not possible to make payment in dollars by opening Letter of Credit. Reply is not convincing as company purchased upgraded condition monitoring system from Bently Nevada, USA and made payment in foreign currency by opening letter of credit account for Anpara 'B' TPS.

Poor Quality of R&M works

Unit No.5 tripped 67 times during the period 26 May 2008 to 28 September 2008 causing loss of generation of 30.43 MU valuing Rs 12.17 crore alongwith abnormal consumption of fuel oil and light diesel oil amounting to Rs 7 crore.

2.1.15 BHEL undertook (May 2005) R&M of unit no.5 of Harduaganj Thermal Power Station at a cost of Rs 24.55 crore and unit was synchronised on 26.05.08. Unit could not be stablised due to persistent problems in Boiler and Turbine and it tripped 67 times during the period 26 May 2008 to 28 September 2008. These trippings forced outages for 1284.41 hours resulting in loss of potential generation of 30.43 MU valuing Rs 12.17 crore[1] coupled with abnormal consumption of fuel oil and Light Diesel Oil amounting to Rs 7 crore. In the absence of any penalty or recovery clause in the LOI issued to the firm (BHEL), this loss could not be recovered.

The Management stated (July 2009) that Unit No.5 was commissioned after 9 years and restart of old units was a difficult job therefore during commissioning many trippings took place. Reply is not convincing as erratic Emergency Stop Valve (ESV) behavior of unit could not be solved by BHEL engineers therefore management requested (July 2008) BHEL to depute team of engineers who were specialised in the 60 MW turbine technology to identify and rectify the defects. It shows that BHEL got the work executed by team which was not specialised in 60 MW turbines. Due to the poor quality of work done by BHEL, Company had to suffer loss of Rs 7 crore due to abnormal consumption of oil besides generation loss of Rs 12.17 crore.

The Company awarded the work of major overhauling of boiler pressure part of unit no. 12 of Obra 'B'TPS to BHEL in February 2008 for Rs 4.12 crore. The unit was placed under shut down from 9 July 2008 to 7 September 2008 for overhauling.

It was noticed (January 2009) that prior to overhauling, outages due to Boiler Tube Leakage (BTL) were 148.06 hours during the period March 2008 to June 2008 (average of 37 hours per month) whereas after overhauling they increased to 419.74 hours during September 2008 to December 2008 (average 105 hours per month). This indicated that expenditure of Rs 4.12 crore incurred on overhauling of the unit could not check the BTL causing generation loss of 17.80 MU valuing Rs 3.24 crore and proving that expenditure incurred on overhauling was unfruitful.

Delayed execution of refurbishment works

Company invited (1998) bids for refurbishment of 5 x 200 MW units of Obra B TPS. The bids were opened (October 1999) and PPIL was found to be lowest bidder. PPIL gave its offer for Rs 638.75 crore to complete the work but it was not awarded to PPIL.

2.1.16 Company invited (1998) bids for refurbishment of 5 x 200 MW units of Obra 'B' TPS. The bids opened in October 1999 and price of Rs 638.75 crore quoted by PPIL was found to be lowest. Board of Directors decided (November 2001) to issue Letter of Intent (LOI) to firm (PPIL) after obtaining approval of Regulatory Authority and U.P. Government. In December 2001 Central Electricity Authority (CEA) gave its approval for the scheme. In the mean time second lowest bidder M/s Alstom Power India Limited reduced (December 2001) its earlier offer of Rs 648.26 crore to Rs 581.26 crore. Due to this no decision was taken by the company and the State Government decided (August 2004) to cancel the above bids and instead awarded work to BHEL.

1 Based on PLF of 39.48% (2008-09).

After negotiations BHEL agreed (May 2006) to do the job at a cost of Rs 1175.00 crore.

BHEL agreed (May 2006) to do the job at a cost of Rs 1175.00 crore. The work, which was to be completed within 30 months from the zero date (20 June 2006) i.e. up to 20 December 2008 commenced in November 2008 and is still in progress (November 2009).

Audit concludes that due to non awarding of work to the lowest bidder (PPIL) in December 2001, and further belated award of work to BHEL in May 2006, the Company had to incur avoidable expenditure of Rs 536.25 crore on refurbishment of Obra 'B' TPS. Management accepted the above facts and stated (July 2009) that work was awarded to BHEL at the instance of State Government. The fact remains that belated decision in awarding the work resulted in extra cost of Rs 536.25 crore besides loss of potential generation of 2803.20 MU valuing Rs 451.32 crore for five years up to 2008-09.

The Company entered into an agreement (February 2003) with M/s Techno prom Export (TPE), Russia for the refurbishment of 5 units of 50 MW capacity each of Obra 'A' TPS for Rs 479.50 crore. The agreement envisaged the refurbishment of Unit No. 1 & 2, to be completed by January 2005 (Phase I), Unit No.3 by July 2005 (Phase II) and unit no.4 & 5 by January 2006 (Phase III). The refurbishment of unit under Phase II & III was to be taken up after completion of Phase I.

TPE started the refurbishment of Unit No.1 & 2 under Phase I (July 2003) but stopped the work (February 2006) mid way without completing the contract. A penalty of Rs 64.14 lakh was deducted (April 2006) from the bills of the firm.

A MOU was further signed (April 2006) with TPE which provided for refund of penalty already deducted by the Company and completion of work of Phase I by November 2006. TPE again failed to complete the work within extended period up to January 2008. Agreement was terminated (March 2008) and remaining work of Phase-I was got completed (May 2009) by the Company after incurring an expenditure of Rs 186.36 crore. But the Company surprisingly did not take any action to recover penalty from TPE for breach of contract. The arbitrator was appointed by the Company at the request (November 2008) of TPE in December 2008. A claim for Rs 217.33 crore was filed (January 2009) by TPE with the Company counter claiming (October 2009) Rs 371.88 crore and US $54.41 lakh against TPE.

Unit No. 4 & 5 (Phase III) in running condition were handed over (September 2005) to TPE without ensuring completion of work of unit no. 1 & 2 (Phase I) and were dismantled at a cost of Rs 74.72 lakh.

Audit observed (January 2009) that Unit No. 3, 4 & 5 were handed over (September 2005) to TPE without ensuring completion of work of unit no. 1 & 2. The unit no. 4 & 5 were in running condition and generating electricity but were dismantled at a cost of Rs 74.72 lakh. TPE failed to meet the contractual requirements for reasons attributable to firm. In view of delay in execution of work CEA directed (August 2007) the Company that there was no need to make further investment on Unit 3, 4 & 5. In February 2008 these units were deleted by CEA on the grounds that these units have been lying unoperational for a longtime due to continuous failure of firm. Thus, imprudent decision of the management of handing over unit no 3, 4 & 5 for refurbishment prior to completion of work of unit no. 1 & 2 resulted in loss of potential generation of 1124.352 MU valuing Rs 217.87 crore during September 2005 to August 2007.

The Management stated (September 2009) that penalty was not recovered from TPE in the interest of work and now 10 *per cent* of contract value recoverable from TPE has been included in claims filed before arbitrator. Unit

No.3, 4 & 5 were handed over to TPE to speed up the work of refurbishment as these units were generating electricity at a very high cost and were unsafe to work. Reply is not convincing because as per the approved Refurbishment scheme Unit No.3, 4 & 5 were to be handed over only after completion of work of Phase I (i.e. Unit No. 1 & 2) which was not ensured. Thus, the contractor was unduly favored and financial interests of the Company were overlooked by agreeing to dismantle units 3,4 & 5, the minimum generation of power from these units was also forfeited and the state was deprived off precious power from Obra (Unit no. 3, 4 and 5) for next 15/20 years resulting in frustration of objectives of Refurbishment activity itself.

Instrumentation Limited, Kota (a Govt. of India undertaking) was awarded the work of C&I system for Obra 'A' TPS (Unit No 1&.2) which was expected to be completed within four months by October 2008 from date of making payment of 10 *per cent* advance i.e. June 2008, but it could not complete the work up to January 2009. The delay on the part of I.L., Kota in completing the work of unit No.1 &2 on scheduled date (October 2008) resulted in loss of generation of 176.64 MU valuing Rs 37.62 crore during November 2008 to January 2009. In absence of penalty clause in the agreement no penalty could be imposed on I.L., Kota for delayed completion of work.

Management stated (July 2009) that I.L., Kota being a Government Company did not accept the penalty clause for delayed execution of the contract. Reply is not acceptable as the Management did not negotiate to include such clause in the contract.

Post R&M/ refurbishment Performance evaluation

The performance of TPSs after carrying out R&M/ Refurbishment was not found in accordance with the norms as envisaged in the schemes. This resulted in loss of Rs 3033.27 crore during 2006-07 to 2008-09.

2.1.17 R&M/Refurbishment Scheme envisaged norms for the consumption of auxiliary, heat rate, oil, coal, PLF and generation cost in the TPSs. Parichha, Panki and Obra 'A' TPS fixed norms in the DPR for post R&M period while Harduaganj and Anpara 'A' TPS did not stipulate any norm in the schemes[1]. These norms are detailed below:

Sl. No.	Name of TPS	Norms for					
		Auxiliary (in*Percent*)	Heat (in Kcl/Kwh)	Oil (Ml/Kwh)	Coal (Kg/Kwh)	PLF (in *Percent*)	Generation Cost (Rs./Kwh)
1.	Obra A	11.0	3000	4.0	0.89	65.0	1.66
2.	Panki	13.0	2950 to 3100	8.0	0.84	55.0	1.97
3.	Harduaganj	11.0 to 11.5	3300 to 3450	4.5 to 5.0	0.87 to 0.97	28.0 to 40.0	2.23 to 2.33
4.	Parichha	10.0	3100 to 3250	10.0	0.85	60.0	2.04
5.	Anpara A	8.0 to 8.5	2500	2.0	0.79 to 0.91	75.0 to 80.0	0.89

Audit observed (May 2009) that the performance of TPSs after carrying out R&M/Refurbishment was much short than expected/envisaged. It indicates that R&M/refurbishment works were not carried out efficiently, economically and effectively. This resulted in loss of Rs 3031.11 crore during 2006-07 to 2008-09 on account of non achievement of norms as discussed below:

Excess Auxiliary Consumption

2.1.18 The norms of auxiliary consumption[2] fixed in respect of each TPS, as per DPR/UPERC and achievement there against during the period 2006-07 to 2008-09 is given in **Annexure-9**. Analysis reveals that none of TPS except

1 To assess the performance where no norms have been fixed, UPERC norms were taken as basis.
2 Electricity consumed for running of Plant.

Panki (in 2008-09) could keep the auxiliary consumption within the norms fixed for post R&M period. The excess Auxiliary consumption during the said period is detailed below:

Sl. No.	Name of TPS	Period	Excess unit consumed (in MU)	Amount (Rs in crore)
1.	Obra A	2008-09	14.32	3.05
2.	Panki	2006-07 to 2007-08	7.57	1.80
3.	Harduaganj	2006-07 to 2008-09	87.27	29.82
4.	Parichha	2006-07 to 2008-09	194.67	52.58
5.	Anpara A	2006-07 to 2008-09	258.89	35.08
	Total		**562.72**	**122.33**

The excess auxiliary consumption was mainly due to failure in observance of annual maintenance schedule of machines as detailed in **Annexure-8**, non-installation of ESP in any TPS, poor performance of clarified water pumps and ID fans etc. It indicates that R&M/Refurbishment activities were not carried out efficiently which caused excess energy consumption of 562.72 MU valuing Rs. 122.33 crore.

The Management admitted (September 2009) that due to delayed overhauling the machines were forced to run on partial load resulting in low generation and consequential high percentage of auxiliary consumption.

Excess Heat Consumption

2.1.19 Thermal efficiency of a power station is a index which measures the efficiency of conversion of Thermal energy into electrical energy denoted as a percentage of heat energy contained in the fuel used in generation. The heat rate as fixed by UPERC was used to arrive at excess heat consumed in terms of coal due to non achievement of guaranteed thermal efficiency as per norms fixed in the DPR. The details of targeted heat rate, heat consumed and excess consumption of heat in terms of coal have been provided in **Annexure-10**.

Analysis of the Annexure indicates that none of TPSs except Anpara 'A' in 2007-08, could keep the heat rate within the norms fixed for post R&M period. This resulted in excess Heat consumption during the said period as detailed below:

Sl. No.	Name of TPS	Period	Excess Heat consumed (in Kcal)	Amount (Rs in crore)
1.	Obra A	2008-09	135626	5.79
2.	Panki	2006-07 to 2008-09	1345480	74.30
3.	Harduaganj	2006-07 to 2008-09	735917	46.36
4.	Parichha	2006-07 to 2008-09	993392	51.74
5.	Anpara A	2006-07 to 2008-09	1285183	36.98
	Total		**4495598**	**215.17**

The reasons for excess consumption of heat were wastages in form of unburnt carbon, pulverised coal leakages and non-reduction of bottom ash and non-reduction of fly ash of coal due to non-installation of ESPs indicating the fact that R&M/Refurbishment activities have not been carried out efficiently. It caused excess consumption of heat 44.96 lakh Kcal valuing Rs 215.17 crore.

The Management admitted (September 2009) that due to partial loading and other constraints the heat consumption was over the norms and R&M works did not improve units loading factor.

Excess Oil Consumption

2.1.20 The norms fixed for oil consumption in respect of each TPS as per DPR/UPERC and actual oil consumption, average oil consumption and power generated during the period 2006-07 to 2008-09 is given in **Annexure-11**. Analysis of the Annexure indicated that Panki and Anpara 'A' TPS could keep the oil consumption within the norms during post R&M period and rest three TPS failed to check the oil consumption. The excess oil consumption during the said period is detailed below:

Sl. No.	Name of TPS	Period	Excess oil consumed (in KL)	Amount (Rs in crore)
1.	Obra A	2008-09	1781.11	6.09
2.	Harduaganj	2006-07 to 2008-09	11532.56	34.42
3.	Parichha	2006-07 to 2008-09	3098.49	9.73
	Total		**16412.16**	**50.24**

Audit noticed that excess oil consumption was due to frequent trippings of machines. Analysis of tripping reports of TPSs revealed that generating units faced 246 trippings in 2006-07, 219 in 2007-08 and 185 in 2008-09 due to boiler tube leakages, fluctuation in furnace draft and ESV[1] problems. Thus, R&M/Refurbishment activities did not lead to observe economy in oil consumption which resulted into the excess consumption of 16412.16 KL oil valued Rs 50.24 crore. The Management admitted (September 2009) audit contention.

Excess Coal Consumption

2.1.21 The details of coal consumed, power generated, average coal consumption per unit generation, excess consumption, are given in **Annexure-12**. Analysis of the Annexure indicates that none of units except Anpara 'A' (in 2006-07 and 2007-08) could keep the coal consumption within the norms fixed for post R&M period. The resulting excess coal consumption during the said period is detailed below:

Sl. No.	Name of TPS	Period	Excess Coal consumed (in MT)	Amount (Rs In crore)
1.	Obra A	2008-09	38128	5.30
2.	Panki	2006-07 to 2008-09	215851	43.58
3.	Harduaganj	2006-07 to 2008-09	63907	38.88
4.	Parichha	2006-07 to 2008-09	170605	36.46
5.	Anpara A	2008-09	9165	10.17
	Total		**497656**	**134.39**

It was observed that excess consumption of coal was due to choking of air preheater baskets and fluctuations in furnace draft, which could have been checked by installation of ESP but not installed. Besides, these existing ash handling systems were also not capable of disposing full load discharge which caused excess consumption of coal 4.98 lakh MT valuing Rs 134.39 crore.

The Management admitted (September 2009) that units were very old and quality of coal was poor leading to consumption of excess coal and efforts are being made to reduce the consumption. The reply is not convincing as the average grade/quality of coal received was of the same grade/quality during pre and post R&M period. R&M activities were undertaken to improve the

1 Emergency stop valve.

performance of old units but this objective was not fulfilled even after R&M/Refurbishment.

Non achievement of PLF

2.1.22 The targeted PLF, PLF achieved, generation and loss of generation is given in **Annexure-13**. The table indicates that none of TPSs except Anpara 'A' (in 2006-07 and 2008-09) and Obra 'A' (Unit No.6 in 2008-09) could achieve the PLF fixed for post R&M period resulting in shortfall of power generation during the said period is detailed below:

Sl. No.	Name of TPS	Period	Short fall in generation due to shortfall in PLF (In MU)	Amount (Rs in crore)
1.	Panki	2006-07 to 2008-09	82.60	19.74
2.	Harduaganj	2006-07 to 2008-09	358.46	108.27
3.	Parichha	2006-07 to 2008-09	663.34	181.66
4.	Anpara A	2007-08	377.94	49.51
	Total		**1482.34**	**359.18**

The Management admitted (September 2009) that low PLF was due to frequent trippings and outages of the machines. The reply is self admitting that outages did not go down despite R&M/Refurbishment.

Generation Cost

2.1.23 The cost of generation to be achieved was envisaged in R&M scheme of Parichha and Panki TPS whereas in other TPSs cost of generation to be achieved after R&M was not envisaged. Audit had to adopt norms fixed by the UPERC for cost of generation for analysis in case of Obra 'A', Harduaganj and Anpara 'A' TPS and the norms of DPR were taken for analysis in case of Parichha and Panki TPS. The targeted cost of generation, its achievement and loss due to non achievement of cost of generation is given in **Annexure-14**. The table indicates that none of TPSs could keep the cost of generation within the norms fixed for post R&M period.

Sl. No.	Name of TPS	Period	Amount (Rs in crore)
1.	Obra A	2008-09	107.30
2.	Panki	2006-07 to 2008-09	426.16
3.	Harduaganj	2006-07 to 2008-09	560.90
4.	Parichha	2006-07 to 2008-09	496.09
5.	Anpara A	2007-08	559.35
6.	**Total**		**2149.80**

Management stated (July 2009) that units could not be run on full load due to several constraints like condenser vacuum, coal quality and excess consumption of oil due to overhauling in 2007-08 which increased the cost of generation. The reply is not convincing as all constraints mentioned by the Management were taken into consideration at the time of finalisation of cost of generation by UPERC.

Environmental Issue

2.1.24 Ministry of Environment and Forest (MoEF), Government of India (GOI) launched (March 2003) the charter on Corporate Responsibility for Environmental Protection (CREP) for compliance of regulatory norms for prevention and control of pollution. The charter had set targets concerning conservation of water, energy, recovery of chemicals, reduction in pollution, elimination of toxic pollutants, process and management of residues that are required to be disposed off in an environmentally sound manner. The charter enlists the action points for pollution control for various types of highly polluting industries. BOD in December 2003 decided to implement provisions of CREP in all its TPS which included:

- Replacement of existing ESPs
- Provision of dry fly ash handling and storage system
- Provision of ash water re-circulation system
- Provision of opacity meters for monitoring emission levels.

Company could not get consent for any of its TPS from UP Pollution Control Board (UPPCB) which resulted into avoidable payment of additional water cess amounting to Rs 14.24 crore as penalty to UPPCB.

These works were required to be completed by December 2005 but same had not been completed in any TPS (September 2009). An expenditure of Rs 173.86 crore had been incurred up to March 2009 on these environmental works which are in the process of execution.

It was observed that company could not get consent for any of its TPS from UP Pollution Control Board (UPPCB) due to non-installation of ESP, Dry fly extraction system, Effluent treatment plant and cooling towers as directed by MoEF, GOI in March 2003. As a result UPPCB imposed additional water cess amounting to Rs 14.24 crore as a penalty for the year 2008-09 alone.

Acknowledgement

2.1.25 Audit acknowledges the cooperation and assistance extended by various levels of the Management at various stages of conducting the Performance Review.

The above audit findings were reported to the Government in August 2009; its replies are awaited (November 2009).

Conclusion

- **Company did not chalk out any comprehensive plan for carrying out R&M and Refurbishment activities indicating time frame like submission of Techno-economic viability Report, approval of DPR, inviting tender for award of works.**
- **Ill planning of the Company led to non observance of directives of CEA, to install major equipments during R&M and refurbishment shut down periods.**
- **Non adherence of annual maintenance schedules of TPSs in many instances lead to deterioration in the condition of machines and forced outages.**
- **Obra 'A' TPS unit no. 3, 4& 5 were handed over to contractor and dismantled without getting the work on unit no. 1&2 completed.**
- **Performance of Company was adversely affected due to non achievement of norms fixed for auxiliary, heat, oil & coal consumption and PLF which led to higher cost of generation during post R&M period.**
- **Company did not follow norms of Uttar Pradesh Pollution Control Board due to which air and water consent for any of its TPS could not be obtained.**

The above lead to frustration of the objectives of Refurbishment and renovation and Modernisation.

Recommendations

- **The Company should devise a comprehensive plan indicating the milestones for executing the identified R&M/ Refurbishment activities.**
- **The Company should devise system to minimize the delay in decision making process and for monitoring the adherence to comprehensive plan in the implementation of R&M/Refurbishment activities. The system should also provide for mid-term evaluation of R&M/Refurbishment activities being implemented, in order to take timely corrective action.**
- **Company should identify works for which major shutdown of machines is required to be carried out under R&M scheme such as installation of ESP and SWAS to avoid loss of generation.**
- **Company should adhere to annual maintenance schedule strictly to avoid deterioration in condition of machineries.**
- **Company should adopt open tender system to obtain competitive rates and to reduce dependence on single supplier.**
- **Company should adhere to the provisions of Pollution Control Board and obtain air, water consent for its all TPSs.**

2.2 Information Technology Support System of Revenue Billing in Dakshinanchal Vidyut Vitran Nigam Limited, Agra

Executive Summary

Dakshinanchal Vidyut Vitran Nigam Limited, Agra (Company) was incorporated with the main objective of distribution of energy to consumers of 17 districts of Uttar Pradesh. The billing of the Company is outsourced and the consumers of the Company are billed as per Tariff Orders approved by Uttar Pradesh Electricity Regulatory Commission (UPERC) from time to time.

IT Controls

The Company did not formulate and document a formal IT policy. The database of the Company is being maintained by the outsourced billing agencies and no clear responsibilities exist to monitor the development of software and correct billing. The Company did not have a disaster recovery and business continuity plan and there were differences in the structure of databases being used by different outsourced agencies. As a result of which there were cases of incorrect application of formula in billing software, duplicate and fictitious records in the data bank.

Monitoring mechanism

The Company failed to ensure the compliance of the terms of the agreement executed with the billing agencies. As a result bills of 4.48 lakh consumers were not generated by the billing agencies in five divisions. As a result, assessment for Rs 23.59 crore could not be done. EUDD IV and VII Agra billed the consumers for 63 units instead of actual consumption. In EUDD-V Agra, 29 consumers having arrears of Rs 31.12 lakh were deleted from the database without payment of arrear amount and duplicate billing was done in EUDD-IV Agra. Cases of high consumption in case of domestic light and fan consumers were not identified in five divisions despite the consumption ranging from 251 to 172580 units per month. There were differences in the figures shown in commercial statements and billing database. The Geographical Information System (GIS) mapping got prepared at the cost of Rs 41.91 lakh were not utilized.

Compliance of tariff orders

In billing of consumers having defective meters, the provisions of tariff orders were not applied. As a result the excess assessment for Rs 31.85 crore was made in nine divisions. The rural metered consumers of EUDD Fatehabad were excess billed for Rs 0.79 crore due to incorrect application of tariff. EUDD Firozabad billed the consumers on fixed units instead of their actual consumption resulted in short assessment of Rs 2.20 crore. Further, there was excess billing of Rs 47.81 lakh due to billing of consumers as 'ADF' instead of at their actual consumption. EUDD III Agra did not levy the fixed charges on domestic and commercial consumers resulted in short charge of Rs 56.14 lakh. The Company did not levy the penalty of Rs 13.49 crore on consumers billed under NA/NR category. Air conditioning charges of Rs 24.05 lakh were not levied on consumers by four divisions. EDD-II, Aligarh and EDD Fatehabad levied incorrect fixed charges of Rs 10.87 lakh on rural metered consumers. The Company did not provide credit of interest on security deposit amounting to Rs 50.64 lakh.

Conclusion and Recommendations

The billing system outsourced by the Company did not have adequate and effective IT control regarding security features, uniform data structures, generation of bills/reports etc. The provisions of tariff orders issued by UPERC were found to be incorrectly and improperly applied in the system along with the insufficient application control and validation checks resulting in excess/short billing against the consumers. The Company should formulate and document an IT policy, disaster and business continuity plan. The compliance of tariff orders and use of uniform data structure by outsource agencies should be ensured through regular monitoring of database.

Introduction

2.2.1 Dakshinanchal Vidyut Vitran Nigam Limited, Agra (Company) was incorporated (May 2003) as a subsidiary of Uttar Pradesh Power Corporation

Limited, Lucknow (UPPCL) with the main objective of distribution of energy to consumers of 17 districts[1] of Uttar Pradesh.

The consumers of the Company were mainly divided into two categories viz. Extra High Tension and High Tension[2] (HT) and Low Tension[3] (LT) and are billed as per Tariff Orders approved by Uttar Pradesh Electricity Regulatory Commission (UPERC) from time to time.

HT consumers were billed through the Energy Billing System (EBS) developed by Price Waterhouse Coopers (PWC) up to November 2008 and from December 2008 onwards through 'SMRITI' software developed by SAI Computers, Meerut. The billing of LT consumers has been outsourced and is being done through two patterns viz. IBM pattern by OPG, New Delhi and Handheld (HH) through SAI Computers, Meerut and C.S. Software, Hyderabad. Under IBM pattern, the inputs (consumer details, consumption of energy and payment details) are sent for bill generation in the form of stubs through Computer Billing Service Center (CBSC) of the Company. In HH pattern the outsourced billing agencies deploy their own staff with HH machines to feed the data of consumption of energy at the doorstep of the consumer, generate the bill and collect the cheque from the consumers in case they desire to make the payment on the spot.

The billing software of OPG is based on COBOL with Operating System as 'UNIX', SAI Computers is using SQL 2000 Server as back end and Visual Basic as front end and C.S. Software is using 'ORACLE'.

Organisational set up

2.2.2 The Company is governed by a Board of Directors (BOD) consisting of a full time Managing Director (MD) who is the chief executive of the Company and is assisted by General Manager (Finance), General Manager (Technical) and General Manager (Commercial) at headquarters. The area of operation is divided in five zones[4], 20 circles and 52 distribution divisions headed by Chief Engineer, Superintending Engineer and Executive Engineer respectively. The Company did not have any Information Technology (IT) wing and Chief Engineer (Commercial) looks after the outsourced billing activity.

Scope of Audit

2.2.3 For the purpose of IT Review, database of 12 distribution divisions in Agra, Aligarh and Mathura towns having 488162 consumers out of 52 distribution divisions for the period November 2007 to December 2008 was analysed using 'IDEA' software.

Audit objectives

2.2.4 The audit objectives were to assess whether:

- the Company had adequate IT infrastructure, documented strategy and IT plan, key control and monitoring mechanism to derive benefits of IT support system to achieve intended objectives;
- business continuity and disaster recovery plan was in place to save the activity of billing from the risk of disruption;

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1 Agra, Aligarh, Marthura, Firozabad, Shikohabad, Jhansi, Banda, Orai, Hameerpur, Kanpur, Etah, Etawah, Farukkhabad, Mahoba, Lalitpur, Hathras and Mainpuri

2 EHT and HT means consumers getting supply at voltage level of 6.6 KV and above.

3 LT means consumers getting supply at voltage level up to 400 volts

4 Agra, Aligarh, Jhansi, Banda and Kanpur.

- the IT controls in the billing application were adequate with reference to accuracy, efficiency and effectiveness of the process of billing;
- the Company has adequate monitoring mechanism to ensure compliance of applicable tariff orders, codal provisions, laid down procedures and regulations issued by UPERC.

Audit criteria

2.2.5 The following audit criteria were used to ascertain whether the objectives stated above were fulfilled:

- the agreements entered into between the Company and the outsourced agency for safeguarding financial interests and performance;
- the conditions as laid down in the Supply Code-2005;
- the Tariff Orders approved by the UPERC from time to time;
- the systematic approach to identify system weaknesses through an internal control mechanism.

Audit methodology

2.2.6 The data bank relating to revenue billing were analysed using the 'IDEA' software for examining the correctness, completeness and integrity of the data. The existence and adequacy of IT controls and effectiveness of IT support system were also assessed.

The result of the queries run on the database were cross verified with physical records at distribution divisions to evaluate the adequacy and working of IT controls to identify loss/ pilferage of revenue.

Audit constraints

2.2.7 HT consumers are billed through Energy Billing System (EBS) developed by Price Waterhouse Coopers (PWC) up to November 2008 and through 'SMRITI' software developed by SAI Computers, Meerut from December 2008. The databank of HT consumers (billed through SMRITI Software), although agreed to be provided by the management in the Entry Conference held on 16 March 2009 but the same were not made available to audit. As a result, its adequacy as well as its correctness in billing of HT consumers could not be examined in audit

Further, details of expenditure incurred on preparation of the said software along with the details of assets created were also not furnished to audit.

The Management stated that CD of monthly bills is being kept at division level but the facts remains that no database was provided to audit.

Audit Findings

2.2.8 Audit findings as a result of performance review are discussed in the succeeding paragraphs:

IT controls

2.2.9 For correct, efficient and economic billing, the Company should have control mechanism, documented IT plan, controls for maintenance of data bank, uniform data structure across all the billing distribution divisions, protection of information and error handling procedure and audit trail. In this connection, the following shortcomings were noticed:

Lack of adequate infrastructure and documented IT policy with the billing agencies

2.2.10 Though the Company has adopted the computerised billing system since its incorporation, it did not formulate and document a formal IT policy and a long term/medium term IT strategy, incorporating the time frame, key performance indicators and cost benefit analysis for developing its own software and integration of various systems. The electronic data bank of the consumers was being electronically maintained by the outsourced agencies. No plans/steering committee with clear role and responsibilities exist to monitor the development/operation of software of outsourced agencies for each functional areas in a systematic manner as well as for ensuring correct billing against the consumers.

The billing agencies were required to maintain adequate infrastructure viz. handheld machines, computers, servers, printers and qualified staff for efficient billing. During physical verification (April 2009) done by audit jointly with the Management, it was noticed that in Mathura the C. S. Software did not have any system of processing of bills locally and the same was done at their headquarters in Hyderabad and the output was sent to Mathura local office through courier.

No comment was made on the audit observations.

Lack of IT security policy

2.2.11 The Company had not formulated an IT security policy regarding the security of IT assets, its software and databank. Audit observed that:

- The modifications made in the master data relating to the consumer services, meters and meter readings, payments, dishonoured cheques, addition of new consumers, arrears, adjustments in assessments etc. by the outsourced agency were not subjected to any supervisory review by the Company staff/officers periodically to ensure that the changes were authorised before committing them to the databank.
- The consumer data transferred from one outsourced agency to the other were not subjected to review to ensure that the closing data of one agency matched with the opening data of the other transferee agency as the agreements executed with them did not contain any such provision.
- No control procedure/system exists to monitor the cases of creation of fictitious book numbers, deletion of consumers from the master data bank, acceptance of duplicate or unauthentic records, distorted position of the consumers with high arrears etc.

No comment was made on the audit observations.

Absence of uniform data structure

2.2.12 Though PWC developed software and its user manual for uniform input billing structure defining, *inter alia*, the fields, description of the fields, data units, field type, field length, numeric field length, and reference table to facilitate adopting of uniform data structure by the billing agencies but this data structure or any other appropriate data structure was not incorporated in the agreements entered into with the billing agencies. In the absence of enabling clause in the agreement, the billing agencies adopted altogether different data structure and none of the agency indicated units adopted for loads (BHP/KW/KVA) as provided in PWC's data structure. Thus, due to absence of uniform data structure for billing in the agreement, various shortcoming viz. duplicate consumers, duplicate meters, fictitious consumers, short/excess billing against the consumers were observed as discussed in the succeeding paragraphs:

Incorrect application of formula for conversion of load in billing software

The formula for conversion of load from BHP to KVA was incorrectly applied resulting in excess charge of 0.48 crore and short charge of 0.02 crore.

2.2.13 The general provision of Tariff Order (2008-09) provides that KVAh based tariff shall be applicable on all small and medium power consumers having contracted load of 25 BHP and above. Accordingly, the load in BHP was required to be converted into KVA using formula i.e. load in HP X 0.746/0.90 (average power factor) = load in KVA.

It was noticed that the procedures for conversion of load was incorrectly applied by the billing agency in the software due to wrong interpretation of provision contained in Tariff Orders. As a result, 17,617 small and medium consumers having load of 25 BHP and above, the formula for conversion of their load was incorrectly applied i.e. out come of multiplication of HP load with 0.746 rounded off to arrive at KW and after that the same was divided by 0.90 to arrive at load in KVA. Thus, the fixed charges of these consumers were wrongly calculated and Rs 0.48 crore was excess charged from them during the period November 2007 to December 2008 in 52 divisions.

Further, the conversion of BHP load was done in 31,750 cases despite their loads being below 25 BHP and the conversion of load was not required in such cases. This resulted in short charge of fixed charges amounting to Rs 0.02 crore.

No comment was made on the audit observations.

Absence of system alerts for Low Power Factor cases

2.2.14 The software designed and used for billing does not automatically provide alerts and generating exception reports in each month in respect of power factor below 0.75 in case of small and medium power consumers as a result, the appropriate action for improving the power factor of the consumers could not be taken by the Company.

The billing software does not automatically provide alerts for low power factor cases which resulted in loss of energy valued at Rs 9.52 lakh.

An analysis of data bank of November 2007 to December 2008 in respect of small and medium power consumers (LMV-6) revealed that there were 1,605 cases whose Power Factor were below 0.75 and ranged between 0.01 to 0.74. In the absence of such analysis by the billing agencies as well as by the Company, no action was taken either to get suitable equipments installed to improve power factor or to disconnect the supplies.

The extent of energy loss in such cases worked out to 76.16 lakh units. In cases where KWh billing was done, value of loss of energy worked out to Rs 9.52 lakh during the period January to December 2008.

No comment was made on the audit observations.

Discrepancies in newly developed billing software for HT billing under EBS

2.2.15 In order to remove the anomalies of the EBS software used earlier, the Company engaged (January 2008) SAI Computers, Meerut. The agency developed a software 'SMRITI' at a cost of Rs 13.48 lakh but this software did not have the features of the EBS software used earlier to make it possible to capture transaction data for independent examination of the correctness of the bills generated by the software. Neither the Company nor the agency could provide for the input data vital for examination of the output generated by it. Instead of bringing any improvement over the earlier software, the new software was not of much use except the bills that are being generated. Thus, the expenditure incurred on development of the new billing software was not having the basic facility for capture of input parameters*. In the absence of the required database, technical, user and operation manual of the software and security features thereof, it could not be ascertained whether or not the expenditure incurred was gainfully utilised.

No comment was made on the audit observations.

Duplicate and fictitious records in the data bank

2.2.16 The software developed and used by the billing agencies did not have adequate input controls to oversee that the data bank did not have duplicate consumers, duplicate book/service numbers, cases with fictitious meters, meters column as blanks. The meter serial number, phase, make and rating were unique within itself and no other meter entry with the same parameters should be accepted by the system.

There were 892 duplicate Book/SC No, 19864 fictitious meter numbers and 13091 meter numbers were installed at 31775 premises in respect of 2,92,844 consumers of eight divisions .

Analysis of the data bank of 3,17,426 consumers of eight divisions revealed that out of 2,92,844 operative consumers there were 892 cases having duplicate book/service numbers, fictitious meters numbers were indicated in 19,864 cases and 13,091 meter numbers were indicated against the 31,775 consumers (ranging from 2 to 13 numbers) as detailed in **Annexure-15.**

The Management stated that duplicate book/service connection numbers are committed in the database due to clerical mistakes and fictitious meter numbers are fed for ledgerisation of consumers. Now actual meter numbers provided by the manufacturers are being fed in 12 digits. The reply is self explanatory.

Billing/assessment

The billing of consumers having defective meters were done against the provisions of tariff orders resulted in excess assessment of Rs 31.05 crore in seven divisions.

2.2.17 The agreement with billing agency provide for development of software and maintenance of database by the agency. An analysis of data of the consumers whose meters were defective and were categorised as IDF/ADF/RDF** revealed that billing against these consumers was inconsistent and against the provisions of the Tariff Orders. This did not have adequate change control procedures to take care of adoption of the new tariff orders. Lack of adequate change procedures resulted in excess/short assessment of energy charges and electricity duty as discussed below:

- Tariff Orders approved by UPERC from time to time provides that in case of consumers whose meter is defective, the billing will be done on the basis of average consumption of previous three billing cycles and where consumption of previous three billing is not available, on the basis of average consumption of three billing cycles after installation of correct meter. Despite of the said provision in the Tariff Order, the domestic consumers whose meters were defective were assessed on ad-hoc basis at 80, 100 and 300 units per KW per month by three billing

* Data captured by MRI machines that details the commercial and technical parameters.

** Indicated defective/appeared defective/reading defective.

agencies (C. S. Software @ 100 and 300 units, SAI Computers and OPG @ 80 units) resulted in excess assessment of energy charges of Rs 28.23 crore and electricity duty of Rs 2.82 crore in 2,43,441 cases in nine divisions as detailed below:

Name of the Division	No. of cases	Units assessed per KW per month	EC Taken (EC to be levied) (Rs)	Excess assessment of EC (Rs)	ED Taken (ED to be levied) (Rs)	Excess assessment of ED (Rs)
EDD-II, Agra	15,240	80	3,13,60,242.00 (1,00,86,264.00)	2,12,73,978.00	0.00 (0.00)	0.00
EUDD-I, Agra	7,899	300	15,60,34,828.00 (4,76,40,457.00)	10,83,94,371.00	32,77,530.00 (9,97,125.85)	22,80,404.15
EUDD-II, Agra	1,22,593	100	15,03,00,702.00 (6,11,98,464.00)	8,91,02,238.00	45,99,605.60 (8,845.20)	45,90,760.40
EUDD-III, Agra	5,714	100	46,34,857.20 (13,25,242.30)	33,09,614.90	1,44,683.01 (45,857.25)	98,825.76
EUDD-IV, Agra	8,657	300	1,15,49,515.10 (20,93,208.00)	94,56,307.10	3,31,174.08 (1,17,856.80)	2,13,317.28
EUDD-V, Agra	72,516	100	4,82,70,148.00 (14,44,613.90)	4,68,25,534.10	2,18,49,926.00 (10,34,996.50)	2,08,14,929.50
EUDD-VII, Agra	2,216	100	2,06,08,800.00 (1,72,40,480.00)	33,68,320.00	5,98,320.00 (4,38,768.00)	1,59,552.00
EUDD-I, Mathura	7,632	80	9,15,840.00 (2,44,224.00)	6,71,616.00	0.00 (0.00)	0.00
EDD-II, Aligarh	974	80	3,35,720.25 (4,15,072.00)	(-) 79,351.75	0.00 (0.00)	0.00
Total	**2,43,441**			**28,23,22,627.35**		**2,81,57,789.09**

Ad-hoc units were shown as sold in billing of private tubewell consumers resulted in short assessment of Rs 96.78 crore.

Besides, the following incorrect billing against IDF/ADF/RDF consumers was also noticed:

- Scrutiny of billing data of Private tube well (LMV-5) consumers for the month of December 2008 revealed that although the bill basis was shown as IDF and ADF but they were billed at ad-hoc 50 units per BHP per month basis instead of at rates prescribed by UPPCL in November 2004. This resulted in short billing against 30,958 consumers amounting to Rs 96.78 crore for the period from December 2004 to December 2008.

The Management stated that meter has not been installed in respect of these consumers and billing has been done on minimum charges and 50 units were shown in ledger only.

- An analysis of data of PTW consumers billed as per rural schedule revealed that although un-metered consumers were required to be billed for Rs 130 per BHP per month until the installation of meter but these consumers were billed at 500 units per BHP per month and against these un-metered consumers 2213000 KWh were shown as sold.

7900 LMV-2 consumers were billed for 300 units instead of 104 units resulting in excess assessment of Rs 11.07 crore.

The Management stated that billing is being done correctly and the billing agency has been instructed to remove the units as sold.

- In EUDD-I, Agra 7,900 IDF commercial consumers (LMV-2- ST-20♥) were billed for 300 units/KW per month instead of applicable tariff provisions or at 104 units/KW per month fixed by the UPPCL. This has resulted in excess assessment of energy charges of Rs 10.84 crore and electricity duty of Rs 0.23 crore for the period March 2008 to December 2008.

♥ Commercial consumers having supply under urban schedule.

The Management stated that billing agency has been instructed to issue bills in respect of defective meter cases as per tariff order.

- In three divisions (EUDD-I, Mathura, EDD-II, Aligarh and EUDD, Firozabad) in respect of 17,788 cases, units sold was taken as 80 units per KW per month and ED was charged accordingly but the assessment was done at Rs 120 per KW per month resulting in short assessment of Rs 7.39 lakh during the period from November 2007 to December 2008 (calculated at the difference of energy charges of Rs 152 per KW per month (80 units* Rs 1.90) and Rs 120.00).

The Management stated that Rs. 49,692 is being charged in respect of 2640 consumers of EUDD-I, Mathura and in case of others, action is being taken for recovery of short assessed amount.

- Similarly, in EUDD-III, Agra in March 2008, 38 consumers of defective meters category were billed in the months of February 2008, January 2008 and December 2007 as a "NOR" (Normal) category. On joining the databases for the month of March 2008 with February 2008, January 2008 and December 2007, average consumption for three months are higher than the actual consumption in March 2008 in above 38 cases resulting in short assessment of Rs 1.39 lakh.

The Management stated that Rs. 1.39 lakh has been charged in the bill of May and June 2009. The reply is not tenable as no documentary evidence was provided to audit.

- 715 consumers of EUDD-I, Mathura billed under IDF category were not billed on the basis of average consumption of previous three billing cycles in December 2008 although, the average consumption for three billing cycles (September, October and November 2008) was higher than the actual consumption than the units billed in December 2008 resulting in short assessment for Rs1.29 lakh.

The Management stated that Rs. 1.29 lakh is being charged in respect of 715 consumers.

413 consumers of LMV-2 were billed for fixed units instead of actual consumption resulting in short assessment of Rs 2.20 crore.

Incorrect categorization of normal category of consumers under defective category

2.2.18 Scrutiny of data bank of EUDD, Firozabad for the period from January 2008 to December 2008 revealed that in respect of 413 consumers of ST-20 although their meters were recording consumption but these consumers were categorised under ADF and were billed at the rate of 104 units per KW per month fixed by UPPCL or 800 units per KW per month fixed by the Company instead of on the basis of their actual consumption recorded in their meters. Further, ceiling of 800 units per KW per month fixed by the Company was not provided in Tariff Orders approved by the UPERC from time to time. This resulted in short assessment of revenue for Rs 2.20 crore as detailed below:

Period	No. of consumers	EC taken (EC to be taken) (Rs)	Difference of EC (Rs)	ED taken (ED to be taken) (Rs)	Difference of ED (Rs)
January 2008	34	1,75,468.80 (18,86,788.80)	17,11,320.00	4,049.28 (43,541.28)	39,492.00
February 2008	37	2,11,161.60 (17,53,034.40)	15,41,872.80	4,919.76 (40,454.64)	35,534.88
March 2008	37	1,83,736.80 (19,53,014.70)	17,69,277.90	4,240.08 (45,069.57)	40,829.49
April 2008	36	99,340.80 (18,11,507.10)	17,12,166.30	2,301.84 (41,804.01)	39,502.17

Period	No. of consumers	EC taken (EC to be taken) (Rs)	Difference of EC (Rs)	ED taken (ED to be taken) (Rs)	Difference of ED (Rs)
May 2008	40	1,62,316.70 (22,03,165.20)	20,40,848.50	3,738.96 (46,112.76)	42,373.80
June 2008	34	1,41,728.00 (19,90,620.50)	18,48,892.50	2,966.40 (41,664.15)	38,697.75
July 2008	34	1,64,466.40 (19,41,364.00)	17,76,897.60	3,442.32 (40,633.20)	37,190.88
August 2008	35	1,27,348.80 (20,39,709.30)	19,12,360.50	2,665.44 (42,691.59)	40,026.15
September 2008	33	1,98,694.40 (21,67,470.90)	19,68,776.50	4,158.72 (45,365.67)	41,206.95
October 2008	30	1,26,316.80 (19,53,391.10)	18,27,074.30	2,643.84 (40,884.93)	38,241.09
November 2008	33	85,759.20 (20,52,445.90)	19,66,686.70	1,794.96 (42,958.17)	41,163.21
December 2008	30	91,469.60 (15,57,289.50)	14,65,819.90	1,914.48 (35,937.45)	34,022.97
Total	**413**		**2,15,41,993.50**		**468281.34**

The Management stated that action for charging of short amount is being taken after scrutiny.

Incorrect billing against rural metered consumers

Incorrect billing in respect of rural metered consumers resulted in excess assessment of Rs 0.79 crore.

2.2.19 Scrutiny of database of light and fan consumers of EDD Fatehabad revealed that most of the consumers were billed under defective meters category and very small percentage were billed for 'MU'* category.

The division was charging the electricity charges of Rs 120 per KW/month along with fixed charges from the consumers and Electricity Duty of Rs 14.40 considering sale of 80 units per KW per month. In this method of billing, although ED was taken on 80 units but EC was charged as Rs 120.00 instead of Rs 80.00 (80*1.00) per KW per month. The excess assessment due to incorrect and inconsistent billing worked out to Rs 78.83 lakh in 5,329 cases calculated on the basis of the Group wise database of latest billing months which was made available to audit.

The Management stated that assessment has been done as per order of November 2004. The reply is not acceptable as ED has been charged on 80 units considering it as sold whereas energy charges has been charged Rs. 120 instead of Rs. 80.

Incorrect computation of Electricity Duty

2.2.20 The Billing software used by billing agencies for billing against domestic light and fan and commercial consumers indicates 'G' for Government consumers and 'NG' for non-Government consumers so that applicable tariff for energy charge and electricity duty may be applied accordingly.

Electricity duty was incorrectly charged from Government consumers resulted in excess charge of Rs 8.73 lakh.

An audit analysis of data for the period from November 2007 to December 2008 revealed that programming logic were not being followed in the billing software, as a result, in the database of Distribution Divisions at Agra town no categorisation of Government and non-Government were indicated and all the operative consumers were billed for energy charges and electricity duty under non-Government category. Further, in EUDD Firozabad and EDD Fatehabad although the categorisation between non-Government and the Government were indicated in the data base but in respect of 60,471 Government consumers, the ED was charged at the rate of 0.09 paise per unit

* Metered unit.

applicable to non-Government consumers instead of 0.03 paise per unit for Government consumers, resulting in excess charging of electricity duty for Rs 8.73 lakh from 60,471 consumers as detailed below:

Name of the division	Total number of consumers	Total number of operative consumers	Number of Government consumers	Number of consumers having electricity duty	Period	ED taken (Rs)	ED to be taken (Rs)
Electricity Urban Distribution Division, Firozabad	59,488	55,021	15,308	12,164	December 2008	1,69,189.77	38,350.59
Electricity Distribution Division, Fatehabad	1,22,381	74,522	45,163	40,524	November 2007 to December 2008	7,52,555.69	10,068.03
Total	**1,81,869**	**129,543**	**60,471**	**52,688**		**9,21,745.46**	**48,418.62**

The Management stated that number of Government consumers in the Firozabad division is 27 whereas it has been shown as 15,308 cases. The reply is not tenable as audit has taken the number of cases where "G" was shown in GOVT field.

Lack of validation controls in preparation of bills

2.2.21 The energy consumption of the consumer is arrived at taking the difference between the present meter reading and previous meter reading and billed under 'NOR' (Normal) category by the billing agency. In case where the present meter reading of the consumer is less than the previous meter reading these consumers is categorised under ADF category and should be billed on the basis of average consumption of previous three billing cycles when their meters were recording correctly.

An analysis of data bank relating to domestic light and fan and commercial consumers revealed that in EUDD-V, Agra the present meter readings of 2438 operative consumers billed under 'NOR' category were less than the previous meter readings. This indicated that their meters were defective and required to be billed under ADF category but the same were billed under 'NOR' category. For these bills, outsourced billing agency were paid at the rates applicable for NOR category instead of ADF category.

The Management stated that Rs. 4.62 lakh has been recovered from the billing agency.

Further, scrutiny of database of EUDD-II, Agra for the month of December 2008 revealed that out of 41,564 cases there are calculation mistake in 48 cases in the fields of data bank as 'PRTMTR' (present meter reading) and 'PRVMTR' (previous meter reading). Consumed units are derived from PRTMTR minus PRVMTR but in 48 cases PRTMTR is less than PRVMTR. In these circumstances the consumers should have been appeared in ledger as RDF category but have been shown as NORMAL category. This type of mistake in the billing database indicates lack of application control in the billing software being used by the agency.

The Management stated that the billing agency has been instructed to indicate these cases as RDF.

Excess billing in case of 'MU' category consumers

35859 consumers were not billed for their actual consumption resulting in excess billing of Rs 47.81 lakh.

2.2.22 As per laid down billing procedure, the consumers under MU category were to be billed on the basis of units consumed i.e. PRTMTR* minus PRVMTR**. Examination of the data base of EUDD-I, Aligarh revealed that 35859 consumers were not billed on the basis of their actual consumption and were billed for more units than actually consumed resulting in excess billing for Rs 47.81 lakh against these consumers as detailed below:

Month	Load (KW)	No. of consumers	EC Taken (EC to be levied) (Rs)	Difference of EC (Rs)	ED Taken (ED to be levied) (Rs)	Difference of ED (Rs)	Total difference (EC+ED) (Rs)
November 2007	1	585	51,129.00 (37,015.80)	14,113.20	14,672.27 (1,753.38)	12,918.89	27,032.09
November 2007	2	17,006	41,00,486.30 (25,80,672.00)	15,19,814.30	15,65,439.55 (77,420.16)	14,88,019.39	30,07,835.69
November 2007	3	2	7,716.00 (1,561.80)	6,154.20	6,311.70 (73.98)	6,237.72	12,391.92
December 2007	1	631	51,433.00 (35,514.80)	15,918.20	2,436.30 (1,682.28)	754.02	16,672.22
December 2007	2	17,635	40,67,621.90 (24,00,216.00)	16,67,405.90	1,22,027.01 (72,006.48)	50,020.53	17,17,426.43
		35,859					**47,81,358.35**

The Management stated that bills as per actual consumption is being issued from August 2009.

Incorrect billing of consumers of domestic light and fan category

2.2.23 Scrutiny of database of EUDD-I, Mathura for the period November 2007 to December 2008 revealed that in some cases, although the meter of the consumers of domestic category having load of 1 kW, were running but these consumers were not billed as per their actual consumption under 'NOR' category but billed as 'ADF' and were charged Rs 50 as fixed charge and Rs 70 as electricity charges.

The billing method adopted by the billing agency was not as per the applicable orders as Rs 70 was charged towards EC in case of 2,640 consumers whose actual consumption during the above period were ranged between 37 and 4,007 kWh resulting in short assessment of Rs 2.85 lakh as detailed below:

Period	No. of consumers	EC taken (Rs)	EC to be taken (Rs)	Difference (Rs)
November 2007	16	1,120.00	3,572.30	2,452.30
December 2007	11	770.00	2,606.20	1,836.20
February 2008	90	6,300.00	25,006.60	18,706.60
March 2008	118	8,260.00	50,189.30	41,929.30
May 2008	101	7,070.00	32,885.70	25,815.70
June 2008	214	14,980.00	38,388.40	23,408.40
July 2008	44	3,080.00	3,228.10	148.10
August 2008	14	1,080.00	10,467.50	9,387.50
September 2008	16	1,170.00	3,666.40	2,496.40
October 2008	14	1,080.00	1,107.70	27.70
November 2008	970	67,900.00	1,30,891.20	62,991.20
December 2008	1,032	72,240.00	1,68,426.30	96,186.30
Total	**2,640**	**185,050.00**	**4,70,535.70**	**285,385.70**

The Management stated that action has been taken for recovery.

* Present meter reading.
** Previous meter reading.

Incorrect billing of fixed and electricity charges

There was short assessment of Rs 4.49 lakh due to incorrect application of tariff rates.

2.2.24 An analysis of data bank of the consumers revealed that the billing agencies did not update the data bank of the consumers as per provisions of applicable tariff of UPERC from time to time. As a result, incorrect computation and billing of fixed charges against the consumers were noticed as discussed below:

- In respect of 692 domestic and 29 commercial consumers of EUDD-I Agra, EC were not charged as per applicable tariff during November and December 2008 resulting in short assessment of Rs 4.49 lakh.

The Management stated that action is being taken for recovery.

- According to Rate Schedule of Tariff Order applicable w.e.f. 27 April 2008, electricity charges at Rs 4.00 per unit (KWh) is chargeable from the consumers of Government category (LMV-4A). Scrutiny of database for the period May 2008 to December 2008 revealed that electricity charges has not been computed by the billing agency as per the rates prescribed in the Rate Schedule in EUDD-V, Agra. This has resulted in excess assessment of Rs 0.42 lakh in 87 cases.

The Management stated that the billing agency has been instructed to make changes in his software.

Short assessment against consumers under 'Permanently locked' category

Fixed charges of Rs 56.14 lakh were not levied in respect of 818 consumers.

2.2.25 An analysis of database of EUDD-III, Agra for the period November 2007 to January 2009 revealed that the billing agency (M/S C. S. Software, Hyderabad) categorised the consumer whose premises were permanently locked/consumer not available as PL in respect of consumers of domestic light and fan (LMV-1) and commercial (LMV-2). As these consumers fall in the category of NA/NR, these were required to be billed on the basis of average consumption of previous three billing cycles and in case average consumption of previous three billing cycles is not available at the rate of Rs 120 per KW per month in case of LMV-1 and at the rate of 104 units per KW per month in case of LMV-2 in addition to fixed charges as per applicable orders.

It was noticed that in case of 517 consumers under LMV-1 category were billed at the rate of Rs 120 per KW per month but fixed charges of Rs 50 per KW per month amounting to Rs 2.81 lakh were not levied.

Similarly, fixed charges of Rs 100 per KW per month were not levied in case of 301 consumers of LMV-2 category resulting in short assessment of Rs 53.33 lakh.

Thus, due to incorrect billing by the billing agency short assessment in case of consumers under 'PL' category worked out to Rs 56.14 lakh and reflects the lack of monitoring on the billing activity of the agency.

The Management stated that the amount has been charged in the bill of May and June 2009. The reply is not acceptable as no documentary proof of recovery was furnished to audit.

Compliance of Tariff Orders

Non-levy of penalty on NA/NR consumers

2.2.26 The general provisions of the Tariff Order effective from 13 August 2007 provides that the billing in case meter of the consumer is not accessible or not read (NA/NR) to be done as per provisions of Para 6.2 (C) of the

Penalty of Rs 13.49 crore at the rate of Rs.300/KW/ month were not levied in nine divisions.

Supply Code with the provisions of penalty of Rs 300/KW/month. Clause 6.2 (C) of the Code *inter alia* states that in case of NA/NR category of consumers a notice shall be served to the consumer stating that the meter shall be made accessible or read by the licensee within seven days after payment of penalty fixed by UPERC failing which the supply shall be disconnected.

A scrutiny of billing database of 10 divisions for the period from September 2007 to December 2008 revealed that in 1,89,285 cases of domestic, commercial and small and medium power categories of consumers, procedure laid down as above was not followed and the billing agencies were not informed accordingly. As a result, penalty at the rate of Rs 300/KW/month as fixed by UPERC amounting to Rs 13.49 crore was not levied/realised from the consumers as detailed below:

Sl. No.	Name of the Division	Period	No. of cases	Amount (Rs)
1	EUDD-I, Agra	November 2007 to December 2008	4,461	38,37,397.00
2	EUDD-II, Agra	September 2007 to December 2008	947	5,22,132.00
3	EUDD-III, Agra	September 2007 to December 2008	398	29,62,200.00
4	EUDD-IV, Agra	November 2007 to December 2008	1,11,072	6,05,32,200.00
5	EUDD-V, Agra	November 2007 to December 2008	545	21,63,925.00
6	EUDD, Firozabad	January 2008 to December 2008	5,449	1,01,67,939.00
7	EUDD-I, Mathura	January 2008 to December 2008	244	6,82,200.00
8	EDD-II, Aligarh	September 2007 to November 2008	3,269	79,60,581.00
9	EUDD-III Aligarh	November 2007 to March 2009	62,162	4,18,07,277.00
10	EDD, Fatehabad	September 2007 to December 2008	738	42,36,442.00
			1,89,285	**13,48,72,293.00**

The Management stated that most of the consumers are not available on site and charging of Rs. 300 will unnecessarily increase the arrear and the billing agency has been instructed to charge actual NA/NR cases. The reply is evasive.

Non-assessment for Air Conditioning charges

2.2.27 Clause 11 of the general provision of Tariff Order 2008-09 applicable from 27 April 2008 provides that for all loads above 5 kW under LMV-2, LMV-4 and HV-1, Air Conditioning (AC) load of 1.5 tonne/5kW or actual as intimated through an affidavit by the consumer shall be billed at Rs 150/tonne per month of air conditioning load over and above the bill prepared on the basis of applicable rate of charge for the month April to September. These charges shall also apply on consumers getting billed under minimum consumption charges. The consumer not having any air conditioning load or whose actual AC load is less than the AC load derived as per 1.5tonne/Kw formula, shall however be at liberty to submit an affidavit to this effect with the concerned Sub Divisional Officer (SDO)/ Divisional Officer.

Air conditioning charges of Rs 24.05 lakh were not levied in 5287 cases of four divisions.

Scrutiny of database for the billing month from May to September 2008 revealed that the special tariff for air conditioning loads have not been applied over and above the amount of bill in respect of 5,287 consumers having load of more than 5 kW in four distribution divisions resulted in short assessment of Rs 21.36 lakh as detailed below:

Divisions	Number of consumers	Amount of AC charges not levied (Rs)
EUDD-III Agra	938	3,39,525.00
EUDD-I Mathura	1983	782325.00
EUDD-III, Aligarh	611	2,80,800.00
EUDD-Firozabad	1,755	7,33,050.00
Total	**5,287**	**2135700.00**

The Management stated that AC charges has been included in EC in case of EUDD-III, Agra, in EUDD-III, Aligarh SDO has been instructed for enquiry and incase of Mathura consumers having load of 5 KW has also been included in 3178 cases shown by audit. The reply is not acceptable as cases shown above exclude the consumers having load up to 5 KW.

Short assessment of fixed charges against metered consumers

2.2.28 As per provisions of Tariff Order issued (August 2007 and April 2008) by the UPERC, the domestic light and fan (LMV-1) and commercial consumers (LMV-2) getting supply as per Rural Schedule shall be charged fixed charges at the rate of Rs 15 per KW per month.

Scrutiny of data bank of EDD-II, Aligarh revealed that these consumers were charged at the rate of Rs 15 and Rs 30 only irrespective of their load resulted in short assessment of fixed charges amounting to Rs 4.02 lakh in 13,529 cases.

The Management stated that the division has been instructed for taking action regarding short assessment of fixed charges.

Non-allowance of rebate to small and medium power consumers

Rural rebate of Rs 19.22 lakh was not provided to small and medium power consumers.

2.2.29 Tariff Orders provides that a rebate of 15 *per cent* on the rate of charge (fixed charge, energy charges and minimum charges) shall be provided to the small and medium power consumers getting supply as per rural schedule.

An analysis of billing database of small and medium power consumers in EDD-II Aligarh revealed that rebate of 15 *per cent* on fixed and energy charges was not provided to the consumers resulting in excess billing of Rs 15.85 lakh against energy charges and Rs 3.37 lakh towards fixed charges during January to December 2008.

The Management stated that the division has been instructed for taking action.

Non/short credit of interest on security deposit

2.2.30 According to clause 4.20 (i) of the Supply Code 2005, the licensee shall pay interest on security deposit to the consumers at bank rate as on 1st April of applicable financial year by way of credit in the bill of the consumer in the month of April, May or June. Accordingly, a provision in the billing software should have been made so that amount of interest is automatically credited to consumer's account.

The credit for interest amounting to Rs 50.64 lakh on security deposit was not given to consumers in nine divisions.

The billing software used by billing agencies, however, did not have such facility. As a result, the amount of interest on security for Rs 50.64 lakh was not credited in respect of 1,23,972 consumers in nine divisions of the Company as detailed below:

Divisions	No. of consumers where credit not given	Amount not credited (Rs)
EUDD-I Agra	2,772	2,75,932.00
EUDD-II Agra	25,064	13,97,335.48
EUDD-III Agra	30,895	10,49,329.26
EUDD-IV Agra	3,610	0.00
EUDD-V Agra	43,893	13,82,043.84
EUDD-VII Agra	4,864	0.00
EDD- Fatehabad, Agra	931	68,970.72
EUDD-III Aligarh	2,581	5,28,075.66
EUDD-I Mathura	9,362	3,62,510.00
	1,23,972	**50,64,196.96**

Further, according to Electricity Supply Code 2005, the credit is to be given to the consumers at bank rate but the scrutiny of database revealed that in respect of six division amount of security interest was credited at the rate of three *per cent* instead of applicable bank rate of six *per cent*. This resulted in short credit of security interest amounting to Rs 3.13 lakh in respect of 15,685 consumers in two divisions.

The Management stated that credit of interest has been given on the basis of security amount available in March 2009. The reply is not tenable as no comment was offered regarding cases pointed out by audit.

Short assessment due to incorrect application of tariff

Incorrect application of tariff in case of BSNL consumers resulted in short assessment of Rs 25.82 lakh.

2.2.31 Rate Schedule-LMV-4 of the Tariff Order is applicable to the Offices of the Government Organizations other than companies registered under Companies Act 1956. These connections were to be billed under LMV-2 for loads up to 75 kW and under HV-1 for loads above 75 kW.

Scrutiny of data bank relating to consumers of LMV-4A category revealed that in seven distribution divisions, connections pertaining to offices and telephone exchanges of Bharat Sanchar Nigam Limited (BSNL) which was converted (1 October 2000) into a Government Company from Department of Telecommunication were billed under the this schedule whereas BSNL is a Government Company registered under the Companies Act, 1956. As result, these consumers were short billed for Rs 25.82 lakh in six divisions* calculated on the difference of fixed and electricity charges between LMV-2 and LMV-4 for the period from January 2005 to December 2008.

Similarly in EUDD-1 Mathura, four Government consumers were billed under 'LMV-5' i.e. private tube well whereas, these consumers were to be billed under LMV-4 (A) applicable for Government category. The incorrect application of tariff resulted in short assessment of Rs 1.38 lakh for the month of January to December 2008.

The Management stated that billing of BSNL consumers has been transferred under LMV-2 and under LMV-4 (A). The bills for the difference amount is being issued.

Short assessment of fixed charges against metered consumers getting supply as per 'Rural Schedule'.

2.2.32 The Tariff Order effective from 13 August 2007, increased the fixed charges from Rs 15 per KW per month to Rs 50 per KW per month for the consumers getting supply as per rural schedule.

Scrutiny of data bank of EDD Fatehabad for the period from January 2008 to December 2008 revealed that the fixed charges have not been charged as per Tariff Orders against 11,621 consumers resulting in short assessment of Rs 6.85 lakh.

The Management stated that UPERC had cancelled the transitional tariff as per review petition. The reply is not acceptable as no documentary evidence was made available.

Billing of NA/NR category of consumers against codal provisions

2.2.33 Scrutiny of data bank of Electricity Urban Distribution Division-III, Aligarh for the period from September 2008 to December 2008 revealed that in the month of December 2008, 53 consumers (domestic consumers) of NA category were present in the data bank. These consumers were to be billed on the basis of their average consumption of previous three billing cycle as per clause 6.2 (c) of the Electricity Supply Code 2005. These consumers were, however, billed under 'MU' category during the period September 2008 to

* EUDD-V, VII and EDD-Fetahabad of Agra, EUDD-III, Aligarh, EUDD-I, Mathura and EUDD, Firozabad.

November 2008. After joining the database of previous three billing cycle and calculating the average consumption units during the said period, it was found that the average units of previous three billing cycles are more than the units charged in December 2008. Thus, the billing against the consumers was made against the codal provisions.

The Management stated that at present billing of NA/NR consumers is being done on the basis of average consumption.

Monitoring Mechanism

Non-generation of bills

2.2.34 Clause 1.2.1 of general specification attached with the agreement executed with billing agency (C.S. Software Enterprise Limited, Hyderabad) provides that each meter reader of the billing agency will visit consumer's premises, collect reading, feed in hand held machine provided them with printed bill and will receive the payment through cheque only. Further, clause 5.26.2 (vi) also provides that in the event of a consumer's complaint that the bill has not been delivered to him is established to the satisfaction to the Company, a penalty of Rs 100 per occurrence shall be debited to the account of the billing agency. The Company failed to ensure the compliance of these provisions by the billing agencies as discussed below:

- An analysis of data bank of domestic light and fan and commercial category of consumers of five urban distribution divisions revealed that out of 23,91,653 cases of operative consumers, the bills were generated and delivered to 19,43,752 consumers only. The divisions, however, neither asked from the agency for non-generation and distribution of bills to 4,47,901 consumers nor imposed/recovered penalty for Rs 4.48 crore from their bills (worked out at the rate of Rs 100 for each occurrence). Further, due to non-generation and distribution of bills against these consumers, the assessment for Rs 23.59 crore could not be done during the period from November 2007 to December 2008 as detailed below:

Sl. No.	Name of the division	Total number of operative consumers	Total number of operative consumers where bills were generated	Total number of operative consumers where bills are not generated	Amount short assessed (in crore)
1.	EUDD-II, Agra	381109	225140	155969	8.38
2.	EUDD-I, Mathura	636510	435663	200847	11.11
3.	EUDD-III, Agra	508422	460251	48171	2.18
4.	EUDD-VII, Agra	469521	463987	5534	0.64
5.	EUDD-V, Agra	396091	358711	37380	1.28
	Total	**2391653**	**1943752**	**447901**	**23.59**

The Management stated that there is no question of levy of penalty as no complaint was received from any consumer. The reply is not acceptable as non-generation of bills was in the knowledge of the divisions.

7733 consumers were billed for 63 units per month instead of their actual consumption.

- In EUDD-IV, Agra 2,780 domestic consumers billed at ad-hoc 63 units even though their consumption were less than 63 units during the period from November 2007 to December 2008. There was no basis/provision for billing on ad-hoc 63 units. This has resulted in excess billing against the consumers for Rs 1.39 lakh. Besides, due to incorrect generation of bills, the billing agency was liable to pay penalty at the rate of Rs 100 per occurrence worked out to Rs 2.78 lakh but the same was not recovered from the agency.

- Similarly, in EUDD-VII, Agra, 4,953 consumers were billed at 63 units per KW per month whereas their actual consumption were less than 63 units. Thus, the billing agency did not generate correct bills against these consumers hence was liable to pay a penalty of Rs 100 per such occurrence as per terms of the agreement amounting to Rs 4.95 lakh but the same was not recovered by the division from their bills.

The Management stated that due to mechanical meters the division has instructed the billing agency for billing of 63 units per KW per month.

- In December 2008, although the meter readings in case of 346 cases of EUDD-I Agra were available but their bills were not generated by the billing agency resulted in non-assessment of revenue of Rs 4.35 lakh.

Reduction in arrears of inoperative consumers from the databank

2.2.35 According to the laid down procedures, the arrears against inoperative consumers shall be reduced if the consumer deposits the arrear amount or their Permanent Disconnection (PD) is finalised and the fictitious amount, if any, is waived off. Scrutiny of data bank of inoperative consumers (BLL_STAUS "Z') in EUDD-VII, Agra revealed that in the month of March 2008, there were 29 consumers having arrears above Rs 5 lakh and having outstanding dues amounting to Rs 2.32 crore. However, in the data bank of April 2008. the number of consumers reduced to 9 with arrears of Rs 1.52 crore despite of the facts neither these consumers deposited the arrear amount nor their PD were finalised.

29 consumers having arrears of Rs 31.12 lakh were deleted from database.

Similarly, in EUDD-V, Agra there were 591 inoperative consumers with arrears of Rs 6.68 crore in month of August 2008 but the data bank of September 2008 indicated the number of consumers only 562 and 29 consumers having arrears of Rs. 31.12 lakh have been deleted from the database against which no documentary evidence was available regarding payment of arrear amount by the consumers.
The Management stated that action is being taken after scrutiny.

Extra expenditure due to non-installation of required infrastructure at Payment Collection Centre by the billing agency

2.2.36 Clause 2 of the agreement executed (February 2008) with billing agency (C.S Software Enterprise Limited, Hyderabad) provides that the agency shall install one Computer at each Payment Collection Centre for collection of revenue and updation in master data bank. The agreement *inter alia*, further, stipulated that consumers may be facilitated for bringing their consumption readings at the centre, get their bills generated and to make payment at the collection centre.

The Company, however, executed (14 August 2008) another agreement with the other agency (M/s Premier Software) for the same work at a fixed amount of Rs 10000 per month and the same was being paid regularly and such amount was not recovered from the billing agency (C.S. Software).
The Management stated that the work of billing agency and work done by Premier Software is different. The reply is not acceptable as establishment of payment collection centre was provided in the agreement of the billing agency.

Duplicate billing done by outsourced billing agency

2.2.37 The scrutiny of master databank of EUDD-IV, Agra revealed that there were 109 duplicate consumers in the master data bank during the period from November 2007 to March 2008 worked out with the help of join databases command as detailed below:

Month	Sub-division	Total No. of consumers	Duplicate consumers
November 2007	SDO-I	7,006	33
December 2007	SDO-II	7,056	33
December 2007	SDO-I	12,904	105
January 2008	SDO-II	14,025	105
January 2008	SDO-I	13,058	109
February 2008	SDO-II	14,097	109
January 2008	SDO-I	13,058	108
March 2008	SDO-II	14,151	108

The billing agency never informed to the division regarding these duplicate consumers and generated the bills of such consumers. The exception reports have also not been submitted by the billing agency, generated the bills twice in case of 109 consumers and was paid accordingly.

The Management stated that recovery would be made from the billing agency after enquiry by Sub-divisional Officers.

Ad-hoc billing against small and medium power consumers

2.2.38 Examination of database EUDD-IV, Agra for the period from January to December 2008 in respect of commercial consumers revealed that EC has not been calculated as per applicable tariff provision.

Further, in case of two small and medium power consumers, although, the meter readings were available in the database but assessment was made on ad-hoc/provisional basis. This has resulted in short assessment of Rs 8.22 lakh.

The Management stated that the bills of the consumers were revised but entries had been made in same month. Regarding two cases it stated that the bills on the basis of actual reading are being issued.

Wrong generation of bills under metered units (MU) category

Energy charges were rounded off instead of total bill amount resulted in excess assessment of Rs 5.98 lakh.

2.2.39 Examination of data base of EUDD-I, Mathura for the period from April to December 2008 in respect of domestic consumers revealed that 27,054 operative cases having load of 1 KW were billed under ‘NOR’ category. The billing agency rounded off the amount of energy charges whereas the total bill amount was to be rounded off resulting in short assessment of Rs 0.11 lakh against 27,054 consumers and excess assessment of Rs 5.98 lakh against 24,136 consumers during the period June to December 2008.

Further, as the billing agency generated the wrong bills of the consumers, hence, was liable to pay penalty of Rs 51.19 lakh as per the agreement but the same was not recovered from the agency.

The Management stated that the billing agency has been instructed to round off the bill amount only.

Non identification of cases of higher consumption of energy

The Company failed to identify consumers having higher consumption of energy.

2.2.40 The consumption of consumers having 1 kW load should not be more than 216 kWh* in a month worked out on the formula prescribed in Electricity Supply Code 2005. If the consumer exceeds this limit, it means that the load of the consumer is either on the higher side or his meter is not recording consumption of energy correctly.

Scrutiny of data bank of LMV-1 (Domestic light and fan consumers) having load of 1 KW relating to five distribution divisions for the period from November 2007 to December 2008 revealed 7,675 cases where the consumption was in excess over the prescribed limit as detailed below:

Name of the division	Total No. of cases	No. of cases under healthy category	No. of cases having consumption over permissible limit	Range of consumption
EUDD-I Agra	5,29,609	39,944	2,506	251-89,105
EUDD-II Agra	41,573	17,260	74	490-9,993
EUDD-IV Agra	1,59,037	44,519	1,182	251-1,72,580
EUDD-VII Agra	4,01,915	39,385	3,322	251-65,068
EUDD-I Mathura	3,51,283	2,67,100	591	251-62,999
			7,675	

This indicated that the billing software used by the billing agency did not have facility to generate such report automatically. In absence of such reports the Company failed to identify such consumers either to regularise their excess load or to change their defective meters to avoid loss to the Company.

The Management stated that consumption of the consumers pointed out by audit may be of more than 30 days. The reply is not acceptable as audit had considered only those cases in which fixed charge was levied for one month only.

Differences between billing data base and commercial statements

There were differences in the figures shown in commercial statements and billing database.

2.2.41 As per the terms of the agreement executed with the agency, the agency was required to provide billing ledger and billing data monthly in soft copy along with other reports to the division, so that the figures of commercial statements which contained the details of each category of consumers along with their assessment could be reconciled by the divisions before submitting it to Company's headquarters. But the softcopy of billing ledgers and billing data were not obtained from the billing agencies, as a result, the figures incorporated in the commercial statements and the figures as per ledger could not be reconciled and there were difference in both the data in respect of eight divisions for the month of December 2008 as detailed in **Annexure-16**.

The Management stated that difference pointed out by audit is due to the consumers having permanent disconnection which could not be deleted from the database in the same month. The reply is not tenable as number of consumers pointed out by audit is exclusive of inoperative consumers.

Non utilisation of Geographical Information System (GIS) mapping

2.2.42 The Company executed (November 2007 and February 2008) agreements with billing agencies (SAI, Meerut and CS Software, Hyderabad)

* Calculated on L*H*F*D formula i.e. 1*24*0.3*30 = 216

GIS mapping was not utilised inspite of expenditure of Rs 41.91 lakh.

for GIS mapping at a cost of Rs 41.91 lakh. The scope of work of agreement *inter alia* provided that the agencies were to undertake door-to-door survey and update master database including GIS mapping (showing roads, streets, lanes and houses or polygon), marking of distribution transformers (DTs), poles and current transformers (CTs) meter installation on low tension side of the DTs. The survey include identifying status of meter (physical and operational status, glass broken, condition of seals, meter make, year of manufacture, number of digits etc.), correctness/legibility of meter number, consumer number, address etc. This also include identifying of power lines leading to the consumers' premises (or otherwise), allotment of sequence numbers as per actual physical sequence at site by visual inspection.

Audit observed that though the GIS mapping was prepared by the agencies but the same was not available in the soft copy with supporting software and interface with the Agency's server or with the data bank of the consumers used by the billing agencies. The Company could not make use of Geographical Information System (GIS) mapping as a result the entire expenditure became unfruitful.

The Management stated that further action will be taken after developing a system in future. The reply is evasive.

Lack of disaster recovery and business continuity plan

2.2.43 The revenue billing against the consumers for their energy consumption and its recovery is the main source of income of the Company. If there is any disaster and the bills of the consumers are not generated on time, the revenue income of the Company will be substantially affected.

The Company did not have a disaster recovery and business continuity plan outlining the action to be taken immediately after a disaster[♣] and to ensure that the data processing operation could be acquired immediately. The key configuration items viz. hardware, software, personnel and other assets which were required for continuity of the IT activity in case of disaster had not been identified and documented. Further, in case of default on the part of outsourced billing agency, the Company did not have a recovery plan for continuity of its billing activity.

The Management stated that a disaster recovery centre would be made under RAPDRP. The reply is evasive as no comment was made on the audit observations.

The matter was reported to the Government (September 2009); their replies had not been received (November 2009).

Conclusion

The billing system outsourced by the Company did not have adequate and effective IT control regarding security features, uniform data structures, generation of reports etc.

The application of tariff orders in billing against the consumers in many cases were found to be incorrect and improperly incorporated in the system along with the insufficient application control and validation

♣ Loss of data due to natural/technological calamities.

checks resulting in excess/short billing against the consumers. The monitoring mechanism of the Company was deficient resulting in non-utilisation of GIS mapping, non/incorrect generation of bills and discrepancies in the billing data base and commercial statements.

Recommendations

- **The Company should formulate and document an IT policy.**
- **IT security policy and business continuity plan should be formulated to prevent changes/modifications in database without authorisation.**
- **The Company should formulate disaster recovery plan for immediate operation of data processing at the time of disaster.**
- **The compliance of tariff provisions issued by UPERC and its application in the billing software/database used by outsource billing agencies should be properly monitored.**