CHAPTER II

2 PERFORMANCE REVIEWS RELATING TO GOVERNMENT COMPANIES

2.1 KARNATAKA POWER CORPORATION LIMITED

IMPLEMENTATION OF RAICHUR THERMAL POWER STATION UNIT-7 BY KARNATAKA POWER CORPORATION LIMITED

Highlights

The Company's decision (August 1998) to implement a Unit of 210 MW instead of a 500 MW or higher capacity was not justified in view of the recommendations (April 1986/April 1990) of the Sub-group under the Advisory Group on Technology Development set up by the Union Ministry of Power (MoP). This self inflicted decision has deprived the State of an additional 290 MW and 40 MW permanently after implementing the Unit-8 of 250 MW, for which approval has been accorded by the State Government.

(Paragraph 2.1.7)

As against Central Electricity Authority (CEA) guidelines for finalisation of bids within 12 months from pre-project activities (date of Government approval) to zero date (date of placement of order), the delays in award of contracts ranged from 8 to 14 months.

(Paragraph 2.1.9)

Revision of synchronisation schedule from 24 to 28 months and compression later to 26 months resulted in payment of bonus of Rs.1.03 crore to contractors.

(Paragraph 2.1.10)

Lack of clarity in tender process in hiving off the Ash Handling System resulted in increasing the Project cost by Rs.5.57 crore.

(Paragraph 2.1.11)

The technical specification/design parameter of the boiler was at variance with Union Ministry of Environment and Forests' stipulations. There was excess consumption of 3.89 lakh tonnes of coal valued at Rs.80.09 crore during the period 2003-07 as compared to the specification of the equipment supplied. The latest technology offered by the equipment suppliers of Variable Frequency Drive and Cooling Tower was not adopted.

(Paragraphs 2.1.12, 2.1.13 and 2.1.14)

The Unit did not achieve the Plant Availability Factor as compared to that of 158 numbers 200/210MW stations in the country (national average as compiled by CEA) resulting in shortfall of generation of 549.67 million units of energy for 2004-06.

(Paragraph 2.1.15)

The Company allocated Rs.114.21 crore of cost of generation of Unit-7 to other six units to avoid low demand for the electricity generated from this unit.

(Paragraph 2.1.16)

The increased use of washed coal did not yield expected benefits.

(Paragraph 2.1.17)

The Company has no control on the important indices of performance such as Gross Calorific Value, Heat Loss, Gross Station Heat Rate, Specific Coal Consumption and Auxiliary Energy Consumption.

(Paragraphs 2.1.18 and 2.1.26)

There was short billing of primary fuel charges of Rs.63.22 lakh and excess claim of secondary fuel charges, fixed charges and incentive of Rs.41.72 crore by the Company due to application of different formulae than that stipulated in the Power Purchase Agreement.

(Paragraphs 2.1.22 to 2.1.24)

Introduction

2.1.1 Karnataka Power Corporation Limited (KPCL) was incorporated (July 1970) as a wholly owned State Government Company, with the main objective of planning, promoting and organising development of power including construction, generation and maintenance of power stations in the State. In pursuit of these objectives, the Company commissioned (1985-1999), a coal based thermal power station at Raichur with six units of 210 Mega Watt (MW) each, besides other Hydel and Wind generating stations**.** The Raichur Thermal Power Station (RTPS) was conceived for construction during 1970s on the assurance given by Singareni Collieries Company Limited (SCCL), for supply of sufficient quantity of coal for running its six units**.**

The Central Electricity Authority (CEA) estimated (1995) (15th Power Survey Report) the peak load demand in the State at the end of IX plan period *i.e.*, 2001-02 at 5,422 MW. The generating capacity available was 3,520 MW and there were various projects of around 1,112 MW proposed to be commissioned during the IX plan period, leaving a projected gap of about 790 MW in meeting the demand at the end of IX Plan. It was in this context

that the Board of Directors (BoD) considered (August 1998) the proposal for construction of Unit-7 at RTPS with capacity of 210 MW, at a cost of Rs.520 crore, which was approved (March 1999) by the State Government and the work began in October 2000. The Unit was synchronised (December 2002) at a cost of Rs.561.98 crore and the commercial operation commenced (April 2003).

The affairs of the Company are managed by a BoD comprising a Chairman, a Vice-Chairman, a Managing Director (MD) and three functional Directors. The Chief Minister of the State is the Chairman of the Board. The MD is the Chief Executive of the Company. The Executive Director (Thermal), assisted by four Chief Engineers and three Deputy General Managers, is responsible for the operation and maintenance of RTPS. The Superintending Engineer (Thermal Design) was the task force leader for implementation of Unit-7.

Scope of audit

2.1.2 The performance audit conducted (October 2006 to February 2007) covers examination of overall efficiency of the Company in conception, planning, financing and implementation of Unit-7 and its operational performance during the period from 2003-04 to 2006-07.

The records selected for detailed scrutiny were based on conventional judgmental sampling method on the basis of financial materiality. Out of 58 packages/contracts valued at Rs.479.29 crore, 20 major packages valued at Rs.458.96 crore were reviewed in audit.

The reviews on execution of Units 1 and 2 and Units 3 to 6 were included in the Audit Report (Commercial) – Government of Karnataka of the Comptroller and Auditor General of India for the years ended 31 March 1987 and 31 March 2000 respectively. The report on Units 1 and 2 was deemed to have been discussed (July 1998) by the Committee on Public Undertakings (COPU). COPU discussed (November 2001 and January 2002) the report on Units 3 to 6, on which no recommendations have been made.

Audit objectives

2.1.3 The performance review of implementation of RTPS, Unit-7 was conducted to ascertain whether:

- the project was conceived with adequate groundwork and planning and implemented in an economic, efficient and effective manner;
- financial propriety was adhered to in tendering process; and the technical specifications and design parameters were in conformity with the requirements;
- the Unit achieved efficiency parameters specified by the equipment suppliers and operational performance of the Unit was effective; and it had not affected the performance of other units;

- generation of power was achieved to the extent envisaged;
- the consumption of fuel was as per norms and the cost of generation was correctly assessed;
- the claims for sale of energy were in line with the provisions of the Power Purchase Agreement; and
- the internal control system was efficient and effective.

Audit criteria

2.1.4 The Audit criteria considered for assessing the achievement of audit objectives were:

- projections made in the Feasibility Report, Detailed Project Report (DPR);
- project implementation schedule;
- design specifications and efficiency standards set by the equipment suppliers;
- norms of operation prescribed by the Central Electricity Authority (CEA), Karnataka Electricity Regulatory Commission (KERC), national averages and World Energy Council reports;
- linkage of coal, terms of Fuel Supply Agreement (FSA) and Power Purchase Agreement (PPA); and
- provisions of Karnataka Transparency in Public Procurement Act.

Audit methodology

2.1.5 The following mix of Audit methodology was adopted for achieving the audit objectives with reference to audit criteria of the performance review were:

- study of the Government Orders, CEA guidelines, KERC guidelines, Minutes of Meetings of the Board of Directors, Technical Committee and Contract Management Group;
- examination of Feasibility Report;
- study of loan and financial arrangement files/records;
- analysis of power generation details, progress reports *etc*;
- scrutiny of PPAs, FSAs and claims; and
- issue of audit enquiries and interaction with the Management, Entry and Exit conferences.

Audit findings

2.1.6 Audit findings arising from the performance review were reported (April 2007) to the Government/Management and were discussed (8 May 2007) in the meeting of Audit Review Committee on Public Sector Enterprises (ARCPSE). The meeting was attended by the Principal Secretary to the Government of Karnataka, Energy Department, the MD of the Company and the Technical Consultant from Central Power Research Institute. The views expressed by the representatives of the Government/Management and replies furnished (May 2007) by the Government/Management have been taken into consideration while finalising the review.

The audit findings are discussed in the succeeding paragraphs:

Planning, capacity and linkage

Planning

2.1.7 The Technical Committee (TC) decided (November 1997) to prepare a feasibility report for establishing an additional unit (Unit-7) at Raichur. The TC further decided (November 1997) to explore the possibility of establishing Unit-7 of 500 MW at Raichur and placed (November 1997) feasibility reports for setting up a 210 MW or a 500 MW unit before the BoD. The BoD was aware of the advantages[29] of 500 MW units in adding substantial capacity in a relatively short period of time *i.e.,* provide efficient power at lower cost as demonstrated elsewhere in the country, lesser operation and maintenance cost and the fact that equipment manufacturers were phasing out 210 MW units. Nevertheless, the BoD, decided (August 1998) to start the construction of a 210 MW Unit (Unit-7) from January 1999 for Rs.520 crore and complete (synchronise) it within 24 months (January 2001).

It was noticed that:

- Unit-7 was constructed only on the basis of feasibility report and no DPR was prepared.

- a Sub-group, under the Advisory Group on Technology Development set up (1985) by the MoP to recommend the next higher size of Thermal Turbo Generator for future projects in India, had recommended (April 1986) that 500 MW units would be adequate to meet the requirement of power development till the year 2000 and that the situation would be required to be reviewed in 1990-91. In pursuance of this recommendation, the Sub-group, reconstituted (1989) by the MoP recommended (April 1990) that next higher size units of 750 MW rating may be adopted and the choice of sub-critical/super-critical parameters may be left open to the utilities to decide.

[29] **A Detailed Project Report of Bellary Thermal Power Station (BTPS - another project by the Company) for 500 MW was approved in April 1998. While discussing the implementation of this project in December 2002, the Board had recorded the above advantages in going for 500 MW (in 1998) at BTPS.**

- the BoD evaluated (August 1998) that the infrastructural facilities existing at RTPS, such as land, raw water pump house, availability of de-mineralised water, circulating water pump house, station building, cooling tower, coal handling plant, power evacuation, *etc*., were inadequate for an additional 500 MW unit. However, audit examination of these requirements **(Annexure-8)** proves otherwise. The fact that the Company subsequently (September 2006) proposed to set up eighth unit of 250 MW within the same available resources goes to disprove the earlier contentions of the BoD.

The State is now deprived of an additional 290 MW and 40 MW permanently after implementing the Unit-8 of 250 MW, for which approval has been accorded by the State Government.

Thus, non-adherence to the recommendation (April 1990) of the Sub-group constituted by MoP for 500/750MW thermal station had not only resulted in foregoing annual savings on account of reduced requirement of coal and auxiliary consumption of approximately valuing Rs.10.86 crore but also deprived the State of 290 MW till the implementation of eighth Unit and 40 MW of power permanently thereafter.

The Government informed (May 2007) in the ARCPSE meeting, that, the Company faced constraints of station layout, coal handling system, water availability, height of Chimney, interchangeability of spares, *etc*., apart from financial constraints, in establishing a 500 MW unit.

As could be seen from **Annexure-8,** the Company did not have major constraints as regards the problem areas. The requirement of land, water, *etc.*, for Unit-7 of 210 MW and the proposed Unit-8 of 250 MW, put together, is more than the requirement for a unit of 500 MW. So far as the problem of interchangeability of spares for 500 MW is concerned, availability of spares for 500 MW could also have catered to the thermal power station of two units of 500 MW each (proposal for the first unit of 500 MW was approved in April 1998) which are being constructed at BTPS (located 150 kilometers away from Raichur). In fact, it would have reduced the inventory carrying cost, if viewed against the decision to implement a stand alone eighth Unit of 250 MW.

Non-materialisation of dedicated mine

2.1.8 As per the Feasibility Report (June 1998), proposals for coal linkage for Unit-7 was proposed to be met either from Singereni Collieries Company Limited (SCCL) or from Talcher coal fields and the Company was having continuous dialogue with the coal companies to find out the feasibility of entering into an agreement for dedicated mine for the supply of coal. It was observed that the Company was not successful in entering into an agreement with coal companies for a dedicated mine for the supply of coal to RTPS.

The Company stated (February 2007) that it had made efforts (June 1998) for getting coal from dedicated mines from SCCL and Western Coal Fields Limited (WCL). But the SCCL authorities had expressed (September 1998) their inability to supply additional quantity of coal for the above units. In respect of WCL, the Company stated that some of the conditions laid down in the draft agreement by WCL were not acceptable to the Company. It was observed that these conditions insisted by WCL were deposit of Earnest

Money Deposit equal to 1/12th of the cost of annual quantity of coal to be lifted (Rs.25 crore) and commitment advance of 1/6th of annual cost of coal (Rs.49 crore). Compared to the higher cost (Rs.550-700 per tonne as mentioned in paragraph 2.1.20) involved in bringing coal from distant mines of Mahanadi Coal Fields Limited (MCL), these conditions were definitely economical.

Award of work and contract management

Time overrun

2.1.9 The Company awarded 58 packages/contracts aggregating Rs.479.29 crore for the implementation of Unit-7. The details of time taken for award of major contracts are given below:

Package	Commence-ment of pre-project activities (Government approval)	Scheduled period for award of packages considering the norm of 12 months from Government approval as per CEA	Actual Month of Award	Delay from the month of Govt. approval (Months)	Time required for completion as per Feasibility Report (Months)	Actual period allowed in the agreement (Months)
Boiler Turbine Generator	March 1999	February 2000	October 2000	08	26	30
Station Building			October 2000	08	24	30
Circulating Water System			April 2001	14	15	20
Re-inforced Concrete Cement Chimney			February 2001	12	24	22
Cooling Tower			January 2001	11	24	26

It was noticed that:

As against Central Electricity Authority (CEA) guidelines for finalisation of bids within 12 months from pre-project activities (date of Government approval) to zero date (date of placement of order), the delays in award of contracts ranged from 8 to 14 months.

- as against CEA guidelines for finalisation of bids within 12 months from pre-project activities (date of Government approval) to zero date (date of placement of order), the delays in award of contracts ranged from 8 to 14 months. This was inspite of the decision to dispense with the tendering process in procurement of the Boiler, Turbine and Generator package from Bharat Heavy Electricals Limited (BHEL).
- as per the decision (August 1998) of the BoD, the project was to be completed in 24 months. The Company, however, revised the schedule three times:
    - from 24 months to 26 months (June 1999),
    - from 26 months to 28 months (June 2000) and
    - from 28 months to 26 months (compression) in March 2002.

The project was synchronised (December 2002) in 25 months at a cost of Rs.561.98 crore. But commercial operation started (April 2003) in 30 months after four months from the date of synchronisation though it was planned to be commenced within two months.

The Government replied (May 2007) that awarding contracts was delayed due to delay in tying up finances and that contracts were awarded after signing (October 2000) of a multipartite agreement for required funds. It was also stated that there was no delay in commercial operation with reference to the contract.

The reply is not tenable as the Company had planned (1998) to raise Rs.3,000 crore for 1,000 MW to be implemented over next three to five years. The MD had informed (August 1998) the BoD in one of their meeting that during the investors conference (July 1998) the financing of Unit-7 was posed and the response from the Banks/Financial institutions was encouraging. There is no evidence to suggest that the Company had initiated action for issue of bonds as specified in the Government approval. The proposed financing of the project through lease finance was also not implemented.

The Company did not award contracts until the multipartite agreement was entered (October 2000), inspite of initiating the tender processes (1998) and receiving Government approval for the project (March 1999). The reply of the Company that there was no delay in commercial operation was with reference to original schedule of 28 months and not with reference to the revised compressed schedule of 26 months.

Avoidable payment of bonus

Revision of synchronisation schedule from 24 to 28 months and compression later to 26 months resulted in payment of bonus of Rs.1.03 crore to contractors.

2.1.10 A bonus clause envisaging payment of premium not exceeding Rs.1.87 crore[30] was included in four civil packages for early completion considering synchronisation of the project in 28 months (February 2003). The bonus was to be paid proportionately for each day of saving beyond a saving of two months subject to the maximum of Rs.1.87 crore. The date of synchronisation was reduced (May 2002) to 26 months. The project was synchronised in 25 months (December 2002). The Company paid bonus of Rs.1.03 crore (based on proportionate days) considering the date of synchronisation as 28 months.

Thus, considering the pace of project, the Company was aware (June 1999 and March 2002) that the project could be completed in 26 months. Yet, the civil packages were awarded considering the synchronisation period as 28 months, which led to avoidable payment of bonus of Rs.1.03 crore.

The Government stated (May 2007) that bonus was paid as per the contractual obligations. The fact, however, remained that unwarranted revisions in the completion dates while awarding the contract resulted in payment of bonus.

[30] station building (Rs.1.25 crore), circulating water system (Rs.0.20 crore), chimney (Rs.0.15 crore) and cooling tower (Rs.0.27 crore).

Evaluation of bids

Ash handling system

2.1.11 The ash generated in the process of burning coal is useful in cement and brick industries. The Company had already handed over the ash handling systems in units one to six to various cement/brick industries for operation and maintenance in consideration of removing the ash free of cost. The Company was also required to achieve[31] 100 *per cent* fly ash utilisation in nine years (by 2011 for Unit-7). The BoD decided (April 2002) to transfer the fly ash disposal system of Unit-7 to interested parties on own and operate basis to bring down the project cost. The fly ash handling system (excluding bottom ash system) was constructed at a cost of Rs.13.38 crore. The fly ash handling system was transferred (May 2002) to a cement manufacturer (ACC) on "own and operate" basis for Rs.7.81 crore for a period of 10 years.

Audit scrutiny of the award of this contract revealed that the Company sent (February 2002) limited enquiries to ACC, Rajashree Cements, Vasavadatta and ARV Society calling for their expression of interest in sharing the cost of the fly ash handling system and for lifting the entire fly ash generated. The enquiries lacked clarity as to the components of the ash handling system proposed to be transferred - there was no indication about sharing the cost of wet ash handling system. The tenders were opened (20 February 2002) in the presence of the representatives of all the firms. The offers received also lacked clarity and the Company interpreted them differently at different times. Initially, it was stated that the bid of ACC was for the fly ash system only for Rs.3.80 crore. It was revised many times subsequently, deriving various conclusions from the terms in the offer and finally fixed at Rs.7.81 crore. The wet ash handling system, constructed at a cost of Rs. 3.46 crore, was also included in the assets to be transferred**.** Similarly, Rajashree Cements' offer, initially (February 2002) evaluated at Rs.3 crore, was later (March 2002) revised to Rs.7.14 crore. The wet ash handling system was not part of their offer as the tender enquiries were not explicit about it. The Rajashree Cements, however, had agreed (March 2002) to share 100 *per cent* of cost and was open to further discussions on the cost issue. After many interpretations and re-interpretations, it was decided in the TC Meeting (February 2002) to entrust the Ash Handling System on "own and operate" basis to ACC and it included the wet ash handling system also**.**

Lack of clarity in tender process in hiving off the Ash Handling System resulted in increasing the Project cost by Rs.5.57 crore.

Thus, the decision of the Company (i) to send limited enquiries, (ii) to not include the details of the components to be hived off (transferred) in the tender, (iii) to accept offers that were prone to different interpretations and (iv) to reject the offer of Rajashree Cements even when it was willing to share the entire cost resulted in increase in the project cost by Rs.5.57 crore.

The Government replied (May 2007) that the tender was limited only to firms based in the State, with a view to encourage local investments. As regards the offer of Rajashree Cements, it was stated that it was a post-tender and conditional one and not superior to that of ACC.

[31] as per the Ministry of Environment and Forests notification (September 1999).

The reply is not tenable as many of the modifications effected in the terms of offer of ACC were also post-tender and the Company did not annul the tender despite the ambiguity in tender specifications as well as the offers received, which resulted in the Company failing to take advantage of emerging market for ash.

Execution of contracts

Appropriateness of technical specifications

Boiler

2.1.12 The BoD was informed (January 2000) that the Company obtained coal linkage from Standing Linkage Committee of the Ministry of Coal from Mahanadi Coal Fields (MCL), Talcher (1,850 kilometres) for Unit-7. The Gross Calorific Value[32] (GCV) of the coal sourced from MCL ranged between 3,206 Kcal/Kg and 3,629 Kcal/Kg with ash content ranging between 39.3 and 43.6 *per cent*. Based on the nature, type and characteristics of this coal, the equipment suppliers designed major critical equipments like Boiler (steam generator), turbine generator, *etc*., to work at 3,500 Kcal/Kg (GCV) with ash content of 40.03 *per cent*.

It was noticed that:

- the Company was aware of the stipulation of the Ministry of Environment and Forests (MoEF) (September 1997) that Thermal Power Stations located more than 1,000 kms away from the collieries were to operate with coal containing less than 34 *per cent* ash content only (washed coal[33] or raw coal with less than 34 *per cent*). As the washed coal with 34 *per cent* ash content has GCV of more than 4,300 Kcal/Kg, the current specifications/designs of the boiler are not in line with the guidelines of the MoEF.

- the impact of the current specifications/designs of the boiler is as follows:

    - increase in the usage of washed coal with GCV of 4,300 Kcal/ Kg did not result in reduction in quantity of coal consumed as brought out in Paragraph 2.1.17. The specific coal consumption had, in fact, increased from 0.618 Kg/Kwh to 0.662 Kg/Kwh.

[32] Gross Calorific Value is the energy per kilogram of coal expressed in Kilocalorie (Kcal) per Kg.

[33] Washed coal (beneficiated coal) is the coal received after the process of washing by Washeries, which reduces its ash content. The Gross Calorific Value of washed coal is above 4,300 Kcal with ash content of less than 34 *per cent.*

- at 3,500 Kcal/Kg, using raw coal with 40 *per cent* ash, the quantity of ash generated is more resulting in higher emissions to atmosphere, increased ash handling and disposal costs, excess load on transportation system and increase in operating and maintenance costs.

The Government replied (May 2007) that as the concept of washed coal was not thought, the use of the same in Unit-7 was not envisaged and while placing orders on BHEL, washeries did not exist for MCL Coal. Further, it was stated that while clearing Unit-7 project, the MoEF had not specified usage of coal with less than 34 *per cent* ash content.

The reply is not tenable as the Company was contemplating usage of washed coal with lesser ash content in all the units as is evident from the discussions of the Technical Committee (April 1998) and as per the techno-economic clearance accorded (January 2001) by CEA, the GCV of coal specified was 4,200 Kcal/Kg. The quantity of washed coal used had been increasing over the years.

Further, as per MoEF's specification use of coal with ash content of less than 34 *per cent* was applicable to all projects located more than 1,000 kms away from the collieries.

There was excess consumption of 3.89 lakh tonnes of coal valued at Rs.80.09 crore during the period 2003-07 as compared to equipment supplier's specification. The latest technology offered by the equipment suppliers of Variable Frequency Drive and Cooling Tower was not adopted.

- the Boiler Equipment supplier's specifications provide turbine heat rate of 1,966 Kilo calories (Kcal) and Boiler Efficiency at 86.17 *per cent* for Unit-7, thus requiring heat of 2,281.54 Kcal to generate one Kwh of electric energy. The details of consumption of coal as per standards adopted for actual generation, coal actually consumed *vis-à-vis* excess consumption of coal are given in **Annexure-9**. It could be seen from the Annexure that during 2003-07, there was excess consumption of coal of 3.89 lakh tonnes valued at Rs.80.09 crore as compared to the equipment supplier's specification.

The Government replied (May 2007) that coal consumption data cannot be considered as the actual consumption as it is an apportioned quantity. The reply is not tenable as the Audit analysis is based on data furnished (November 2006) by the Company; the same data that was reported to other statutory authorities like CEA and KERC. No other data was furnished to substantiate the reply or refute the audit findings.

Variable Frequency Drive (VFD)

2.1.13 BHEL had proposed Variable Frequency Drive (VFD) for Induced Draft (ID) fans stating that if ID fan operates at less than 80 *per cent* of rated speed with VFD, there was a potential saving of 300 to 500 KW in auxiliary consumption and that various Units of National Thermal Power Corporation at Unchahar and Dadri are being operated with VFD.

The case of going for VFD for ID Fans in place of Hydraulic Coupling in the BTG Package of Unit-7 was discussed (January 2001) by the Contract Management Group (CMG) and also in the meeting (February 2001) of Technical Committee. The CMG had concluded that the additional investment of approximately Rupees three crore on VFD was unviable and decided for hydraulic coupling.

It was observed that the Company lost the opportunity to increase the sale of energy of 8.55 MUs (2003-04 to 2006-07) and would further lose 47.74 MUs during the remaining life of the Unit due to reduced auxiliary consumption. The consequent additional revenue foregone was Rs.1.10 crore (2003-04 to 2006-07) and further revenue of Rs.7.16 crore in the remaining life of the Unit. In this connection, it is pertinent to mention that Units 5 and 6 are fitted with VFDs for ID fans.

The Government replied (May 2007) that VFD was not opted for due to initial problems experienced in Units 5 and 6 and poor servicing support from BHEL. It was also stated that provision for VFD has been made, if required, at a later stage. The reply is not tenable as inspite of these stated de-merits, the Company had proposed (October 2002/ February 2003) to fit Unit-8 and BTPS with VFDs, thereby substantiating the audit observation.

Cooling Tower

2.1.14 The note (November 1997) to the Technical Committee explaining the relative merits of cooling tower, mentioned that there were two types of Natural Draft Cooling Tower (NCDT) *viz*., Splash Type Fill (STF) and Poly Vinyl Chloride (PVC) Film Type Fill. The cost and time required to implement PVC Film Type Fill was stated to be lesser due to reduction in height of the tower from 146.2 metres to 110 metres besides lower cost of pumping power by Rs.60.99 lakh per annum.

The Technical Committee, however, opted (May 1999) for STF cooling tower as that type of tower was installed in other six units of RTPS.

It was observed that the increase in cost of pumping power due to implementation of STF cooling tower was Rs.1.29 crore (2003-07) and in the remaining life of the unit the avoidable recurring cost would be Rs.40.15 lakh per annum.

The Government replied (May 2007) that raw water drawn directly from Krishna river during rainy season could not be used in PVC Film Fill cooling tower due to high turbidity (impurities). It was further stated that in case, clarified water was used, PVC Fill type NDCT could be used effectively.

The reply is not tenable as the Company did not explore the possibility of utilising the existing clarifier or going for a new one. In fact, the high turbidity of water during the rainy season was never a subject of discussion while taking the decision. The Company is now constructing a separate clarifier for Unit-8, which option was available for Unit-7 as well.

Performance of the Unit

2.1.15 The table below indicates the operational performance of Unit-7 for the four years ended 2006-07.

Sl. No.	Particulars	2003-04	2004-05	2005-06	2006-07
1	Annual generating capacity (Million Units)	1,844.640	1,839.600	1,839.600	1,839.600
2	Total available hours in a year	8,784.000	8,760.000	8,760.000	8,760.000
3	i) Planned outage hours	535.767 (6.10 *per cent*)	408.033 (4.66 *per cent*)	1,026.320 (11.72 *per cent)*	-
	ii) Forced outage[34] hours	301.950 (3.44 *per cent*)	331.983 (3.79 *per cent*)	896.513 (10.23 *per cent*)	74.670 (0.85 *per cent)*
	iii) Hours lost due to build-up (shortage) of coal stock	-	316.000 (3.61 *per cent*)	180.530 (2.06 *per cent*)	-
	iv) Hours lost due to No Load Demand (Backing down of generation on despatch instructions from the purchaser)	-	239.000 (2.73 *per cent*)	1,525.450 (17.41 *per cent*)	712.130 (8.13 *per cent)*
	v) Total outage hours (excluding planned outages)	301.950 (3.44 *per cent*)	886.983 (10.13 *per cent*)	2,602.493 (29.71 *per cent*)	786.80 (8.98 *per cent*)
	vi) Total outage hours	837.717 (9.54 *per cent*)	1,295.016 (14.78 *per cent*)	3,628.813 (41.42 *per cent*)	786.800 (8.98 *per cent)*
4	Budgeted outage hours	1,784 (20.31 *per cent*)	1,618 (18.47 *per cent*)	1,618 (18.47 *per cent*)	1,618 (18.47 *per cent*)
5	Actual running hours	7,946.283	7,464.984	5,131.187	7,973.200
6	Percentage of Plant Availability Factor (PAF) (5/2 x 100)	90.46	85.22	58.58	91.02
7	Possible generation with reference to actual hours operated (MUs) (0.21 MUs x Sl.No.5)	1,668.719	1,567.647	1,077.549	1,674.372
8	Actual generation (MUs)	1,644.352	1,495.826	1,033.251	1,663.830
9	Shortfall in actual generation to possible generation (MUs) (7-8)	24.367	71.821	44.298	10.542
10	Shortfall in possible generation for total available hours (MUs) (1-8)	200.29	343.77	806.35	175.770
11	Plant Load Factor[35] *(per cent*) (8/1 x 100) (Actual generation/Capacity)	89.14	81.31	56.17	90.45
12	Heat Rate of Unit-7 (Kcal/Kwh)	2,507	2,522	2,571	2,578
13	Thermal Efficiency[36] (*per cent*) (859.8452 /Sl.No.12)	34.30	34.09	33.44	33.35

[34] Outages are of two types: Planned and Forced. Planned outage is time spent for any scheduled maintenance activity calling for de-synchronisation of unit for a certain period. Forced outages is the time spent for synchronising back the unit subsequent to failure of any plant/equipment.

[35] Plant Load Factor is the percentage of Energy generated to the capacity to generate energy during the period.

[36] Thermal Efficiency of a power station is an index which measures the efficiency of conversion of thermal energy to electrical energy. It is the output of electrical energy denoted as a percentage of heat energy contained in the fuel used in generation; 1 Kwh = 859.8452 Kcal.

It was observed that:

- the outages varied from 8.98 *per cent* to 41.42 *per cent* during 2003-2007. As per the norm fixed by CEA, the total outages of a unit should not exceed 20 *per cent* of the available hours. The actual outages, however, for Unit-7 was 41.42 *per cent* due to shortage of coal stock and No Load Demand (NLD) from KPTCL.

  The Government replied (May 2007) that the outages had increased mainly due to increase in the idle hours due to shortage of coal and NLD. The reply is not tenable as NLD was on account of high cost of generation of Unit 7, which the Company was unable to keep within the limits specified by the CEA.

- as per the data compiled by CEA based on the working of 158 numbers of 200/210 MW thermal stations (national average), the average operating availability was 87.24 *per cent* (2004-05) and 86.44 *per cent* (2005-06). However, in respect of Unit-7, the actual operating availability was 85.22 and 58.58 *per cent* in the corresponding years, indicating lesser availability of operating hours and consequent reduction in generation. The shortfall in generation as compared to this national average was 549.67 million units of energy.

The Unit did not achieve the Plant Availability Factor as compared to that of 158 numbers 200/210MW stations in the country (national average as compiled by CEA) resulting in shortfall of generation of 549.67 million units of energy for 2004-06.

- further, as against the national average of 5.81 (2004-05) and 6.80 *per cent* (2005-06) in respect of forced outage, the actual forced outage (including NLD and build-up of coal stock) was 10.13 and 29.71 *per cent* respectively.

  The Government replied (May 2007) that as the data compiled by CEA was for the power stations, it could not be compared on unit basis. The reply is not tenable as the performance evaluated by CEA was with reference to that of the similar units spread over the entire country, including old units; the RTPS unit being a new station should have lesser forced outage than the national average.

- as against the designed thermal efficiency of 37.69 *per cent*, the efficiency achieved varied from 33.35 to 34.30 *per cent.*

  The Government replied (May 2007) that it was not appropriate to compare the thermal efficiency achieved as the designed efficiency is for ideal conditions. The Company contended that there are a number of factors, such as ageing, excess moisture, excess air, low PLF, *etc*., for lower efficiency. The reply is not tenable as the unit besides being a new one was fed with higher GCV of coal and annual maintenance done regularly and as such there was no reason for lower thermal efficiency in the initial years of operation.

- the purchasers preferred hydel energy and low-cost thermal energy, and the Company had to curtail/back down generation in Unit-7 due to the higher cost of generation of Unit-7 though it was capable of generating and delivering energy.

The Government replied (May 2007) that the generation in Unit-7 had to be backed down due to comfortable hydel position and low grid demand and not due to higher cost of generation.

The reply is not tenable as even when the hydel generation was favourable, Karnataka Power Transmission Corporation Limited (KPTCL) was drawing power from RTPS. Among the RTPS units, Unit-7 was the least favoured. It is evident from the fact that Unit-7 had generated the least energy during the last four years as compared to the other six units. The only explanation for this low demand is the higher cost of generation of this unit.

Increase in cost of generation of other units due to implementation of Unit-7

2.1.16 The table below gives the cost of generation of RTPS and Unit-7:

Particulars		2003-04	2004-05	2005-06	2006-07
A	Annual consumption of coal of RTPS (tonne)	70,39,782	69,41,493	60,51,311	75,36,280
B	Annual consumption of coal of Unit-7 (tonne)	10,18,157	9,66,372	6,85,110	11,01,891
C	Annual weighted average rate of consumption of RTPS considering coal from all sources (Rs. per tonne)	1,794.77	1,967.38	2,186.59	2,069.37
D	Annual weighted average rate of consumption for Units 1 to 6 without MCL coal (to the extent of consumption in Unit-7) (Rs. per tonne)	1,742.00	1,928.86	2,156.33	2,008.90
E	Annual weighted average rate of consumption for Unit-7 allocating MCL coal (Rs. per tonne)	2,106.86	2,205.51	2,423.56	2,432.46
F	Annual gross generation of RTPS (MUs)	11,393.69	10,730.97	9,182.27	11,483.43
G	Annual gross generation of Unit-7 (MUs)	1,644.352	1,495.826	1,033.251	1,663.83
H	Average primary fuel cost per Kwh of all Units **{(A x C)/F}** (Rs.)	1.109	1.273	1.441	1.358
I	Average primary fuel cost per Kwh for each Unit from 1 to 6 (each) **[{(A-B) x D}/(F-G)]** (Rs.)	1.076	1.248	1.420	1.316
J	Average primary fuel cost per Kwh of RTPS Unit-7 **(B x E)/G** (Rs.)	1.305	1.425	1.607	1.611
K	Amount by which primary fuel cost per Kwh for Unit-7 is higher than fuel cost per Kwh for units 1 to 6 **((J-I)*100)** (paise)	22.90	17.70	18.70	29.50
L	Increase in primary fuel cost due to implementation of Unit-7 **((H-I)*F/10)** (Rs. in crore)	37.60	26.83	19.28	48.23
M	Excess primary fuel cost of Unit-7 recovered through the other six Units **((J-H)*G/10)** (Rs. in crore)	32.23	22.74	17.15	42.09

It was observed in audit that:

The primary fuel (coal) cost per unit of generation[37] of Unit-7 was Rs.1.305, Rs.1.425, Rs.1.607 and Rs.1.611, as against the cost per unit of Rs.1.076, Rs.1.248, Rs.1.420 and Rs.1.316 of the other six Units in the years 2003-04, 2004-05, 2005-06 and 2006-07 respectively. The excess cost of 22.90 paise,

[37] **Based on specifications in the Feasibility Report and as per the design parameters of the critical equipments. This is computed based on average fuel cost, consumption and generation.**

17.70 paise, 18.70 paise and 29.50 paise per unit for Unit-7 was mainly on account of use of costlier MCL coal. The increase in cost of coal consumption comes to Rs.131.94 crore (2003-07) was attributable to implementation of Unit-7. The amount of Rs.114.21 crore was, however, allocated to units 1 to 6 and recovered from the energy sold to Karnataka Power Transmission Corporation Limited (KPTCL)/Electricity Supply Companies (ESCOMs).

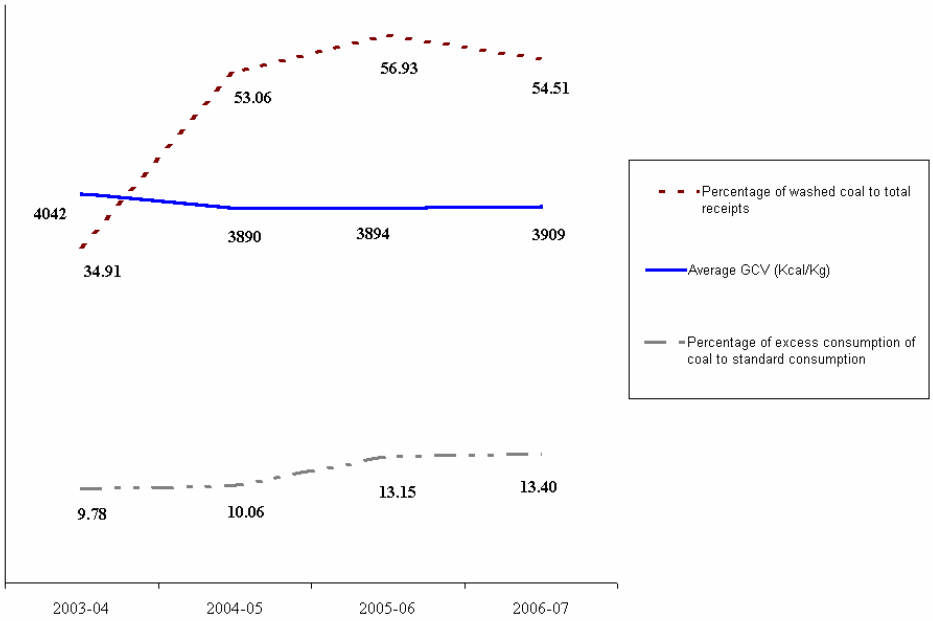
The Company allocated Rs.114.21 crore of cost of generation of Unit-7 to other six units to avoid low demand for the electricity generated from this unit.

The Government replied (May 2007) that there was no additional burden to the consumers as fuel cost of the station is fully recovered from all the units due to adoption of station tariff without considering the performance of individual units due to technical reasons. The fact, however, remains that implementation of Unit-7 had increased the cost of generation of the other six units.

Consumption of coal

2.1.17 The World Energy Council[38] reported that the field trials conducted at one of the Thermal Power stations in India using washed coal showed that there was reduction in specific coal consumption from 0.777 Kg/Kwh to 0.533 Kg/Kwh and improvement in boiler efficiency by two *per cent*.

The chart below shows the percentage of washed coal to total receipts, the percentage of excess consumption of coal to standard consumption of Unit-7 and average GCV of coal consumed by Unit-7:



[38] **http:\\www.worldenergy.org/wec-geis/publications.**

It was observed that:

- the percentage of excess consumption of coal of Unit-7 to standard consumption (equipment specification) had been increasing year-after-year. This is despite the fact that the quantity of washed coal of GCV of 4,300 Kcal/Kg with less than 34 *per cent* ash increased from 34.91 *per cent* to 54.51 *per cent* during 2003-04 to 2006-07. The percentage of washed coal was as high as 56.93 *per cent* in 2005-06. But the difference between the actual coal consumption and standard coal consumption, which was 9.78 *per cent* in 2003-04 increased to 13.40 *per cent* in 2006-07.

- though the quantity of washed coal procured increased (coal of higher GCV) yet the average GCV of the coal consumed decreased.

The increased use of washed coal did not yield expected benefits.

- with the usage of more quantity of washed coal of higher calorific value, the specific coal consumption should have come down and the boiler efficiency improved. On the contrary, the specific coal consumption increased from 0.618 Kg/Kwh to 0.662 Kg/Kwh and the Boiler Efficiency reduced from 87.10 *per cent* in 2003-04 to 85.58 *per cent* in 2006-07.

- while the average GCV of coal received actually increased (unloading point), the average GCV of coal tested at belt measurement point (consumption accounted by the Company) showed a decreasing trend.

The Government replied (May 2007) that the coal consumption had increased, due to decline in the GCV of coal as a result of decline in the quality of raw coal over the years and stacking/reclaiming process and spontaneous combustion. It was also stated that increase in the moisture, as well as percentage of combustibles in ash and low PLF had contributed to reduction in the efficiency of boiler and performance of mills, leading to increased consumption of fuel.

The reply is not specific; the reasons for increasing percentage of excess consumption need to be investigated and adequate steps need to be taken to control excess consumption.

Unexplained heat loss

2.1.18 The Company receives its coal supply through rail rakes at the Coal Handling Plant (CHP; two Nos. - Stage I and II). The coal supplied is of two types *viz*., raw coal[39] and washed coal. On receipt at the rail yard (Marshalling yard) the wagons are unloaded by wagon tipplers. At this unloading point the washed coal only is tested in terms of GCV by a sample quality check whereas the raw coal is accepted (without testing) based on Useful Heat Value (UHV- as declared by collieries at the time of loading in collieries by joint sampling[40]).

[39] raw coal is unwashed coal.
[40] Company officials, Colliery officials and representative of the transport Company.

From the unloading point the coal is fed onto the conveyors. The coal then passes on to the crushers and later joins the washed coal on the conveyor. Then the coal (now in mixed state) is conveyed to the bunkers, (called belt measurement point) where a quality check is done again (for the mixed coal) to determine the average GCV. This average GCV of mixed coal is adopted by the Company for the purposes of consumption and billing the energy as per Power Purchase Agreement (PPA).

Audit observed that the Company accepted the raw coal at the unloading point based on UHV but did not test for its GCV. Only the washed coal was tested for its GCV. The average UHV of raw coal was 2,973, 2,869, 2,953 and 2,950 (2003-04 to 2006-07) and the average GCV of washed coal was 4,358, 4,503, 4,487 and 4,606 respectively. The Company, however, measured the average GCV (mixture of raw and washed coal) at the belt measurement point, which was 4,042, 3,890, 3,894 and 3,909 respectively during the above period.

It could be seen that while the average UHV of raw coal and average GCV of washed coal was increasing at unloading point, the average GCV of mixed coal at belt measurement point decreased. In the coal handling plant, the coal merely moves from unloading point to belt measurement point through the conveyor and as such there is no reason for reduction in heat content or GCV. The Company has not analysed/investigated the reasons for the same. It is pertinent to mention here that lower GCV also meant higher cost of electricity to the buyer as the primary fuel charges payable by the buyer is inversely proportional to the GCV of coal consumed.

The Government replied (May 2007) that the losses in calorific value between the unloading point and belt measurement point had happened due to the sprinkling of water at wagon tippling, storage, *etc*.

The reply is not acceptable as the total heat content of coal, which depends only on the carbon content, is not lost due to sprinkling of water. The Company had not investigated/analysed the reasons for the loss in calorific value between unloading and belt measurement points.

Fuel supply

2.1.19 The CEA fixes power generation targets for Thermal Power Stations considering capacity of plant, average plant load factor and past performance. The Company works out coal requirements on the basis of targets so fixed and past coal consumption trends. Based on the Company's quarterly requirement, the CEA recommends the requirement to Standing Linkage Committee (SLC) which allots coal based on the availability at various collieries. The quantity, mode of transit, nearness of mines, *etc*., are taken into account by the SLC while determining the linkage. On the basis of linkage source approved by SLC, the Company enters into Fuel Supply Agreements[41] with collieries for supply of quality coal.

[41] **The Company has entered into Fuel Supply Agreements (April and September 2000) with SCCL and WCL for supply of coal.**

The Company lifts coal from the mines of Singareni Collieries Company Limited (SCCL), Western Coalfields Limited (WCL), South Eastern Coalfields Limited (SECL) and Mahanadi Coalfields Limited (Talcher Area) (MCL) based on quantity allotted by the SLC. The mines of SCCL, WCL and SECL are nearer *i.e.*, 550 kms, 660 kms and 1,300 kms respectively and the quality of coal is comparatively better than that of MCL's (1,850 kms).

Extra expenditure due to non-lifting of coal from nearby sources

2.1.20 The table below indicates the coal linkage, supplies from SCCL, WCL, SECL and MCL and the consumption of RTPS and Unit-7:

Year	Linkage (excluding MCL's)	Lifting (excluding MCL's)	Shortfall in lifting	Supplies from MCL	Consumption	
					RTPS	Unit-7
	(in lakh tonnes)					
2003-04	71.70	64.08	7.62	10.27	70.40	10.19
2004-05	67.35	66.45	0.90	13.17	69.41	9.66
2005-06	67.35	58.14	9.21	14.60	60.51	6.86
2006-07	67.11	57.40	9.71	14.55	75.36	11.02
Total	**273.51**	**246.07**	**27.44**	**52.59**	**275.68**	**37.73**

From the above it can be observed that as against the allotment/linkage of 273.51 lakh tonnes of coal (excluding MCL), the Company lifted only 246.07 lakh tonnes of coal (2003-07) resulting in short lifting of 27.44 lakh tonnes. It could also be seen that the quantity lifted from nearby sources has been gradually coming down over the years whereas the lifting from far away MCL has been increasing.

The Company was not lifting the entire quantity from nearby sources (SCCL/WCL); but increasing its procurement from far away sources (MCL). As the MCL coal is costlier by Rs.550-700 tonne, the extra expenditure on procurement of shortfall quantity of 27.44 lakh tonnes of coal was Rs.166.68 crore during the period 2003-07.

The Government replied (May 2007) that the shortfall in lifting of the allotted quantity from the nearby sources was due to factors beyond the control of the Company and the coal companies such as diversion of rakes by Railways, strike, rain, *etc.*

The reply is not tenable as the Company should have lifted the entire allotted quantity by taking up the matter with SLC and Ministry of Railways and persuading the coal companies to supply the entire allotted quantity.

Sale of energy

2.1.21 The Company initialed a separate Power Purchase Agreement (PPA) with KPTCL for Unit-7 and submitted (August 2000) it to KERC for approval. KERC pointed out (August 2001) that certain sections of the PPA dealing with metering, plant load factor, deemed generation, *etc.*, could not be adopted in

view of the fact that the auxiliary consumption, net power output and net metered energy could not be measured accurately exclusively for Unit-7 with the metering systems specified in the PPA. As directed by KERC, KPTCL submitted (January/March 2002) the re-negotiated PPA for RTPS (Units 1 to 7) to KERC for approval with revised clauses incorporating the re-negotiated and mutually agreed parameters. A few major parameters are given below:

Parameter	Proposed in PPA (August 2000)	Re-negotiated and mutually agreed parameters (January/March 2002)	As approved by KERC (July 2002)
Plant Load Factor	70 *per cent*	72 *per cent*	77 *per cent*
Heat Rate	2,500 Kcal/Kwh or actuals whichever is lower in post-stabilisation period	2,495 Kcal/Kwh or actuals whichever is lower in post-stabilisation period	2,450 Kcal/Kwh or actuals whichever is lower in post-stabilisation period
Secondary Fuel Oil Consumption	3.5 Ml/Kwh or actuals whichever is lower	2.5 Ml/Kwh or actuals whichever is lower	2 Ml/Kwh or actuals whichever is lower
Auxiliary consumption	9.5 *per cent* or actuals whichever is lower	9 *per cent* or actuals whichever is lower	8.5 *per cent* or actuals whichever is lower

The common PPA for RTPS Units 1 to 7 was approved (July 2002) by KERC with modifications as shown above. As the modified parameters were stated to be adverse, the Company approached (September 2002) the Honorable High Court of Karnataka. As per the Government Order (10 May 2005), trading of electricity was taken over from KPTCL and entrusted (10 June 2005) to newly set up Electricity Supply Companies (ESCOMs). Pending decision by the Court, energy bills in respect of Unit-7 are raised as per the re-negotiated/mutually agreed PPA initiated in January/March 2002 on KPTCL/ESCOMs.

In this connection, the following points deserve mention:

Short claim of Primary fuel (Coal) charges - and excess claim of Secondary fuel charges

There was short billing of primary fuel charges of Rs.63.22 lakh and excess claim of secondary fuel charges, fixed charges and incentive of Rs.41.72 crore by the Company due to application of different formulae than that stipulated in the Power Purchase Agreement.

2.1.22 As per the PPA (January/ March 2002) the "Energy charges for each billing month shall be the sum of recoverable cost of primary fuel and secondary fuel" as per the respective formula. The Company, however, has been applying different formulae other than that stated in the PPA resulting in short-billing of primary fuel charges by Rs.63.22 lakh and excess claim of secondary fuel charges by Rs.15.72 crore for the period April 2003 to March 2007.

The Government replied (May 2007) that the formulae for calculation of primary and secondary fuel charges would be suitably modified in the PPA to be executed with ESCOMs, on receipt of the judgement from the High Court of Karnataka.

The reply is not convincing as the formulae for recovery of primary and secondary fuel charges and the parameters mentioned therein were agreed to by both the Company and the KPTCL after negotiation and re-negotiations. The matter in the court related only to the parameters fixed by the KERC.

Excess claim of Operation and Maintenance (O&M) expenses

2.1.23 Clause 4.3 (b)(iv) of the PPA stipulates that "the O&M and insurance expenses for the first tariff year will be equal to 2.5 *per cent* of capital expenditure of Unit-7 and in each subsequent tariff period after the first tariff period shall be increased by six *per cent*."

The Company, however, claimed the entire O&M expenditure incurred without limiting it to the applicable percentage on the final capital expenditure of Rs.561.98 crore as on the date of commissioning resulting in excess claim of Rs.16.65 crore for the period 2003-07.

The Government replied (May 2007) that the formulae would be suitably modified on receipt of judgment from Honorable High Court. The reply is not acceptable as the case in the Honorable High Court is against the orders of KERC and not against the PPA finalised on the basis of several rounds of negotiations, to which the Company is a signatory.

Excess incentive claim

2.1.24 The PPA provides for payment of incentive at the rate of 8 paise per Kwh for every additional unit of "electricity delivered to the interconnection point" beyond Actual Plant Load Factor (APLF) of 72 *per cent* and up to and inclusive of 75 *per cent* PLF during a tariff period (one year) and at the rate of 40 paise per Kwh for PLF beyond 75 *per cent*.

The payment of such incentive shall be for the electricity delivered to the interconnection point *i.e.*, net energy exported (Gross generation – auxiliary consumption). The auxiliary consumption was to be the lower of nine *per cent* of gross generation and actual. The Company, however, adopted a flat rate of nine *per cent* of gross generation as auxiliary consumption. Further, the Company considered PLF which takes into account the deemed generation also for calculation of incentive instead of APLF as stated in the PPA which excludes deemed generation. This resulted in excess claim of Rs.9.35 crore for the period from April 2003 to March 2007 due to erroneous application of formula stipulated for calculating PLF. This included Rs.99.15 lakh for the year 2005-06 when the Company was not eligible for any incentive.

The Government replied (May 2007) that the Company had considered PLF including deemed generation for preferring the incentive claim in line with the clause specified in PPA and that the claim for 2005-06 had been withdrawn in the books of the Company. The reply is not acceptable as the formula for claiming incentive in the PPA is APLF and not PLF which takes into account deemed generation also. No record in support of the withdrawal of the claim (2005-06) was furnished in support of the reply.

Financial management

2.1.25 The BoD estimated (August 1998) the total cost of Unit-7 (210 MW) at Rs.520 crore which was approved (March 1999) by the Government. The Company was also permitted (March 1999) to raise loan from market with Government guarantee. The cost was therefore revised (February 2000) to Rs.613 crore[42], based on final prices for earlier units (Units 5 and 6). The CEA gave (January 2001) the techno-economic clearance for the project with a debt-equity ratio of 80:20.

The Company undertook the project with an estimated debt of Rs.490 crore (80 *per cent*) through loans and Rs.123 crore (20 *per cent*) by way of equity contribution through internal accruals. The final cost of the project on the scheduled date of reporting (three months after completion) to the CEA was Rs.561.98 crore.

It was noticed that the Company did not submit the final cost to CEA (August 2007), even though it was required to do so within three months (July 2003) of commercial operation. The Financial Institutions and Commercial Banks contributed Rs.490 crore by way of loans and the Company's share through internal accruals (equity) was Rs.71.98 crore. The actual debt-equity ratio was 87:13 as against the CEA approved debt-equity ratio of 80:20. As the tariff mechanism[43] provides for 16 *per cent* Return on Equity (RoE), the RoE forgone was Rs.6.47 crore per annum[44] and Rs.97.05 crore over the 15 years currency of the PPA.

The Government replied (May 2007) that the actual ratio considering the total cost as Rs.572.56 crore at the end of March 2004 worked out to 85:15 (Rs.490 crore debt and Rs.82.56 crore equity) and the equity contribution was less only by Rs.31.95 crore and RoE on this worked out to Rs.127.81 crore over the life of the asset (25 years). Similarly, the increase in finance charges due to increased debt was Rs.17.39 crore and hence the difference in cash flow worked out to Rs.110.42 crore during the life of the plant (Rs.127.81 crore - Rs.17.39 crore) resulting in reduction in tariff to the extent of 3.68 paise per unit, which benefited the consumers. It was further stated that certain works and expenditure (like procurement of insurance spares) which were envisaged earlier and not executed at the time of commissioning of the project would be undertaken and this would raise the equity to 20 *per cent*. It was also replied that the envisaged equity could not be invested due to cash shortages resulting from poor realisation from KPTCL.

The reply is not acceptable as although the consumers are perceived to be beneficiaries by way of reduction of 3.68 paise per unit, the loss of return on equity to the Company could reduce the financing of its ongoing and future expansion projects and life extension works. As regards cash shortage, it was noticed that the Company had earned profits of over Rs.220 crore and had paid

[42] Hard cost of Rs.520.39 crore and Soft cost of Rs.92.61 crore; Hard cost means package cost; Soft cost means interest during construction, overhead, administration expenses *etc*.

[43] Tariff mechanism is a method of determining the cost of energy and consists of two parts; fixed cost and variable cost. The return on equity assured in this case was 16 *per cent.*

[44] Rs.112.40 crore – Rs.71.98 crore = Rs.40.42 crore * 16 *per cent.*

dividend of Rs.75.37 crore in the last five years ending 2005-06; implying investment by way of equity of Rs.40.42 crore was in fact possible.

Derived values adopted by the company

Station Heat Rate

2.1.26 Gross Station Heat Rate[45] (GHR) is the heat energy input in Kilocalories required for generating one KWh (one unit) of electrical energy at generator terminals. GHR is an important index for assessing the efficiency of a thermal power station. Higher GHR meant loss to the Company as payment is limited to the value specified in the PPA (2,495 Kcal/KWh).

The Company has to multiply GCV of coal with the specific coal consumption to arrive at the station heat rate. The Company, however, does not have a method to determine the specific coal consumption and therefore the station heat rate is assumed**.** The specific coal consumption is arrived at by dividing the assumed station heat rate by the GCV of the coal fed and is thus a derived value. Based on this derived value of specific coal consumption and gross generation, the Company arrives at the total coal consumption for the entire station.

The comparative details are given below:

Particulars	2003-04	2004-05	2005-06	2006-07
Station heat rate achieved by RTPS	2,498	2,517	2,566	2,564
Station heat rate as per PPA	2,495	2,495	2,495	2,495
Station heat rate as per KERC	2,450	2,450	2,450	2,450

From the above, it could be seen that the station heat rate was on an increasing trend despite improvement in quality of coal received. Further, the station heat rate had not met the values set by KERC/PPA.

In this context, it is pertinent to mention that KERC in its order (July 2002) on PPA for RTPS (Units 1 to 7) had remarked that data relating to station heat rate was unreliable and had directed the Company to set up a proper procedure for computation of the same and obtain ISO certification or any other certification.

Despite a lapse of five years (July 2002 to August 2007), the Company had not deliberated or formulated any procedure for arriving at a realistic Station heat rate. As a result the efficiency of the plant could not be determined.

[45] **Formula as prescribed by CEA for working out GHR is:**
Gross Station Heat Rate=GCV of Coal (Kcal/Kg) x Specific Coal Consumption (Kg/Kwh)
and Specific Coal Consumption = Total coal consumption in a month (Kg) / Gross Generation in the month (Kwh)

Auxiliary Energy Consumption

2.1.27 Auxiliary Energy Consumption in relation to a period means the quantum of energy consumed by auxiliary equipments of the Unit and transformer losses within the generating station and shall be expressed as a percentage of the gross energy generated at the generator terminals of the Unit. The Company has no energy meters for measuring the quantum of energy consumed by auxiliary equipments. The Auxiliary Energy Consumption is arrived at by deducting net energy exported from the gross generation of the Station. This is then allocated to all the Units in proportion to the gross generation of the respective Units. This methodology of 'more generation more auxiliary consumption' is not scientific in as much as the two parameters hold an inverse relationship than a direct one.

The Government replied (May 2007) that as it was not practically possible to measure auxiliary consumption of each equipment and therefore, of each Unit; the Company had adopted the above method for calculation of auxiliary consumption as per CEA guidelines.

The reply is not acceptable as the KERC had suggested (September 2002) introduction of metering system to measure the net metered energy from the plant and the net power output, which has not been adhered to (August 2007).

Internal control

2.1.28 Internal control is a management tool used to provide reasonable assurance that management objectives are being achieved in an efficient and effective orderly manner. Following deficiencies were noticed in the internal control systems being followed by the Company:

- Internal control in respect of project appraisal, finalisation of bids, project planning, controlling outages was not commensurate with the guidelines prescribed by CEA.
- Internal control with respect to fuel management (coal linkages) was inadequate.
- Internal control in respect of claims management for sale of energy as per the PPA was weak.
- Internal control in identifying heat loss and develop a procedure for computation of station heat rate was absent.
- The statutory auditors also opined that internal control procedures need to be strengthened commensurate with the size and nature of business.

The Government replied (May 2007) that the above suggestions on the internal control would be considered for further improvements in future.

Acknowledgement

Audit acknowledges the co-operation and assistance extended by the staff and the Management of the Company at various stages of conducting the performance review.

Conclusion

By not considering the recommendations of the 'Committee to recommend next higher size of Coal fired Thermal Power Stations' the Company lost an opportunity for setting up a 500MW high capacity plant as Unit-7, especially when the demand for power in the State was increasing. Lack of clarity in tenders for hiving off the handling and disposal of fly ash system resulted in ambiguity in the offers received and the best offer was not accepted. The specifications/design parameters of the boiler were not in line with the guidelines of the MoEF as regards the ash content. The latest technologies available and offered by equipment suppliers/builders were not adopted. There was shortfall in generation due to higher outage hours as compared to national averages. The cost of generation in Unit-7 being on the higher side the excess cost was being apportioned to other units for recovery from KPTCL to avoid a situation of low demand for Unit-7. The consumption of coal was in excess of the specification of the equipment supplied and the additional cost incurred on washed coal did not yield the desired benefits. The reduction in heat of coal when it is moved from unloading point to belt measurement point was not analysed/ investigated. There was short billing and excess claim due to incorrect application of formula in the PPA. The data on important indices of performance such as Gross Calorific Value, Heat Loss, Specific Coal Consumption and Auxiliary Energy Consumption is unreliable and therefore, do not reflect the true position. The Company had not complied with KERC instructions for setting up proper procedures for computation of the indices as mentioned above.

Recommendations

- **The Company should focus on setting plants of higher capacity to avoid obsolescence and meeting increased demand.**

- **Procedures for procurement of coal, both washed and raw, acceptance and issue should be streamlined and closely monitored for improving efficiency. Because of non-proximity to coal mines, Ministry of Coal should be convinced for allowing drawal of coal from dedicated mines.**

- **The Unit should strive to perform as per equipment supplier's specification.**

- **The Company should analyse/investigate reasons for heat loss. The recommendations of KERC to set up a proper procedure for computation of parameters and obtain ISO certification need to be implemented.**

- **The Company should exercise due care in raising claims for sale of energy.**

2.2 KARNATAKA POWER TRANSMISSION CORPORATION LIMITED AND ELECTRICITY SUPPLY COMPANIES

ACCELERATED POWER DEVELOPMENT REFORMS PROGRAMME (APDRP) IMPLEMENTED IN KARNATAKA BY THE KARNATAKA POWER TRANSMISSION CORPORATION LIMITED AND ELECTRICITY SUPPLY COMPANIES

Highlights

Two Accelerated Power Development Programme projects sanctioned during 2000-01 and 31 out of 35 APDRP projects sanctioned during 2002-03, 2004-05 and 2005-06 are yet to be completed (March 2007).

(Paragraphs 2.2.7 and 2.2.11)

Non-fulfillment of obligation by the State Government in repaying the loan taken from Rural Electrification Corporation (REC) adversely affected the implementation of APDRP schemes.

(Paragraph 2.2.13)

APDRP funds were diverted for other purposes as well as for short-term investments. No penalty was, however, levied by Ministry of Power.

(Paragraphs 2.2.15 and 2.2.16)

Physical and financial progress was inflated by including the meters procured by consumers / procured against deposits from consumers for new installations by two ESCOMs.

(Paragraph 2.2.19)

Unrealistic preparation of Detailed Project Reports resulted in award of distribution works at high tender premium. It also resulted in a loss of grants amounting to Rs.47 crore from the Ministry of Power.

(Paragraph 2.2.20)

The objective of installing tamper proof and static/high precision energy meters with measuring and data storing capabilities for the purpose of downloading data by computers was not fulfilled as ESCOMs used high precision electro mechanical meters.

(Paragraph 2.2.21)

Milestone relating to privatisation of distribution is yet to be achieved.

(Paragraph 2.2.30)

There was no significant reduction in Aggregate Technical and Commercial Losses (AT&C losses) except in some towns.

(Paragraph 2.2.36)

Introduction

2.2.1 Power is a critical infrastructure for economic growth. Accelerated development of the power sector depends on efficiency and commercial viability of the State Electricity Boards (SEBs). The Ministry of Power (MoP) identified distribution reforms as a key area to bring about the efficiency and commercial viability of SEBs/Utilities. As a sequel to this, 'Accelerated Power Development Programme (APDP)' was launched during 2000-01, with the objectives of Renovation and Modernisation/life extension/up-rating of old power plants (thermal/hydel) and up-gradation of sub-transmission and distribution network (below 66 KV) including energy accounting and metering.

With a view to restructure the concept of APDP, from merely an investment window, to a mechanism for supporting power sector reforms in the States, (linked to the fulfillment of certain performance criteria by way of benchmarks and to incentivise the reform process), APDP was renamed (March 2003) as "Accelerated Power Development Reforms Programme" (APDRP).

APDRP is being implemented by the power sector companies with the objective of improving financial viability of State Power Utilities, reduction of Aggregate Technical and Commercial (AT & C) losses to around 15 *per cent*, improving customer satisfaction and increasing reliability and quality of power supply. The MoP, entered (May 2002) into a Memorandum of Agreement (MOA) with Karnataka Power Transmission Corporation Limited (KPTCL) for implementation of APDRP by KPTCL and Electricity Supply Companies (ESCOMs)[46]. National Thermal Power Corporation Limited was the lead advisor-cum-consultant under the overall guidance of MoP for implementation of the programme. Central Power Research Institute, Bangalore was deployed as the field advisor-cum-consultant to monitor the implementation in the State.

The Managing Director is the chief executive of KPTCL. The Managing Director, KPTCL is Chairman of all ESCOMs. Implementation of the APDRP programme in the respective companies is undertaken by the Superintending Engineers at the Circle level and by the Executive Engineer at the Division level. The Finance wing of KPTCL is headed by Director (Finance) who is assisted by Financial Advisor and Chief Accounts Officer, while in ESCOMs the Finance wing is headed by Financial Advisor who is assisted by Controller (Accounts) and Controller (Finance) at Head office and by Accounts officers at Field level.

[46] **Bangalore Electricity Supply Company Limited (BESCOM), Hubli Electricity Supply Company Limited (HESCOM), Gulbarga Electricity Supply Company Limited (GESCOM), Mangalore Electricity Supply Company Limited (MESCOM) and Chamundeswari Electricity Supply Corporation Limited (CESC).**

Scope of Audit

2.2.2 The performance audit conducted between June 2006 and February 2007 covers the implementation of APDP/APDRP by KPTCL and five ESCOMs in Karnataka during 2000-01 to 2006-07 as part of power sector reforms and their achievements with reference to the objectives set. Audit selected fourteen[47] APDRP projects (sanctioned cost of Rs.1,015.49 crore) out of 35 projects (sanctioned cost Rs.1,186.32 crore) for review. The documents/information maintained in respect of these 14 projects relating to their formulation and planning, funding, implementation, monitoring and evaluation of actuals *vis-à-vis* targets were test checked.

Audit objectives

2.2.3 The performance review of implementation of APDP/APDRP projects by the power sector companies in the State was conducted with a view to ascertain whether:

- the Detailed Project Reports (DPRs) were prepared realistically, to achieve the programme objectives;
- funding requirements were realistically assessed and funds were sanctioned and released by the Government of India and State Government in time;
- released funds were utilised efficiently, economically and effectively for achievement of the objectives of the programme;
- AT&C losses were reduced in accordance with the action plan and targets;
- programme had provided for an effective and working monitoring mechanism at all levels;
- satisfaction level of consumers had improved in terms of quality, regularity and cost of power supplied; and,
- commitments agreed to in terms of MOAs between (i) MoP and State Government and (ii) MoP and KPTCL were complied with.

Audit criteria

2.2.4 The Audit criteria adopted for assessing the achievement of Audit objectives were:

- MoP guidelines on APDP/APDRP;
- milestones agreed to in the MOAs;

[47] **Bangalore City, Tumkur, Davangere, Robertsonpet (KGF), Bangarpet, Ramanagara, Mangalore, Gulburga, Bidar, Raichur, Hassan, Hubli Circle, Belgaum Circle and Mysore Circle.**

- targets set for reduction of AT&C losses;
- monitoring mechanism envisaged in the guidelines and the MOA between MoP and KPTCL; and,
- targets for Distribution Transformer (DT) failure rates and other parameters.

Audit methodology

2.2.5 The following mix of Audit methodology was adopted for achieving the audit objectives with reference to audit criteria of the performance review:

- examination of DPRs of schemes;
- review of Reports on compliance to conditions of MOA and guidelines issued by MoP;
- review of details of funds received and utilised;
- review of tenders, bids, award of works and their execution;
- review of monthly progress reports on physical and financial performance;
- scrutiny of monthly reports on 'Benchmark parameters' of MoP; and,
- issue of Audit enquiries and interaction with Management of KPTCL/ESCOMs.

Audit findings

2.2.6 Audit findings arising from the performance review were reported (April 2007) to the Government/Management and were discussed in the meeting (21 May 2007) of Audit Review Committee on Public Sector Enterprises (ARCPSE). The meeting was attended by the Principal Secretary to the Government of Karnataka, Energy Department, Managing Directors of the companies and a Technical consultant from the Central Power Research Institute. The views expressed by the representatives of the Government/ Management and replies furnished (May 2007) by them have been taken into consideration while finalising the review.

The audit findings are discussed in the succeeding paragraphs:

APDP/APDRP projects

2.2.7 MoP approved (2000-01) 11 APDP projects with an outlay of Rs.162.98 crore. These eleven projects involved eight projects on transmission, metering and distribution transformers by KPTCL (Rs.114.50 crore), two projects for renovation and modernisation by Karnataka Power Corporation Limited (KPCL) (Rs.44.84 crore) and one

project on renovation and modernisation by Visveswaraya Vidyuth Nigam Limited (VVNL) (Rs.3.64 crore). The MoP released (February 2001) Rs.40.75 crore as grant and Rs.40.75 crore as loan. Out of 42 schemes forming part of 11 projects, 39 were completed, two were under progress and one had been dropped as of January 2007 (**Annexure-10).** The project relating to establishment of 2 x 5 MVA 33/11 KV sub-station at Uttur for Rs.1.73 crore under transmission scheme was not taken up as higher capacity sub-station had already been established nearby. But, the grant of Rs.43 lakh received from MoP for this project was not refunded.

2.2.8 APDRP focuses on up-gradation of Sub-transmission and Distribution in densely electrified zones in the urban and industrialised areas and improvement in commercial viability of the State Electricity Boards. Its components include investment for strengthening and up-gradation of the sub-transmission and distribution system and incentive to encourage/motivate utilities to reduce losses.

Funding pattern

Investment component

2.2.9 MoP was to provide funds up to 50 *per cent* of the scheme cost through a combination of 25 *per cent* grant and 25 *per cent* loan. The balance 50 *per cent* of the scheme cost was required to be arranged by borrowings from Power Finance Corporation (PFC) / Rural Electrification Corporation (REC)/ other financial institutions/own sources as counterpart fund.

Incentive component

2.2.10 MoP would provide grants to the State Governments up to 50 *per cent* of the actual loss reduction by SEBs/Utilities. The year 2000-01 was to be the base year for the calculation of loss reduction in subsequent years. The amount under incentive component was to be utilised for improvement of power sector only.

KPTCL preferred (August 2005) a claim for incentive amounting to Rs.256.81 crore for 2002-03 and Rs.362.51 crore for 2003-04. MoP, after scrutiny of the incentive claims of all the entities in Karnataka on a consolidated basis as per the guidelines, intimated (April 2006) that the net losses of the Karnataka State for 2002-03 and 2003-04 had not reduced over the base year 2000-01 and as such the State was not eligible for incentive.

The matter was not pursued further by KPTCL. This indicated that the entities had not achieved the parameters. No action was taken to work out the actual loss reduction for the year 2004-05 and 2005-06 to determine the eligibility for incentive amount.

Project cost and Finance

2.2.11 Thirty-five projects aggregating Rs.1,186.32 crore were sanctioned (2002-03, 2004-05 and 2005-06) for Karnataka. The details of project cost, funds received and utilised as on 31 January 2007 are as detailed below:

Year of sanction	Name of the executing agency	No. of projects	Sanctioned cost	Funds (MoP grant and loan and REC loan) received as on 31.01.2007	Funds utilised as on 31.01.2007
			(Rs. in crore)		
2002-03	BESCOM	4	372.22	335.44	346.21
	MESCOM	2	26.19	31.96	16.23
	CESC	2	164.44	147.66	104.91
	HESCOM	3	505.16	439.67	384.55
	GESCOM	2	72.22	55.67	52.16
	KPTCL*	-	-	31.89	21.40
Sub-total		**13**	**1,140.23**	**1,042.29**	**925.46**
2004-05	BESCOM	10	24.55	5.37	16.08
	MESCOM	4	5.44	-	-
	CESC	1	0.29	-	-
	GESCOM	1	1.32	-	-
Sub-total		**16**	**31.60**	**5.37**	**16.08**
2005-06	GESCOM	6	14.49	-	-
Sub-total		**6**	**14.49**	**-**	**-**
Grand total		**35**	**1,186.32**	**1,047.66**	**941.54**

*** 66 KV and above sub-station works executed by KPTCL.**

The financial progress achieved was 79 *per cent* of the sanctioned cost and 31 out of 35 projects were under execution (January 2007).

2.2.12 The general terms and conditions issued by the MoP for utilisation of funds, *inter alia*, include that:

- the State Government shall release the funds provided under APDRP to the State power utility within a week of the said amount being credited in the State Government account by MoP;
- the State Government shall release the funds to the State utility under the same terms and conditions as they receive it from the MoP;
- the funds received under APDRP shall not be diverted for other purposes either by the State Government or utilities;
- the utilities shall open a separate bank account in the first instance itself in a scheduled/nationalised bank for the purpose of implementing the Schemes under APDRP. Funds from the Government/internal resources or loans from REC earmarked for the purpose shall be credited to this account;
- funds were to be released by MoP as per the procedure stipulated in the MOA.

Audit scrutiny revealed the following:

Non-fulfillment of obligation to repay REC loans by the State Government resulted in REC adjusting the same from APDRP loan releases

Non-fulfillment of obligation by the State Government in repaying the loan taken from Rural Electrification Corporation adversely affected the implementation of APDRP schemes.

2.2.13 Following the unbundling of KPTCL and formation of five Electricity supply companies (ESCOMs), the State Government decided (May 2002) to take over and repay the long-term debt of KPTCL up to Rs.1,050 crore including Rs.271.34 crore from REC. Although State Government was to repay the loans taken over, KPTCL continued to make repayment to REC till August 2004. Thereafter, due to deteriorating financial conditions, KPTCL was unable to repay the loan installments on behalf of State Government.

In view of the above, REC adjusted Rs.39.50 crore (2004-05) and Rs.47.36 crore (2005-06) out of APDRP loan releases to KPTCL. As against Rs.86.86 crore adjusted by REC, State Government released an amount of Rs.45.34 crore (against 2005-06 REC adjustments) leaving a balance of Rs.41.52 crore as of March 2007. The impact of REC adjustments on the APDRP works could not be quantified in audit. The interest burden on the adjusted loans (Rs.7.40 crore till March 2007) was being borne by KPTCL.

The Government stated (May 2007) that the Energy department had taken up the issue with the Finance department of the State Government.

The fact remained that the State Government failed to honour its commitments, thereby depriving the Company of APDRP funds.

Delay in release of funds by State Government

2.2.14 As per APDRP guidelines, amounts released by MoP is to be released by State Government within a week to KPTCL/ESCOMs; otherwise, it would be treated as diversion of funds. It was also provided that in the event of diversions, the equivalent amount would be adjusted with 10 *per cent* penal interest against the next installment of Central Plan assistance. On a review of funds released by MoP to State Government and then by State Government to KPTCL, it was observed that the State Government made piece meal releases to KPTCL and that too with delays ranging from 21 days to 258 days, as indicated in the table.

(Rs.in crore)

Date on which amount was released	Amount released by MoP	Due date for release by State Government	Amount released by State Government	Date of release	Delay (in days)
04.04.2002	29.77	11.04.2002	29.77	27.05.2002	46
28.01.2003	57.69	04.02.2003	28.84	25.02.2003	21
			28.85	28.03.2003	52
04.04.2003	57.69	11.04.2003	57.69	05.06.2003	55
31.03.2004	290.30	07.04.2004	100.80	21.06.2004	75
			94.25	30.09.2004	176
			95.25	21.12.2004	258
Total	**435.45**		**435.45**		

The delays in releasing the funds by State Government had amounted to diversion of funds. No penalty has, however, been adjusted by the MoP so far (July 2007).

The Government while agreeing (May 2007) to the facts, stated that the APDRP works were not hampered for want of funds. The fact remained that 31 out of 35 projects were yet to be completed (July 2007).

Diversion of funds for other purposes

2.2.15 As per MOA, a separate bank account was opened by KPTCL, for APDRP projects. Audit, however, noticed (November 2006) that funds from this account were also utilised for making payments to parties/contractors not connected with the implementation of APDRP by issuing cheques and by transferring amounts to different bank accounts. A test check of transactions (January 2003 to June 2005) revealed that Rs.38.42 crore was paid to parties/contractors not connected with the implementation of APDRP and Rs.55.58 crore was transferred to various other bank accounts, in violation of the provisions of the MOA. These amounts were made good subsequently. Though these constituted diversion of funds, no penalty was levied by MoP.

The Government stated (May 2007) that by utilising the idle funds from the dedicated account, KPTCL saved interest by avoiding borrowings. The fact is that utilisation of funds for other than APDRP works is in violation of APDRP guidelines.

Short term investments

2.2.16 KPTCL invested APDRP funds in short term deposits and earned interest (January 2003 to June 2005), of Rs.1.59 crore. The interest so earned was not treated as APDRP funds. It was also noticed that the APDRP guidelines or in the MOA entered into between MoP and KPTCL no where state that KPTCL can invest and earn interest.

The Government stated (May 2007) that instead of having idle funds in dedicated current account, short term deposits were made and interest earned. The fact remained that this constituted diversion of funds and the interest earned was not credited to APDRP account. Further, MoP funds were not for earning interest.

Implementation of the programme

2.2.17 Implementation of 35 projects was to be done as per DPRs which specify details of targets with respect to each item of work and overall objectives to be achieved. DPRs, prepared by KPTCL/ESCOMs, were approved by the MoP.

Following deficiencies were noticed in execution of these projects.

2.2.18 The physical progress achieved as of January 2007, in respect of projects sanctioned during 2002-03 are given in **Annexure-11.** As against the completion schedule of six months for priority works and eighteen months for overall completion of the projects, none of the 13 projects[48] sanctioned during 2002-03 was completed even after four years**.** In respect of 22 projects[49] sanctioned during 2004-05 and 2005-06, work was complete in respect of four projects of BESCOM and the rest are under progress as at January 2007. The Government attributed (May 2007) the delay in completion to delay in obtaining statutory clearances, objections from private land owners and legal proceedings resorted to by these private land owners.

Incorrect reporting and claims by ESCOMs

2.2.19 The DPR for Bangalore City approved (October 2002) at a total cost of Rs.338.30 crore included Rs.151.75 crore under consumer metering for replacement of 11,70,401 Electromechanical Meters by Electronic/High precision Electro Mechanical (HPEM) Meters. As against this, BESCOM reported (March 2006) a physical progress of 8,23,292 meters with a financial progress of Rs.102.80 crore. A review of the details of expenditure disclosed that BESCOM had included 5,47,234 single phase and 25,377 three phase HPEM meters, valued at Rs.56.83 crore, pertaining to new installations serviced with meters purchased by the customers. Thus, the financial progress was inflated to the same extent and inflated claims preferred to MoP for grant and loan and for counterpart funding from REC.

In the case of Hubli Circle (HESCOM), the DPR, approved (October 2002) at a cost of Rs.239.74 crore included Rs.32.06 crore under consumer metering towards replacement of 2,87,354 Electromechanical Meters by Electronic/ HPEM Meters. HESCOM serviced (October 2002 to November 2005), 86,576 new installations with electronic/high precision meters. The Company, however, considered it as progress under APDRP with a financial progress of Rs.11.23 crore and claimed for release of funds.

As meters required for new installations was not in the scope of APDRP and also meters were either provided against deposit or procured by customers themselves, the financial progress claimed was inflated and incorrect.

In the ARCPSE meeting (May 2007) the Management accepted the audit contention and agreed to withdraw the physical and financial progress relating to new installations. Accordingly, BESCOM intimated (June 2007) that they would be withdrawing financial progress of Rs.116.59 crore. The ESCOMs

[48] **Mysore, Belgaum, Bijapur, Hubli, Gulbarga, Bidar, Hassan, Managalore, Robertsonpet, Raichur, Bangalore, Tumkur and Davangere.**

[49] **Anekal, Chandapura, Chitradurga, Chickballapur, Doddabalapur, Ramnagara, Bangarpet, Harihar, Chanpatna, Chintamani, Shahbad, Shimoga, Bhadravathi, Sagar, Chickmanglur, Holenarasimpura, Hospet, Basavakalyana, Bellary, Koppal, Yadgir and Gangavathi.**

will not only have to withdraw the financial progress but will have to refund the already received grants and loans from MoP and counterpart funding from REC. In the absence of details in respect of other ESCOMs, the extent to which claims were inflated could not be ascertained.

Loss due to preparation of unrealistic project reports

2.2.20 MoP sanctioned the APDRP schemes based on the DPRs submitted by KPTCL / ESCOMs. These projects included works relating to Distribution, Sub-stations, Consumer metering and Information Technology. The projects sanctioned (2002-03) for Rs.1,140.23 crore included Rs.820.90 crore towards distribution works. Audit observed that out of the said distribution works, works estimated at Rs.634.55 crore were awarded at Rs.870.60 crore, as detailed below:

ESCOM	DPR cost for distribution	Amount put to tender	Awarded cost	Percentage of tender premium
	Rs. in crore			
BESCOM	203.06	224.27	292.74	30.53
MESCOM	24.60	22.35	33.03	47.79
CESC	33.33	32.00	36.86	15.19
HESCOM	376.09	314.23	451.25	43.61
GESCOM	45.53	41.70	56.72	36.02
Total	**682.61**	**634.55**	**870.60**	**37.20**

Unrealistic preparation of Detailed Project Reports resulted in award of distribution works at high tender premium. It also resulted in a loss of grants amounting to Rs.47 crore from the Ministry of Power.

While the aggregate premium worked out to 37.20 *per cent* over the tender cost, the contract-wise premium varied from 14.36 *per cent* to 55.69 *per cent*, as per details in **Annexure-12.** While the variations between DPR cost and amount put to tender were due to revision of quantities upwards/downwards taking into account the field requirements before floating the tender. The variations between tender cost and award cost were due to the following:

- The DPRs were prepared based on Schedule of Rates (SR) for the year 2001-02, but works were tendered/awarded much later.

- Non-provision towards works contract tax, service tax, employees cost, interest during construction, contingencies, transportation, watch and ward, insurance against theft and accident, performance guarantee, loss of interest on margin money *etc*., in the estimates as the works were awarded on turnkey basis, which was not the general practice of the ESCOMs earlier.

Failure to factor the above cost elements in the DPRs resulted in ESCOMs bearing the excess over DPR cost. Consequently, it also resulted in foregoing Rs.47 crore (being 25 *per cent* of the difference between DPR cost for distribution and award cost), by way of APDRP grants from MoP.

In the ARCPSE meeting (May 2007) the Management accepted the facts and stated that in respect of projects sanctioned during 2002-03, the premium obtained reflected market realities as there was time gap between preparation of estimates and award of contracts, which contributed to the increase in cost.

Use of High Precision Electro Mechanical meters instead of tamper proof, Static / High Precision meters.

The objective of installing tamper proof and static/high precision energy meters with measuring and data storing capabilities for the purpose of downloading data by computers was not fulfilled as ESCOMs used high precision electro mechanical meters.

2.2.21 As per MOA (May 2002) between MoP and KPTCL, it was mandatory to install tamper proof, static/high precision, energy meters for all customers within seven months of the signing of the MOA. Considering the APDRP requirements of 100 *per cent* feeder metering, energy audit, consumer indexing, computerised billing, Demand Side Management[50] *etc.*, energy meters required measuring and storage of various data, which could be downloaded by computers. Accordingly, the MoP intimated (July 2003) KPTCL that only static/electronic meters shall be procured from the funds under the APDRP/PFC/ REC.

It was, however, noticed that in the projects sanctioned during 2002-03, the type of meters to be used was not specified clearly. While some projects envisaged the replacement of electro mechanical meters by electronic meters, some projects specified the use of either 'electronic/high precision electro mechanical meters' or 'electronic/high precision meters'.

The number of electronic meters used by BESCOM and HESCOM against the total number of meters used was as under:

Name of the ESCOM	Total meters used		Electronic meters used		Percentage of electronic meters to total meters used
	Quantity	value	Quantity	value	
	(value: Rs. in crore)				
BESCOM	9,70,067	123.86	36,834	20.90	3.30
HESCOM	4,96,817	56.88	1,794	1.35	0.36

Thus, due to non incorporation of MOA condition regarding use of electronic meters clearly in the DPRs and approving the projects with different options, less number of electronic meters were used under priority works, defeating the mandate of installing tamper proof, static/high precision energy meters with measuring and data storing capabilities for the purpose of downloading the data by computers later on and preventing commercial loss of power.

In the ARCPSE meeting (May 2007) the Management stated that there was no mandatory requirement. As the experience with electronic meters was unsatisfactory, it was decided to procure limited quantity of electronic meters. Further, the Management stated that the proposal of procuring meters, which had the capability of transmitting data to a computer was futuristic and not viable at present for the Domestic/Bhagya Jyothi - Kutir Jyothi/Irrigation Pumpset category.

The reply is not acceptable as the use of Static/High precision meters was agreed to in the MOA. The non-installation of these meters was self defeating as the objectives of energy audit, downloading data from such meters for usage in computerisation programme, already provided for in the APDRP would not be achieved.

[50] **a process by which the peak load (demand) is assessed, to facilitate procurement action for additional quantity or to resort to load shedding/power cuts *etc.***

Large scale failure of transformers

2.2.22 Distribution work relating to Karwar O&M Division (under Hubli Circle) was awarded (October 2003) to ABB Limited, on turnkey basis at a cost of Rs.37.91 crore (Rs.31.95 crore towards supplies and Rs.5.96 crore towards erection).

The above work, *inter-alia*, included the supply and erection of 552 distribution transformers. Based on the field requirements, the firm supplied and commissioned 592 transformers. Out of 592 transformers commissioned, 297 transformers failed within the guarantee period. The supplier had replaced only 163 transformers leaving 132 transformers to be replaced (December 2006).

It was further noticed that the Division released (December 2005) Rs.1.34 crore being the retention money at 3.25 *per cent* of the value of the contract, against two bank guarantees valid up to 5 October 2006. These bank guarantees were not got renewed further. In addition, two more bank guarantees for a sum of Rs.4.17 crore provided by the supplier towards performance guarantees, which had expired (January 2007) were not renewed. Though the Division requested (August 2006) the Corporate office of HESCOM to recover the costs by invoking the guarantees, no action was taken (January 2007).

Thus, due to non-replacement of failed transformers the anticipated benefits of distribution improvement works were not derived.

In the ARCPSE meeting the Management of HESCOM stated (May 2007) that the failure is due to inability of withstanding the rigors of overloading/ handling of high voltage winding and that if the failed transformers are not replaced, the cost would be recovered from the pending bills of the supplier. Report on replacement/recovery is awaited (August 2007).

Delay in commissioning of Under Ground cables

2.2.23 The project approved (October 2002) for Hubli Circle at a cost of Rs.239.74 crore included 'conversion of 11 KV overhead lines to underground cable' in respect of 12 feeders in Hubli city, at a cost of Rs.35.73 crore. The work was awarded (August 2003) to ABB Limited for Rs.37.25 crore on turnkey basis, for completion within nine months (May 2004).

The project was ultimately completed (December 2006) after a delay of two and half years. The delay was mainly on account of delay in getting the approval from Power Telecommunication Coordination Committee (PTCC). Thus, due to delay in completion of these works, the anticipated benefits of the distribution improvement work could not be achieved in time.

Incomplete works

2.2.24 The DPR for Mysore Circle included Rs.39.06 crore towards Distribution Improvement works in Chamarajanagar Division. This work was

awarded (October 2001) to KAVIKA, Bangalore (contractor) for completion in six months at a cost of Rs.39.06 crore.

As of May 2003, work was completed in full in respect of 38 feeders and in respect of balance 18 feeders work was partially completed. Since the contractor did not take up the balance work, the purchase order was cancelled (October 2004). As against the order value of Rs.39.09 crore, amount paid was Rs.30.44 crore, leaving a balance of Rs.8.62 crore. A proposal for completing the balance work departmentally at a cost of Rs.1.33 crore was approved (November 2004). Audit noticed (January 2006) that though the proposal to complete the work departmentally was approved (November 2004), no action was taken (May 2007). Neither the balance work was completed, nor the grant amounting to Rs.1.62 crore (75 *per cent* of 25 *per cent* grant received) was refunded.

The Government stated (May 2007) that need based works were carried out departmentally.

Projects/Works dropped

2.2.25 The following APDRP works of KPTCL and HESCOM relating to Hubli Town under Hubli Circle project were not taken up:

- Establishing 110/11 KV sub-station and 110 KV line to Gabbur at a cost of Rs.4.74 crore. This was considered not required in view of a proposal to establish 220 KV receiving sub-station at Bidnal which is about two kms from Gabbur (KPTCL);

- Establishing 33/11 KV sub-station at Mahadeva Textiles at a cost of Rs.5.10 crore due to non availability of land (HESCOM);

- Providing additional 5 MVA Transformer at PH compound at a cost of Rs.50 lakh, in view of upgrading 33KV sub station to 110/11 KV sub station (HESCOM).

MoP had released the grant amounting to Rs.1.94 crore and loan amounting to Rs.1.94 crore (February/March 2003 and June 2004) to KPTCL/HESCOM in respect of these works. The grant amount of Rs.1.94 crore is yet to be refunded to MoP (March 2007).

The Government stated (May 2007) that MoP is yet to release Rs.47.55 crore towards grant portion of the APDRP works and may adjust the grants relating to works not taken up. No adjustment was reported to date (August 2007).

Un-metered installations

2.2.26 One of the performance conditions agreed (May 2002) with MoP was to install tamper proof, static/high precision, energy meters for all customers within seven months of the signing of the MOA except for agricultural consumers for whom the works were to be completed within two years. It was also agreed that, henceforth, no new connections would be released without meters.

It was observed in audit that, even after four years, large number of installations remained un-metered (March 2006). The status of metering of un-metered installations is summarised below:

ESCOM	Category of consumers	No. of installations existing as on 31.03.2005	No. of installations for which meters are fixed as on 31.03.2005	No. of installations for which meters were to be fixed as on 31.03.2005	No. of installations for which meters were fixed during 2005-06	Balance as on 31.3.2006
BESCOM	IP sets	4,89,630	21,746	4,67,884	18,661	4,49,223
	BJ/KJ installations	3,67,841	2,27,436	1,40,405	1,15,897	24,508
	Street lights	18,389	13,342	5,047	2,970	2,077
MESCOM	IP sets	3,20,310	1,74,483	1,45,827	14,737	1,31,090
	BJ/KJ installations	2,23,018	1,12,176	1,10,842	8,206	1,02,636
	Street lights	19,672	11,021	8,651	1,736	6,915
HESCOM	IP sets	3,90,305	1,29,404	2,60,901	10,608	2,50,293
	BJ/KJ installations	2,79,588	2,43,283	36,305	5,418	30,887
	Street lights	9,767	9,767	-	-	-
GESCOM	IP sets	2,05,634	10,707	1,94,927	NA	NA
	BJ/KJ installations	4,07,474	2,04,534	2,02,940	NA	NA
	Street lights	7,337	7,337	-	NA	NA
CESC	IP sets			1,84,754	54,886	1,29,868
	BJ/KJ installations			1,54,291	84,546	69,745
	Street lights			12,872	7,212	5,660

IP = Irrigation pumps ; BJ/KJ = Bhagya Jyothi/Kutir Jyothi

Non-metering of installations as indicated above had a direct bearing on AT&C losses and revenue realisation as the above installations were billed on assessment basis.

In the ARCPSE meeting the Government admitted (May 2007) that the progress under IP, BJ/KJ installations was poor because there was opposition from farmers and beneficiaries.

Monitoring

Formation and functioning of DRC

2.2.27 As per MOA signed (May 2002) between MoP and KPTCL, a State Level Distribution Reforms Committee (DRC) was to be constituted within one month of signing the MOA. The Committee was to comprise the State Government representative, Head of the Utility, a representative from National Thermal Power Corporation and a representative from MoP. The Committee so constituted was to meet once in two months, to review the progress of implementation of APDRP projects, compliance to MOA conditions and performance against APDRP targets/benchmarks.

The DRC was, however, constituted (May 2003) by KPTCL after a delay of 11 months. It was also noticed that, as against 23 bimonthly meetings required to be held (May 2003 to March 2007), only eight meetings were held.

The delays in constituting the DRC and not holding the meetings as envisaged indicate that implementation of APDRP projects was not monitored as required. This has also contributed to delays in completion of the projects and non-accrual of anticipated benefits to the State/Utilities.

The Government stated (May 2007) that due to administrative and technical reasons the DRC meetings could not be held once in two months as required and that progress of APDRP works was reviewed in the internal review meetings of KPTCL/ESCOMs. The fact remained that even review meetings were not held as required.

Implementation of MOA commitments

A review of commitments made as per MOA entered into with the State Government *vis-à-vis* actual achievement revealed as under:

Unbundling and privatisation

2.2.28 To provide quality power on demand to all consumers, State Government committed (February 2000) to undertake unbundling of transmission and distribution functions, formation of distribution companies and privatisation of distribution of electricity in a time bound manner. The status of implementation of the milestones are as under:

Milestone	Target date	Actual date
Privatisation of Distribution Company/ Companies.	December 2001	Not yet done
Separation of distribution function, incorporation of Distribution Companies and notifying the effective date of transfer.	31 December 2000	31 May 2002
Separation and transfer of assets and liabilities of KPTCL and VVNL.	30 April 2000	1 April 2000

Unbundling

2.2.29 The distribution function was unbundled (February 2002) from KPTCL and four distribution companies were set up to take over the distribution function in the State in line with the commitment. These were BESCOM, HESCOM, GESCOM, MESCOM, One more distribution Company – CESC was setup (December 2004), by carving out certain circles/divisions from MESCOM.

There was, however, a delay of seventeen months in achieving the target set for unbundling the distribution function.

Privatisation

2.2.30 The Financial and Distribution Privatisation (FDP) Consultants of the Government had proposed a 'Distribution Margin[51]' (DM) approach for privatisation of the distribution sector. The State Government vide its order (December 2002) accorded in-principle approval for the 'Summarised Final

[51] the distributor is entitled to a fixed margin on the quantity distributed.

Strategy Paper for inviting private sector participation in distribution of electricity' and to undertake further steps to invite private sector participation in the newly formed distribution companies.

Further, the FDP consultants had proposed certain legislative amendments to the KER Act for implementation of the privatisation strategy under the proposed 'Distribution Margin' approach. In the meeting of the Steering Committee of the Government (February 2004), the FDP Consultants were requested to come out with an 'Options paper' regarding alternative privatisation models. In the Steering Committee meeting (July 2004), the FDP Consultants presented an 'Options paper' and legislative amendments proposed in the KER Act. The Consultants discussed three options *viz*., (i) privatising ESCOMs as they were, in accordance with privatisation strategy; (ii) privatising concentrated zones/cities and (iii) maintaining status *quo*. The Government decision in the matter is awaited (July 2007).

APDRP and Power Reforms

2.2.31 The MoP entered (May 2002) into a MOA with KPTCL to implement APDRP and Power reforms. In terms of the MOA, KPTCL agreed, *inter-alia*, to the following reform measures:

- Metering of 11 KV feeders, energy accounting and audit at 11 KV feeder level;
- 11 KV feeders to be operated as business units;
- Each Distribution Circle to be an independent profit centre, with the Superintending Engineer as the Chief Executive Officer (CEO);
- Penal provisions for theft, including special laws as well as special courts.

Feeder metering and Energy audit

2.2.32 Metering of all the 11KV feeders was envisaged in APDRP. In line with this commitment, all the 11KV feeders (5,174 numbers) have been metered.

Mandatory energy audit and commercial accounting for each 11 KV feeder on actual meter reading basis, as detailed below, was agreed (May 2002) to be undertaken:

- From point of import upto 11KV outgoing feeder – sub-station wise accounting of input and output on monthly basis, with immediate effect.
- Individual feeder wise accounting and audit to cover all consumers on the feeder once in two months commencing within three months of date of installation of feeder meters.

Though feeder wise energy audit was being carried out in all the ESCOMs, Commercial accounting was not being done in any of the ESCOMs.

Anti-theft legislation

2.2.33 Anti-theft legislation was brought into force in Karnataka during 2002. Under this legislation, various stringent provisions have been made including a minimum term of imprisonment for theft of electricity. Special courts have been set up (April 2002) throughout the State to deal with the theft cases.

The details of cases detected by the vigilance squads and the revenue collected during the last five years were as under:

(Rs. in lakh)

Year	BESCOM		MESCOM		CESC		HESCOM		GESCOM	
	No. of cases detected	Amount realised (Rs.)	No. of cases detected	Amount realised (Rs.)	No. of cases detected	Amount realised (Rs.)	No. of cases detected	Amount realised (Rs.)	No. of cases detected	Amount realised (Rs.)
2002-03	504	34.90	349	40.37	742	-	-	-	2400	50
2003-04	5,611	121.99	340	35.55	536	-	-	-	1554	79
2004-05	9,908	124.72	395	39.93	552	-	-	-	1961	63
2005-06	11,403	191.64	621	49.44	549	-	-	-	2318	51
2006-07	10,457	340.42	515	57.12	1088	134.92	353	38.95	2,309	210.34
Total	**37,833**	**813.67**	**2,220**	**222.41**	**3,467**	**714.21***	**9,972***	**1,350.17***	**10,542**	**453.34**

*** represents the total amount realised from 2000-2007; the year-wise break up (except 2006-07) is not available**

As may be seen from the above data, the number of cases detected and the amount realised varied from one ESCOM to the other but was generally showing an increasing trend.

Performance of benchmark parameters

2.2.34 The project reports approved by MoP set out certain benchmarks/parameters to be achieved by ESCOMs. Performance of ESCOMs against each of the benchmark/parameters as at the end of 31 March 2007 are discussed hereinafter:

Aggregate Technical and Commercial Losses (AT&C losses)

2.2.35 AT&C losses[52] is considered a clear measure of the overall efficiency of power distribution since it measures technical and commercial losses.

One of the objective of APDRP was to reduce the AT&C losses to around 15 *per cent*. The status of AT&C losses, ESCOM wise, for the last five years are as under:

(percentage)

Utility	2002-03 (from 1.6.2002)	2003-04	2004-05	2005-06	2006-07
BESCOM	25.06	36.35	31.77	33.33	26.85
HESCOM	39.54	45.15	41.90	47.28	37.16
GESCOM	33.91	53.16	49.27	50.58	48.66
MESCOM	27.34	31.64	26.74	22.13	15.37
CESC[53]	-	-	-	45.03	34.43

[52] **AT&C loss is calculated as { (Energy input – Energy realised)/Energy input}x 100**
Where, Energy realised = Energy billed x Collection efficiency,
and Collection efficiency = (Amount realised / Amount billed) x 100.

[53] **CESC was formed in December 2004.**

It can be seen from the above that AT&C losses increased with reference to the base year (2002-03) in all the utilities except in respect of MESCOM where it reduced to 15.37 *per cent* and in respect of HESCOM where it decreased marginally to 37.16 *per cent.*

2.2.36 The AT& C losses of selected towns, where APDRP projects were being implemented, for the last five years, are indicated below:

(percentage)

Name of the town	2002-03	2003-04	2004-05	2005-06	2006-07
Bangalore City	16.84	14.15	12.19	11.74	9.99
Tumkur	18.83	14.13	10.23	17.90	11.22
Davangere	20.41	25.69	17.19	25.71	20.55
Robertsonpet (KGF)	42.83	39.20	29.80	33.09	10.77
Bangarpet	32.11	30.30	24.16	36.19	16.13
Ramanagara	23.46	31.04	24.71	31.62	21.81
Mangalore	17.01	13.11	11.40	13.10	5.62
Gulburga	35.35	34.55	33.57	35.21	26.28
Bidar	27.99	43.26	40.49	58.85	25.18
Raichur	48.46	44.79	39.88	35.28	24.12
Hassan	23.41	20.50	17.03	19.01	12.10
Hubli Circle	26.23	30.33	35.67	41.25	27.26
Belgaum Circle	28.50	24.25	41.28	45.03	35.57
Mysore Circle	34.20	37.39	20.55	11.87	10.87

There was no significant reduction in Aggregate Technical and Commercial Losses (AT&C losses) except in some towns.

As may be seen from the above, only in respect of six towns[54], AT&C losses were less than 15 *per cent*. It was between 15 to 20 *per cent* in one town[55]. The rest were above 25 *per cent* despite implementing APDRP with huge investments.

The Government stated (May 2007) that AT&C loss is dependent on revenue collection. It further stated that while the revenue collection in respect of IP sets was very poor, the revenue collection in respect of water supply, street light of Local Bodies and Government installations was irregular.

The fact is that KPTCL was unbundled into ESCOMs to reduce AT&C losses. The ESCOMs showed marginal improvement only. In respect of Government departments only Government can ensure total revenue collection.

[54] **Bangalore City, Tumkur, Robertsonpet (KGF), Mangalore, Hassan and Mysore Circle.**
[55] **Bangarpet.**

Metering, Billing and Collection efficiency

2.2.37 The performance during 2005-06 *vis-à-vis* targets as per DPRs in respect of Metering, Billing and Collection efficiencies in the projects selected for review in Audit was as under:

(percentage)

Name of the town	Metering efficiency		Billing efficiency		Collection efficiency	
	Target	Actual	Target	Actual	Target	Actual
Bangalore City	90.04	86.96	90.04	89.43	100.00	98.28
Tumkur	91.29	83.63	91.29	89.68	100.00	91.55
Davangere	90.82	84.20	90.82	85.25	100.00	87.15
Robertsonpet (KGF)	90.47	60.04	90.47	77.30	100.00	86.56
Bangarpet	83.48	80.52	83.48	83.26	100.00	76.87
Ramanagara	89.74	63.34	89.74	81.46	100.00	83.94
Mangalore	95.18	89.20	95.18	89.51	100.00	97.09
Gulburga	88.56	72.03	88.56	74.90	100.00	91.41
Bidar	88.41	49.63	88.41	71.57	100.00	85.23
Raichur	89.05	71.83	89.05	71.83	100.00	90.09
Hassan	92.00	77.66	92.00	87.32	100.00	92.75

The shortfall in achievement of these efficiencies/DPR targets had resulted in higher AT&C losses. This had also resulted in non-accrual of the anticipated benefits to the Utilities.

The Government stated (May 2007) that revenue collection in respect of IP sets was very poor and in respect of water supply, street light of Local Bodies and Government installations revenue collection was not regular. The fact remained that the basic objective was not achieved.

Failure rate of Distribution Transformers

2.2.38 One of the objectives of APDRP was to improve the quality and reliability of power supply by reducing the failure rate of Distribution Transformers (DT). Target *vis-à-vis* actual DT failure rate during the last three years in respect of selected towns are as under:

(percentage)

Name of the town	Target	Actual		
		2003-04	2004-05	2005-06
Bangalore City	0.20	0.00	0.00	0.00
Tumkur	2.00	2.42	1.74	0.82
Davangere	1.00	3.50	1.33	0.00
Robertsonpet (KGF)	2.00	3.72	4.58	3.72
Bangarpet	1.00	6.10	4.22	0.00
Ramanagara	1.00	8.06	1.23	2.30
Mangalore	1.00	4.96	5.00	4.90
Gulburga	1.00	1.20	0.88	3.18
Bidar	1.00	3.70	2.16	0.00
Raichur	1.00	6.50	6.50	7.52
Hassan	1.00	3.24	2.90	0.30

It can be seen from the above details that the DT failure rates showed an improvement and the same was less than the targets in respect of six towns[56]. The failure rate in Raichur showed an increasing trend.

Employee productivity

2.2.39 The employee productivity, in terms of input energy per employee and revenue realised per employee during the last four years *vis-à-vis* the base year are summarised below:

Input energy per employee (in lakh units):

Name of the town	Target	Actual			
		2003-04	2004-05	2005-06	2006-07
Bangalore City	12.64	14.27	14.96	17.13	19.56
Tumkur	6.40	6.33	6.21	7.06	8.86
Davangere	6.35	6.62	6.52	7.33	6.88
Robertsonpet (KGF)	20.37	7.57	8.13	7.20	7.79
Bangarpet	6.00	6.00	11.75	12.04	18.59
Ramanagara	16.14	16.13	16.19	17.85	14.07
Mangalore	6.51	9.46	9.68	9.17	10.05
Gulburga	5.44	6.32	6.63	7.48	7.42
Bidar	8.65	4.83	4.83	6.08	6.67
Raichur	10.14	9.26	9.20	8.57	11.37
Hassan	3.43	3.46	3.91	4.03	4.46

Targets set for input energy per employee were not achieved in Robertsonpet, Ramanagara, and Bidar towns.

The Government replied (May 2007) that the input energy per employee could not be achieved in Bidar and Raichur towns since the annual input energy had not grown substantially during the years.

Revenue realised per employee (Rs. in lakh)

Name of the town	Target	Actual			
		2003-04	2004-05	2005-06	2006-07
Bangalore City	45.12	51.53	59.74	69.63	83.06
Tumkur	18.97	21.33	24.66	26.09	31.90
Davangere	19.30	21.52	25.71	26.19	24.95
Robertsonpet (KGF)	65.72	21.88	23.08	16.49	24.75
Bangarpet	18.49	15.80	32.84	42.63	70.01
Ramanagara	51.66	40.22	48.61	48.28	32.86
Mangalore	28.65	36.21	39.81	37.18	44.84
Gulburga	16.76	16.65	17.15	17.71	19.23
Bidar	24.88	14.22	14.87	12.57	14.42
Raichur	10.23	25.05	26.96	21.72	26.69
Hassan	10.63	11.80	14.06	15.85	16.48

Targets set for revenue realisation per employee were not achieved in Robertsonpet, Ramanagara and Bidar towns.

[56] Bangalore City, Tumkur, Davangere, Bangarpet, Bidar and Hassan.

The Government stated (May 2007) that GESCOM was putting all efforts to increase revenue collection so that revenue realised per employee is achieved.

Acknowledgement

Audit acknowledges the co-operation and assistance extended by the staff and the Management of the Companies at various stages of conducting the performance review.

Conclusion

Two APDP projects sanctioned in 2000-01 and 31 out of 35 APDRP projects sanctioned in 2002-03, 2004-05 and 2005-06, were yet to be completed. This resulted in delay in accrual of anticipated benefits to ESCOMs. Preparation of project estimates based on old SR, non-inclusion of essential elements in cost and awarding the contract at higher tender premium resulted in ESCOMs bearing the incremental costs and foregoing of grants from MoP. ESCOMs used high precision electro mechanical meters instead of electronic meters defeating the purpose for which they were included in the project. The delay in releasing APDRP funds by State Government to the ESCOMs amounted to diversion of funds. Two Utilities (BESCOM and HESCOM) included meters procured by consumers/procured against deposits from consumers for new installations, in the physical and financial progress under APDRP. Grants relating to dropped/short closed APDP/APDRP works was not refunded to MoP. Milestone relating to privatisation of distribution is yet to be achieved. There was no significant reduction in AT&C losses except in some towns. As there was no reduction of loss, the State was not eligible for any incentive for the years 2002-03 and 2003-04. Claims for 2004-05 and 2005-06 were yet to be worked out.

Recommendations

- **KPTCL / ESCOMs should make all out efforts to complete the projects at the earliest in order to derive the benefits anticipated.**
- **KPTCL / ESCOMs should ensure that all the cost components are properly loaded in the estimates in future so that no financial benefit is lost.**
- **State Government should ensure that APDRP funds are released promptly.**
- **ESCOMs should report the progress of the work on the basis of actual expenditure and not on the basis of new installation serviced with meters procured by customers.**
- **ESCOMs should make concerted efforts to reduce the AT&C losses.**

2.3 KRISHNA BHAGYA JALA NIGAM LIMITED, KARANATAKA NEERAVARI NIGAM LIMITED AND CAUVERY NEERAVARI NIGAM LIMITED

IMPLEMENTATION OF LIFT IRRIGATION SCHEMES BY IRRIGATION COMPANIES

Highlights

Seventy four Lift irrigation schemes (LIS) with an estimated cost of Rs.4,494.45 crore are being implemented by the Irrigation Companies against which an expenditure of Rs.2,061.02 crore had been incurred as on 31 March 2007. These companies are operating 63 completed lift irrigation schemes. Review of the ongoing schemes revealed that only six schemes were completed during the period, and the benefits achieved were negligible.

(Paragraphs 2.3.1, 2.3.7, 2.3.8 and 2.3.29)

Even after spending Rs.1,399.88 crore (2002 to 2007) only six schemes of Rs.9.42 crore were completed as on August 2007.

(Paragraph 2.3.7)

Execution of all the schemes simultaneously without prioritisation led to non-completion of the schemes, time and cost over-run and consequent delay in providing irrigation facilities to farmers. The utilisation of irrigation potential created also was low due to delay in repairs and maintenance, non-development of land for irrigation *etc*.

(Paragraphs 2.3.8 and 2.3.29)

Lack of prioritisation of works and lack of planning was observed in respect of six LISs and expenditure of Rs.232.50 crore incurred on these LISs remained infructuous as of date.

(Paragraphs 2.3.14 to 2.3.20)

Deviations from instructions/codal provisions by the companies resulted in extra expenditure, excess payment *etc*., amounting to Rs.15.59 crore.

(Paragraphs 2.3.21 to 2.3.28)

The utilisation of irrigation potential created was very low due to delay in repairs and maintenance.

(Paragraph 2.3.31)

The financial viability of LIS is doubtful in view of high electricity charges.

(Paragraph 2.3.35)

The companies failed to avail Central Excise Duty exemption on machineries and equipments used in the projects.

(Paragraph 2.3.36)

Introduction

2.3.1 The geographical area of Karnataka is divided into seven river basins. The average annual yield of these rivers is 97,352 million cubic meters[57] (mm^3) (3,437.95 thousand million cubic feet – TMC) of water of which the economically utilisable water potential for irrigation is about 48,000mm^3 (1,695 thousand million cubic feet-TMC). The net sown area of the State is 107 lakh hectare (Ha). While the irrigation potential from all sources has been estimated at about 61 lakh Ha comprising 35 lakh Ha under major and medium irrigation, 10 lakh Ha from minor irrigation using surface water and 16 lakh Ha from ground water resources.

The State Government had prepared master plans (1993/revised in 2002) for the various river basins. According to these plans the total utilisation of water under major[58], medium[59] and minor[60] irrigation projects using surface water was 1,142.62 TMC in Krishna and Cauvery river basin. In order to utilise the State's share of water expeditiously, the State Government set-up three Irrigation companies, *viz*., Krishna Bhagya Jala Nigam Limited (KBJNL) in 1994, Karnataka Neeravari Nigam Limited (KNNL) in 1998 and Cauvery Neeravari Nigam Limited (CNNL) in 2003 under the Companies Act, 1956. These companies are in the nature of special purpose vehicles equipped to raise funds through issue of bonds and term loans from financial institutions. The main functions of these companies, *inter-alia*, include completion of ongoing projects, including Lift Irrigation Schemes (LISs) and to build, operate and maintain new irrigation projects in Krishna and Cauvery basins. Fifty ongoing LISs at an estimated cost of Rs.2,133.14 crore with outlay of Rs.231.74 crore (expenditure incurred till that date) and 57 completed LISs were transferred to these companies at the time of their formation. In addition 24 new schemes involving estimated cost of Rs.2,361.31 crore were taken up (2002-07) by these companies. At present (June 2007) these companies are implementing 68 LISs and maintaining 63 completed LISs, apart from other projects relating to flow irrigation.

LISs envisage pumping up (lifting) of water from a source to a certain height from where water is supplied for irrigation through canals. This facility is resorted to where topographical conditions are unsuitable for flow irrigation. A typical LIS comprises storage (in take channel and jack well), pump house, pumping machineries, raising main, distribution chamber and canal distribution network.

The Chief Minister and the Water Resources Minister respectively are the Chairman and Vice Chairman of these companies while the Chief Secretary, the Principal Secretary, Finance Department and the Secretary, Water Resources Department are the members of the Board of Directors of these companies. The Water Resources Department is headed by the Principal

[57] As per administrative report 2003-04 of Irrigation Department, Government of Karnataka.
[58] Major irrigation work means an irrigation work having an irrigable area of more than 10,000 Ha.
[59] Medium irrigation work means an irrigation work having an irrigable area of more than 2,000 Ha and upto 10,000 Ha.
[60] Minor irrigation work means an irrigation work having an irrigable area upto 2,000 Ha.

Secretary to the State Government who monitors the activities of the department including those of the Irrigation companies. The Irrigation companies are headed by the Managing Directors who monitor the activities through Chief Engineers at Zonal level, Superintending Engineers at Circle level and Executive Engineers at Divisional level.

Scope of Audit

2.3.2 The performance audit conducted between November 2006 and April 2007 covers LISs executed and maintained for the period 2002-07. Of the 68 LISs being executed and six completed LISs by these Irrigation Companies, 25 LISs on which expenditure of Rs.1,483 crore was incurred for creating envisaged irrigation of 2.91 lakh Ha spread over 10 districts[61] were selected based on risk assessment with due consideration given to investments, irrigation potential and return on investment envisaged as per the project reports, locations and media reports. Besides, out of 57 completed LISs being maintained by these companies, 15 LISs spread over five districts[62] were selected for performance audit.

Audit objectives

2.3.3 The performance review on the implementation of irrigation schemes by irrigation companies was conducted with a view to ascertain whether:

- the project survey and investigation were carried out before taking up a project;
- estimates were prepared based on survey and investigation reports;
- availability of water was assessed properly;
- works were executed as per plan and economically, efficiently and effectively;
- fund provided were sufficient to carry out the work;
- the progress of the work was properly monitored;
- the irrigation potential was created as per project report and utilised to the extent created;
- maintenance was carried out promptly;
- payments were made as per agreement/codal provisions.

[61] **Bangalore Rural, Belgaum, Bijapur, Coorg, Gadag, Gulbarga, Hassan, Haveri, Mandya and Mysore.**

[62] **Bangalore Rural, Belgaum, Coorg, Hassan and Mandya.**

Audit criteria

2.3.4 The Audit criteria adopted for assessing the achievement of audit objectives were:

- Provisions in the Karnataka Public Work Department Code, Irrigation manual of the State Government, Indian Standards Specifications and Government Orders issued by State Government from time to time;
- Investigation reports, estimates, design and plan of detailed project report and completion reports;
- Schedule of rates;
- Water allocation statements;
- Budget provisions;
- PERT chart and Management Information System reports.

Audit methodology

2.3.5 The following mix of Audit methodology was adopted for achieving the audit objectives with reference to audit criteria of the performance review:

- scrutiny of the records such as detailed project reports, estimates, tender documents, status reports, work bills *etc.*, maintained in various offices of the Companies, proceedings of the discussions of the Executives;
- review of minutes and agenda of the meetings of the Board of Director's and various publications brought out by the Government on irrigation;
- interaction with management and issue of audit queries.

Audit findings

2.3.6 Audit findings arising from the performance review were reported (May 2007) to the Government/Management and were discussed in the meeting (21 June 2007) of Audit Review Committee on Public Sector Enterprises (ARCPSE). The meeting was attended by the Principal Secretary to the Government of Karnataka, Water Resources Department, Managing Director of KNNL/Representatives of the Companies and a Technical Consultant (Retired Chief Engineer) from Water Resources Department. The views expressed by the representatives of the Government/Management and replies furnished (June 2007) by the Government/Management have been taken into consideration while finalising the review.

The audit findings are discussed in the succeeding paragraphs:

Financial management

2.3.7 The financial position of the irrigation companies is given in **Annexure 13**. The capital expenditure incurred on the works in respect of schemes in progress and schemes already completed is shown under 'Capital work-in-progress' and the Revenue expenditure incurred on such assets, after deducting the income earned during the period is being shown under Miscellaneous Expenditure - Expenditure during construction period pending capitalisation.

The estimated cost of the 74 schemes (68 being executed and six completed) being implemented by the irrigation companies was Rs.4,494.45 crore. The total expenditure incurred on these schemes as at 31 March 2007 was Rs.2,061.02 crore and the amount required for completion of the 68 LISs was Rs.2,433.43 crore. The expenditure incurred by the irrigation companies on the LISs during the last five years was as follows:

Company	2002-03	2003-04	2004–05	2005-06	2006-07	Total
	(Rs. in crore)					
KNNL	12.84	26.99	92.75	197.01	209.47	539.06
KBJNL	151.01	133.92	143.43	163.87	161.17	753.40
CNNL	-	-	19.94	49.96	37.52	107.42
Total	**163.85**	**160.91**	**256.12**	**410.84**	**408.16**	**1,399.88**

Against requirement (April 2002) of Rs.3,833.31 crore[63] for completion of 74 LISs, the total annual work plan (2002-07) for five years was Rs.1,985.41 crore[64] and an amount of Rs.1,399.88 crore (36.52 *per cent*) only was made available. Out of 74 schemes only six schemes with an outlay of Rs.9.42 crore were completed and put to use, after a delay of two and half years to fourteen years since initiation. These Irrigation companies were formed as special purpose vehicles to raise funds from the market. The borrowings are guaranteed by the State Government. It was observed, that the available resources were spent on large number of works without giving priority to complete the projects in advance stage. Consequently most of these schemes remained incomplete and negligible irrigation benefits had accrued.

The Government stated (June 2007) that priority was given to development of flow irrigation owing to relative ease and quickness in execution. The reply is not relevant since the audit observation speaks for intra-priority among the LISs.

[63] Rs.4,494.45 crore – (Rs.2,061.02 crore –Rs.1,399.88 crore).
[64] CNNL – information in respect of some works not furnished by the Company.

Time and cost over-run

2.3.8 Taking up LISs simultaneously without due prioritisation and adequate planning resulted in prolonging the works (as of March 2007) of some of the LISs, as detailed below:

(Rupees in crore)

Company	No. of LISs	Original estimated cost (as on date of commencement)	Revised estimated cost or as on date expenditure	Cost overrun (estimated)	Time overrun
KNNL	8*	395.69	2,171.74	1,776.05	One year three months to two years nine months
CNNL	47	255.72	552.03	296.31	One year six months to thirteen years six months
KBJNL	5	793.57	1,165.49	371.92	One year three months to two years nine months
Total	**60**	**1,444.98**	**3,889.26**	**2,444.28**	

*** - One LIS in 1973 and two in 1993 were taken up without targeted date of completion.**

It was observed that out of above 60 LISs, three major LISs[65] of KNNL were taken up by Government between 1973 and 1993 for irrigation of 1,47,712 Ha with original estimated cost of Rs.358.02 crore and without any definite target date for completion. These were transferred (1998) to KNNL after incurring an expenditure of Rs.41.96 crore on its formation. Based on the Schedule of Rates (SR) 2003-04, the cost of these LISs was revised (2003-04) to Rs.2,045.53 crore. The Company had funded Rs.415.69 crore as at March 2007 and Rs.1,587.88 crore is required to complete these LISs. At this pace, it might take another 19 years to complete these three LISs. The slow progress of works in these LISs as stated by the Management were:

- heavy floods in the river;
- increase in the scope of the scheme;
- land acquisition problem;
- heavy rainfall in work spots.

In respect of LISs of KBJNL meant to irrigate 1,29,320 Ha, the reasons for cost and time over-run as stated by the Management were:

- delay in finalisation of designs of head works;
- increase in quantities;
- land acquisition problem and delay in clearance from Chief Electrical Inspector to the Government (CEIG) and Karnataka Power Transmission Corporation Limited (KPTCL).

[65] Hipparagi (1973), Singatallur and Bhima (1993).

The reasons for cost and time over-run in respect of LISs of CNNL meant to irrigate 49,946 Ha as stated by the Management were:

- insufficient allocation of funds;
- delay by the agencies/contractors;
- land acquisition problems *etc*.

Project planning and Management

Defective estimates

2.3.9 With a view to ensuring financial discipline in limiting the expenditure on works, the State Government issued instructions (June and November 1991) to ensure the accuracy of estimates, *inter-alia*, directing that in no case extra financial implication should exceed 20 *per cent* of the estimated cost. Guidelines were also issued by the State Government (1973) on preparation of estimates emphasising the need for taking trial pits for every 100 feet or closer intervals so as to estimate the different classification of soil strata close to actuals. Audit scrutiny revealed that trial pits were taken at 100 metre interval only instead of 100 feet or closer intervals as required, in respect of four works. Consequently, the soil strata and ground levels noticed during excavation widely varied from the estimates. The design of embankments also had to be changed to suit actual site conditions. As a result there was huge increase in quantities of excavation and embankment works, which resulted in avoidable extra expenditure of Rs.5.40 crore as detailed below:

- In respect of three works of KBJNL[66], as against estimated quantity of 12.85 lakh cubic metre of excavation and embankment, the actual quantity excavated was 24.09 lakh cubic metre. The quantities in excess of 125 *per cent* of tender quantities were paid at higher rates than quoted rates as per clause 13 of the contract, resulting in additional expenditure of Rs.2.92 crore, which could have been avoided had the estimates been more accurate.
- In respect of two works[67] of KBJNL the increase in quantities resulted in increase of cost of works to Rs.25.43 crore as against the tendered cost of Rs.15.96 crore. Further, the evaluated prices for these two works on actual quantities at the rates of the second lowest bidders, worked out to Rs.12.61 crore and Rs.10.34 crore as against the actual costs of Rs.14.46 crore and Rs.10.97 crore respectively (During execution there was huge increase in quantities of items of works for which the successful contractors quoted workable rates necessitating higher payment as per clause 13(b) of tender conditions and the quantities for non-workable rates either decreased or were not recorded). Thus, award of works based on defective estimates led to vitiation of contracts resulting in additional expenditure of Rs.2.48 crore.

[66] ARBLC Km 48 to 55, ILC Km 0.225 to 6 and MLIWC Km 30 to 40.
[67] ILC 25 to 32 and MLIWC Km 30 to 40.

The Government stated (June 2007) that trial pits were taken at 100 metre interval only to economise, early finalisation and approval of estimates. The reply is not tenable as the deviations in taking trial pits by the Management have not only resulted in incorrect estimates but also in avoidable extra expenditure of Rs.5.40 crore as mentioned above.

Changes in designs after entrustment of works

2.3.10 The designs for the work are to be approved by the competent authority before commencement of the work and approved drawings should constitute part of the contract. Audit scrutiny revealed that in case of three LISs estimated (1999-2004) and executed (2002-2007) at a cost of Rs.37.38 crore, the designs had to be changed to suit the site conditions. This resulted in increase in scope of works amounting to Rs.12.85 crore as detailed below:

Ainapur canal (KNNL)

2.3.11 The design of aqueduct was changed (October 2004) from double vented trough[68] to single vented trough[69] and the reasons attributed for the change were that construction of double vented trough was difficult and would pose maintenance problems. The change in design resulted in extra expenditure of Rs.2.37 crore. The construction and maintenance problems which double vent trough would pose, were however, not on record.

Lead off canal of Mulwad LIS (KBJNL)

2.3.12 The estimate of the work was prepared in July 1999 with provision for service road of six metre width, size of 0.5:1 for hard rock and cross drainage works. During execution, the site conditions necessitated for;

- increase in width of service road to seven metre,
- modification of hard rock slope to 1:1,
- taking up of nine additional cross drainage works, and
- increase in canal length by 100 metre.

Failure to finalise proper estimate based on site conditions resulted in these changes and incurring of extra expenditure of Rs.5.86 crore.

Head works of Nanjapura LIS (KNNL)

2.3.13 The project authorities were aware that raising main pipes were to be laid in Banur Town and that too below the heavy traffic road, with insufficient space for two rows of pipes; yet the estimates for raising main of two rows with pre-stressed concrete pipes were finalised (May 1999**)** and work was taken up. During execution, considering the site conditions of heavy traffic of vehicles on the road and non-availability of sufficient space, the design of raising-main was changed (February 2000) to mild steel pipes with one row and the resultant additional expenditure was Rs.4.62 crore. Interestingly, the

[68] Aqueduct with two channels for passage of water.
[69] Aqueduct with single channel for passage of water.

proposal for change of concrete pipes to mild steel pipes took six years between initiation (February 2000) and final decision (January 2006). Meanwhile the cost of steel plate had increased from Rs.20,748.89 per tonne to Rs.35,324 per tonne. Delay in finalisation resulted in avoidable extra expenditure of Rs.1.19 crore.

Inadequate planning

2.3.14 The lack of prioritisation and planning of works was observed in respect of the below mentioned LISs and expenditure of Rs.232.50 crore incurred (1986 to 2005) on these LISs remained unfruitful as of date (June 2007).

Daddinaganur LIS of KNNL

2.3.15 The Daddinaganur LIS was conceived (1994) and sanctioned (March 1999) at an estimated cost of Rs.5.67 crore envisaged construction of a weir[70] across Ghataprabha river to lift 0.653 TMC of water in two lifts to irrigate 5,357 acres of land of rehabilitated persons affected by construction of Hidkal Dam. The works such as construction of weir, head works and raising main, canal and distributaries of first lift were completed (2005) at a cost of Rs.7.20 crore. The first lift could not be commissioned (2005) due to non-supply of power even though required deposit of Rs.21.63 lakh were made (July 2002) with the Electricity Supply Company. Thus, despite creation (2005) of irrigation potential (IP) of 3,438 acres in the first lift, water could not be lifted and IP created could not be utilised. Failure to synchronise all the components of LIS resulted in non-commissioning of the project and expenditure of Rs.7.20 crore incurred for the first lift also remained unfruitful for the last two years as the purpose for which LIS was created was defeated as agriculture were deprived of water.

Hipparagi Barrage Lift Irrigation Schemes (HBLIS) of KNNL

2.3.16 The HBLIS conceived (1973) at an estimated cost of Rs.186.70 crore envisaged construction of a gated barrage across Krishna river with two foreshore LISs (Haliyal and Ainapur) on the left bank of the river to provide irrigation to 74,742 Ha. Subsequently, (2001) the scope of the project was increased with two more LISs (Karimasuti and Savalagi Tungal) off taking at Haliyal east canal and the utilisation proposed was 11.64 TMC. The cost of the project as per the latest revision (2003-04) was Rs.1,113.50 crore. Though the barrage was completed (September 2004) at a cost of Rs.54.72 crore and water was being stored since then, it could not be utilised for irrigation purposes during the last three years as the Lift Irrigation works were still (August 2007) under progress. At Haliyal, water is to be lifted in two stages and then released into Haliyal lift Canal. The Haliyal Lift canal works of Rs.61.92 crore were not taken up (May 2007). But the head works for both Karimasuti and Savalgi Tungle LISs which take off from the Haliyal East Lift Canal had been taken up during March 2004 and were under progress with

[70] Weir is solid wall across the river which raises water surface level upstream without causing submergence of land, in order to supply in a canal taking off above it; which allows the excess water to pass over it.

expenditure of Rs.11.01 crore as against the contract cost of Rs.22.92 crore. These schemes are in advanced stage of completion and have no source of water until the Haliyal Canal itself is completed and water is fed into the canal. Thus the purpose for which HBLIS was set up defeated as the targetted group was not benefited.

The Government (June 2007) while accepting the audit findings informed that it is confident that these LISs would be completed by 2009-2010.

Delay in taking up of command area development works

2.3.17 Three LISs[71] of Cauvery Neeravari Nigam Limited (CNNL) taken up during 1986 and 1991 to irrigate 15,233 Ha of land were completed partially and IP of 8,427 Ha was created (May 2007) at a cost of Rs.111.69 crore. These LISs were commissioned in December 1998 and September 2005. The IP created could not be utilised as command area was not developed and land levelling (which is required to be done for getting the irrigation benefits) by farmers was not taken up enthusiastically by the farmers. As such the expenditure of Rs.111.69 crore incurred on these LISs remained largely unfruitful for the last two to nine years. The purpose for which the IP was created was defeated. The Government stated (June 2007) that land owners (farmers) were gradually developing their land to accept the irrigation facilities in a phased manner.

Indi Lift Irrigation Scheme of KBJNL

2.3.18 The Indi LIS was conceived (May 1999) at an estimated cost of Rs.337.92 crore to irrigate 62,582 Ha of land utilising 11.31 TMC of water from Narayanapur Left Bank Canal. The scheduled date of completion was December 2005. The lift canal is 97.30 kms long with 47 distributories. The canal works were started in December 2000 itself and completed in March 2003, at a cost of Rs.58.89 crore. The work relating to the head works for lifting of water was taken up only in September 2003 and was still (August 2007) under progress. Thus, canal works were taken up much in advance of head works, without synchronising the connected component of the works according to priorities and irrigation potential of 37,434 Ha created at a cost of Rs.58.89 crore could not be utilised for want of water. The purpose for which the IP was created was defeated.

Projects inordinately remaining incomplete

2.3.19 Audit scrutiny of six works (**Annexure-14)** revealed specific lapses such as finalisation of contract before starting the land acquisition process, non-closure of contracts even though the agency had not started the work for three years, improper monitoring of the work, award of work without ascertaining the financial condition of the contractor, delay in acceptance of tender and delay in finalisation of design *etc*., involving additional financial burden of Rs.37.02 crore to these companies.

[71] **Hallimysore, Huchanakoppalu and Kamasamudra.**

Excessive cement concrete lining for canal sides and beds

2.3.20 As per Indian Standard Code 3873 (IS) – 1993, the thickness of cement concrete (CC) lining of canal shall be fixed depending upon the full supply depth of water and canal capacity as indicated below:

Capacity of Canal (in Cum)	Depth of Water (in metre)	Thickness of CC lining (in millimetre)
0-5	0-1	50-60
5-50	1-2.5	60-75
50-200	2.5-4.5	75-100

The estimates in respect of six[72] canal works provided for CC lining thickness of 100 mm, instead of a maximum 75 mm thickness required as per the design section of discharge and full supply depth. The works executed (2001-07) accordingly resulted in excess CC lining of 85,533 cum over and above the required quantity of 2,52,862 cum and the consequential extra expenditure was Rs.9.76 crore.

The Government stated (June 2007) that as per IS code 456, the maximum size of the aggregate[73] used should not be more than one-fourth of the size of the member[74] and since 20 mm and down size aggregate is normally used for CC lining, it is necessary to increase lining thickness to 100 mm. The reply is not tenable as the size of the aggregate could have been reduced instead of increasing the thickness of the lining. It is also pertinent to note that Chief Engineer (Gorur) had issued (October 2006) circular instructions to follow the IS code 3873 – 1993.

Contract management

Deviations from instructions/codal provisions by the companies resulted in extra expenditure, excess payment *etc*., amounting to Rs.15.59 crore.

2.3.21 Effective management of contracts requires strict compliance of the relevant codal provisions and instructions of the Government by these companies with regard to award of works, regularisation of payments as per contract terms, recovery of dues, promptness in taking decision *etc*. Audit scrutiny revealed that the project authorities while implementing the works of LISs had flouted these instructions/codal provisions resulting in avoidable extra expenditure, excess payment *etc*., to the tune of Rs.15.59 crore as indicated in the succeeding paragraphs.

[72] **KBJNL-ARBC Km 4.92 to 67 (seven packages), MLEC Km 0 to 17.40, MLWC Km 0 to 78, ALBC Km 51 to 85; KNNL - BLIS Balundgi Lift canal Km 0 to 25; CNNL - Hallimysore Lift canal Km 1, 2, 3, 6, 7, 10, 11, 13, 14, 15 and 17.**

[73] **Metal (Jelly).**

[74] **in a structural system column, beam, slab *etc*., are members, likewise in canal concrete lining is considered as member.**

Payment of lift charges

2.3.22 In respect of the work of construction (March 2001 to November 2003) of trough cum aqueduct in Km 0.00 to Km 1.00 of Almatti Right Bank Lift Canal (ARBLC), the contractor quoted a rate of Rs.1,950 per cum for the item of 'M20 concrete' which included charges for all lifts. Lift charges of Rs.40.39 lakh were, however, paid (January 2005) separately for laying 13,179.74 cubic metre of M-20 grade concrete to the aqueduct, resulting in excess payment of Rs.40.39 lakh.

The Government stated (June 2007) that the contractor laid foundation as per item No.14 (M-20 grade concrete item) and for construction of super structure he was paid under Extra Item Rate List (EIRL) item in terms of general conditions of the schedule of rates 1996-97 and as such there was no over payment. The reply is not acceptable as the contract was for construction of the trough cum aqueduct and therefore laying concrete for the main structure, *i.e.*, the trough cum aqueduct, is not an extra item and the payment referred to was for lift charges for laying M-20 grade concrete to the trough cum aqueduct only and not for construction of the structure.

Over-excavation

2.3.23 As per the design norms recommended (1991) by the State Government, the side slope in soft rock cutting was 0.5 : 1. During execution of Indi Lift Canal (ILC) works in Km 10 to 23 of (four packages), taken up in October 2001, the side slope in soft rock cutting was modified to 1:1. The reason stated was that the slope of 0.5:1 is very steep and unstable for soft rock. This deviation from norms resulted in increase in quantities of excavation by 2,07,645 cum and the consequential avoidable expenditure of Rs.1.24 crore.

The Government stated (June 2007) that the side slopes were changed to 1:1, so that the concrete lining could stick. The reply is not acceptable as the design norms recommended by the Government had not been amended.

Tender evaluation

2.3.24 As per Karnataka Public Works Department (KPWD) Code (Vol-I), negotiations should be undertaken with the contractors who had quoted erratic and irrational rates (compared to the estimates). This was for the purpose of rationalisation and moderation subject to ensuring that overall percentage of rates quoted by the contractors after rationalisation of rates do not exceed the original percentage. KBJNL had also issued (February 2001) norms for awarding contracts specifying the acceptable levels of premium over the estimated rates: (a) for Earth work above Rs.50 lakh – 25 *per cent* below, (b) for cross drainage works – 5 *per cent* above, and (c) for concrete lining works – 8 *per cent* above.

KBJNL invited (June 2002) separate tenders for construction of two consecutive sections of ILC works - (i) Km 40 to 48 and (ii) Km 48 to 55.693. After evaluation of tenders (November 2002) the lowest bid for second work, which was 1.11 *per cent* below the tendered amount, was negotiated twice to rationalise the rates and also to adhere to the norms and the offer was reduced to 13.99 *per cent* below the tendered amount. The lowest bid for the first work at 10.99 *per cent* below the tendered amount contained irrational and un-workable rates – *e.g.* Rs.5 per cum for hard rock excavation as against the estimated rate of Rs.181.70 per cum where as Rs.240 per cum for soft rock excavation as against the estimated rate of Rs.78.90 per cum was accepted (June 2003). The bid was accepted as such without rationalisation and moderation. During execution (June 2003 to December 2005), the quantities of items of work for which the contractor had quoted rates favourable to him increased while the quantities of items of work for which the contractor had quoted unfavourable rates decreased. Thus, due to non preparation of realistic estimates and quantities therein, as well as failure to rationalise the rates resulted in avoidable extra expenditure of Rs.8.26 crore.

The Government stated (June 2007) that overall percentage of the lowest offer was within the acceptable norms, and as such there was no scope for any further negotiation. The reply is not acceptable as rationalising of rates was in the interest of the Company.

Delay in finalisation of tender

2.3.25 The tenders for head works of Indi LIS costing Rs.11.22 crore were opened (October 2002) by KBJNL (Company). The work was to be completed by December 2004. The Company, however, after a delay of 10 months from opening of tender, entered (September 2003) into an agreement with the contractor at his quoted rate (*minus* 24.69 *per cent*) for Rs.8.45 crore. Reasons for delay were not available on record. The contractor executed (September 2003 to June 2006) the work. He claimed Rs.2.41 crore on account of increase in cost of material, which was agreed to by the Company.

The Government (June 2007) while accepting the delay stated that the revised rates for steel *etc*., have been paid as per general conditions of Scheduled of rates. The reply is not acceptable. The contractor had quoted 24.69 *per cent* below the estimates. Had the work been awarded without delay of 10 months, the Company would have avoided loss of Rs.2.41 crore.

Payment for additional quantities

2.3.26 As per Clause 13 of the general contract conditions, any additional work which the contractor may be directed to do shall be carried out by the contractor at the same rates as are specified in the tender for the main work. Any additional quantity of work over and above 125 *per cent* of the tendered quantity shall be paid at the rates as per the schedule of rates or derived from the schedule of rates prevalent at the time of execution of additional quantities. Audit scrutiny revealed that in respect of the below mentioned item of works payment for the quantities in excess of 125 *per cent* of tender quantities was

made (2002-06) either at new rates or at rates not based on the prevalent schedule of rates resulting in extra benefit of Rs.1.96 crore to the contractors:

Name and duration of the work	Quantity in excess of 125 *per cent* of tender quantities	Rate of payment	Rate payable as per clause 13 of agreement	Difference in rate/amount (Rs.)
Hipparagi Barrage vertical gates by KNNL (March 2002 to November 2005)	Additional work of five gates was entrusted. In respect of three of these gate works the quantities had exceeded 125 *per cent.*	Rs.403.35 lakh	Rs.265.82 lakh	137.53 lakh
Head work of ILS by KBJNL (October 2001 to December 2003)	Additional work of concrete (12,342.18 cum)	Rs.1,965.81 per cum	Rs.1,494.28 per cum	471.53 per cum 58.20 lakh
Total				**195.73 lakh**

In respect of Hippargi Barrage, the Government stated (June 2007) that the rates were approved by the Technical Sub-Committee. This reply does not explain why Clause 13(b) was not applied while approving the rate. In respect of ILS, the Government stated that the new Schedule of Rate was communicated on 10 September 2004 to the concerned Division and therefore the additional work of January 2004 was paid based on the then prevailing Schedule of Rates. The reply is not tenable since the new Schedule of Rates 2003-04, issued by Water Resources Development Organisation (WRDO) came into force with effect from 15 October 2003.

Extra payment in violation of tender conditions

2.3.27 The construction of intake canal of Haliyal LIS was awarded (July 2003) to a contractor on tender basis for Rs.96.08 lakh which was 54.57 *per cent* below the amount put to tender. As per tender condition the contractors were required to inspect the site and satisfy themselves about the nature of work involved before quoting. As per the canal alignment finalised at the time of calling for tenders, there was necessity of controlled blasting. Therefore the quoted rate of Rs.90 per cum was for excavation of hard rock of all toughness and under all conditions. During execution (July 2003 to June 2006), the alignment of the canal was slightly changed and in the modified alignment there was necessity for excavation of hard rock through controlled blasting. The project authorities however, treated the excavation of hard rock with controlled blasting as new item with the rate of Rs.154.39 per cum. 67,729.31 cum of hard rock excavation had been paid at Rs.154.39 per cum instead of at the quoted rate of Rs.90 per cum resulting in excess payment of Rs.43.61 lakh.

The Government replied (July 2007) that the contractor had quoted his rates taking into the field realities of the original agreement, where the controlled blasting was not necessary, and that the controlled blasting arose subsequently due to shifting of the alignment. The reply is not acceptable as the change in alignment did not warrant payment at new item rates since the work of hard

rock excavation involved controlled blasting also both in the original alignment as well as the new alignment.

Payment not in accordance with tender condition

2.3.28 Four packages of canal excavation in Km 10 to Km 23 of ILC were taken up (October 2001) on tender basis through four contractors. The rates quoted by the contractor were 49.44 to 50.06 *per cent* below the estimated cost. One of the schedule items of work was excavation in soft rock with or without blasting. The KBJNL authorities combined the two separate items of SR *viz.,* excavation without blasting and with blasting and included in the tender with estimated quantity of 5,60,832 cum and the estimated rate for the combined item ranged between Rs.79.25 and Rs.80.27 per cum. The works were put to tender and the accepted rate for this item ranged between Rs.70 and Rs.80 per cum. During execution (October 2001 to December 2003) the recorded quantity of this item was 9,65,591 cum. The quantity in excess of 125 *per cent* of the tender quantity was 2,64,551 cum. In terms of clause 13(b) of the agreement the quantities in excess of 125 *per cent* of the tender quantities were to be paid at the rates of SR of the year of execution plus or minus tender premium. Accordingly, the correct rates payable for 2,64,551 cum (in excess of 125 *per cent* of the tender quantity) were ranging between Rs.40.02 and Rs.40.36 per cum. The Company, however, paid at rates ranging between Rs.71.04 and Rs.74.68 per cum treating this quantity as new item of excavation in soft rock with blasting in violation of the agreement resulting in excess payment of Rs.87.92 lakh.

The Government stated (June 2007) that the soft rock was excavated with blasting and therefore the classification and payment was correct. The reply is not tenable as one of the contract items of work was excavation of soft rock with or without blasting and therefore the quantities in excess of 125 *per cent* of tender quantity should have been paid at Clause 13(b) rates derived on the basis of Schedule of Rates (estimates) for soft rock with or without blasting.

Performance of completed schemes

2.3.29 IP in Ha created and utilised in respect of 63 completed/partially completed LISs for which information have been furnished are indicated below:

(area in Ha)

Irrigation Company	Date of taking up	No. of LISs	Envisaged IP	Created IP	Shortfall in creation (percentage)	Maximum registered utilisation	Shortfall in utilisation (percentage)
KNNL	between 1973 and 1994	18	1,90,519	35,269	82	11,194	68
KBJNL	between 1993-94 and 2000-01	5	1,29,320	98,564	24	1,338	98
CNNL	between 1986 and 2002-03	40	54,340	21,836	60	27,748	-
		63	3,74,179	1,55,669	58	40,280	74

The shortfall in IP creation was due to the fact that three LISs of KNNL taken up in 1973 and 1993 with envisaged IP creation of 1,47,712 Ha are under initial stage even after lapse of 13 – 34 years and no IP has been created so far (June 2007).

As can be seen from the above table that the IP created fell short of target by 58 *per cent* and the reasons for shortfall as informed by Management were:

- delay in clearance of forest land,
- project clearance delay by Government,
- the works being in initial stages,
- shortage of funds, and
- delay by contractors/agencies.

The reasons for shortfall of 74 *per cent* in utilisation of created IP as informed (March 2007) by the Management were:

- shortage of water,
- Non-construction of laterals, field irrigation channels, outlets, *etc*.,
- Non-taking up land development works by farmers,
- overlapping of atchkat (command area),
- disrupted power supply, and
- leakages in pipes, repairs in motors, pumps, valves *etc*.

Out of the 15 completed LISs selected for test check, it was noticed that 13 LISs which were completed between 1978 and 2002 at a cost of Rs.153.99 crore had created irrigation potential of 38,014 Ha and out of this only 10,322 Ha (27 *per cent*) was being utilised during the last five years even though the expenditure on operation, maintenance is being incurred at an average cost of Rs.3,530 per Ha per year .

The Government stated (June 2007) that necessary action is been taken to minimise the gap between potential created and utilised.

LISs under Malaprabha Project (KNNL)

2.3.30 The Malaprabha river Project was envisaged to irrigate 2,14,151 Ha with 48.70 TMC of water. Under this project 11 LISs were completed (1978-2006) with a irrigation potential of 33,877 Ha. Based on the river gauging done (1972-2002), the dependable yield (at 75 *per cent*) was estimated at 27 TMC after construction of the Munoli dam on the river, which was sufficient to irrigate only 1,28,490 Ha.

It was observed that:

- out of the 27 TMC of water, the water requirement for flow and LIS were 19.881 TMC and 7.119 TMC. The actual utilisation, however, was 0.529 TMC to 3.658 TMC under LIS and 9.39 TMC to 32.14 TMC under flow irrigation, in 2001-02 and 2005-06 respectively.

- out of the IP of 33,877 Ha created under the LISs, the utilisation was between 11,507 Ha (33.97 *per cent*) in 2001-02 and 22,387 Ha (66.08 *per cent*) in 2005-06.

The Company had taken up these LIS inspite of being aware that the total irrigatable land would not increase. The implementation of LIS had merely diverted water from flow irrigation to LIS and also resulted in additional cost on operation and maintenance. The cost of operation and maintenance for 2002-07 was Rs.12.34 crore. Thus, the available water was being shared for creation of irrigation potential under flow irrigation as well as LIS, with the result that neither of the facilities was fully utilised.

The Government confirmed (June 2007) that water is being shared both for flow and LIS proportionately.

The utilisation of irrigation potential created was very low due to delay in repairs and maintenance.

Delay in repairs

2.3.31 Six LISs of CNNL which were completed (1981 and 2002) at a total cost of Rs.9.51crore were not functioning (August 2007) as indicated below:

Name of LIS	Cost/Period of completion	IP created in acres	Remarks
C-II Igglur Barrage	Rs.200.71 lakh 1999	1,000	Remained non-functional since 2000 due to leakages in raising main pipes, damages to pipes, valves *etc*. Repair estimate of Rs.50 lakh sanctioned in October 2006.
D-Igglur Barrage	Rs.606.15 lakh 2000	1,890	Remained non-functional since 2000 due to leakages in raising main pipes, damages to pipes, valves *etc*. Repair estimate of Rs.89.25 lakh sanctioned in October 2006.
Budeguppe and Kodihalli	Rs.64.84 lakh 2002	680	Functioned for two years. Due to frequent power fluctuations, the RCC pipes of raising main pipes damaged. Remained non-functional since 2004. Repair estimate of Rs.60.90 lakh sanctioned in October 2006 for Kodihallli.
Kyathaghatta and Madehalli	Rs.79.57 lakh 1981-82	1,218	Functioned upto October 2001. Due to non-payment of power charges, electricity was disconnected during November 2001. In the mean while, due to floods in 2005, motors got damaged. Repair estimate not yet approved (May 2007).

Four estimates for repairs and replacements at a total cost of rupees two crore were prepared and sanctioned (October 2006) for four LISs and no estimate was prepared for the other LISs. No further action was taken in these cases and the repairs were yet to be carried out (May 2007). This rendered these six LISs non-functional (2002 to 2007) and 4,788 acres of IP created at a cost of Rs.9.51 crore remained unfruitful resulting in crop loss of Rs.110.70 crore at the rate of Rs.34,855 per acre per annum (based on the project estimate of C-II Igglur) for a period of six years. Further, the Company incurred a minimum power charges liability of Rs.82.66 lakh in respect of four LISs payable to

Electricity Supply Company (information not available for other two LISs) for the period 2002-07.

The Government stated (June 2007) that efforts are being made to attend to repairs and replacements.

Avoidable payment of penalty

2.3.32 As per electricity tariff, High Tension (HT) power consumers are required to maintain an average power factor of not less than 0.85 upto 31 March 2003 and 0.90 thereafter. Any shortfall in power factor attracts penalty at the prescribed rates. The HT power connections of 11 LISs of Malaprabha Project (KNNL) and Almatti Left Bank LIS (KBJNL) were serviced before 1994-95 and August 2001 respectively. It was observed that the average power factor was ranging from 0.01 to 0.89 in respect of Malaprabha Project LISs and 0.54 to 0.88 in respect of ALB LIS and therefore these companies paid a penalty of Rs.1.21 crore for the period 2002-2007.

The Government stated (June 2007) that capacitors have been fixed in two LIS and the action would be taken up in respect of other LISs.

Avoidable payment of power charges

2.3.33 The Kamasamudra I & II LISs of CNNL were commissioned (June 1998) with 12 pumps with capacity of 6,210 Horse Power (HP) of which four were to be stand-by and only eight pumps of total 4,140 HP were to operate at any time. Agreement for HT power connection with contract demand for 5,700 HP was entered (June 1998) into with the Karnataka Electricity Board. The Company had to pay minimum tariff ranging from Rs.115 per HP per quarter to Rs.250 per HP per quarter as per the electricity tariff regulations. Availing power supply at higher capacity rating than required resulted in avoidable payment of Rs.70.20 lakh for the period 2002-2007.

The Government stated (June 2007) that efforts are being made to reduce the contract demand.

Demand and Collection of water charges

2.3.34 The sustainability and efficient utilisation of irrigation assets created by incurring huge capital cost depends on effective maintenance. Such maintenance cost needs to be met mainly through the recovery of water charges. Based on the recommendations of Finance Commissions and independent studies, the State Government observed that the State should get reasonable return or at least minimise the losses on operation and maintenance. On the recommendations of the Planning Department of the State, it was decided (October 1988) that water users pay for water utilised for irrigation so as to fully cover all the operational and maintenance costs and also yield a reasonable return on investment.

The power to levy and collect water charges is vested in the State Government till 2002. The amendment (2002) of Irrigation Act, permitted the Irrigation Companies to levy and collect water charges. KNNL and CNNL are operating and maintaining 63 completed LISs. KNNL started (2004) collection of water rates since 2004. The details of levy, collection and balance of water rates for the years 2002-03 to 2006-07 in respect of area irrigated through LISs were not furnished (August 2007) by the Companies and as such, it was not possible in audit to ensure that the Companies were able to get reasonable revenue from water charges for LISs to cover the maintenance cost.

The Government stated (June 2007) that the Companies are raising demands on the users but the collection record is very poor due to lack of infrastructure in the Companies, absence of coercive power to collect water charges and also on account of concentrating on capital works rather than collection of water charges. The reply is silent regarding corrective measures proposed to be taken, if any.

The financial viability of LIS is doubtful in view of high electricity charges.

Viability of Lift Irrigation Schemes

2.3.35 LISs incur recurring maintenance cost and bulk of it is attributable to energy charges. These LISs are designed to lift water during one or two crop seasons only in a year. Electricity charges are levied based on actual consumption or minimum tariff (HT 3(a)) amount which ever is higher. Further minimum charges are imposed even if the plant or machines are not operated and no power is consumed. Accordingly, the cost of power charges in respect of three KBJNL projects[75] ranged between Rs.6.71 and Rs.35.72 per month per acre, whereas the average water rates leviable as per Irrigation Act are Rs.9.67 per acre per month, leaving an enormous gap between maintenance cost and water rates. Based on the cost of operating of LISs, KNNL and KBJNL had apprised (July 2002 and December 2003) the State Government of the necessity to evolve a policy on sharing of cost of power incurred for operating these LISs for sustaining them. The Government, however, is yet (May 2007) to formulate policy on LISs.

Failure to avail Central Excise Duty exemption

The companies failed to avail Central Excise Duty exemption on machineries and equipments used in the projects.

2.3.36 The GOI fully exempted (8 January 2004) Central Excise Duty (CED) on all items of machineries, equipments, pipes, instruments *etc*., required for setting up of water supply plants and delivery of water for irrigation and drinking purpose. In order that the contractor may avail the benefit of CED exemption a certificate (to the effect that the goods are cleared for the intended use *i.e.*, the plant and equipments *etc.*, which are going to be used for setting up of water supply plants) has to be issued by the Deputy Commissioner of the district (in which the plant is located) on the basis of the information provided by the Company that these equipments would be utilised for lift irrigation systems. Test check of records of 14 contracts relating to head works involving Rs.168.50 crore finalised between May 1999 and September 2005, revealed the following omissions:

[75] **Almatti Left Bank Canal, Almatti Right Bank Canal and Mulwad LIS.**

- In case of 11 contracts valuing Rs.113.62 crore, finalised after 9 January 2004, the companies failed to include appropriate clause that would bind the contractor to avail the CED exemption so that benefits could be passed on to the Company.

- Even though the companies had made necessary arrangements for issue of CED exemption certificates by the Commissioner in four contracts of Rs.53.65 crore, no follow-up action was taken to ascertain whether the CED exemption was availed by the contractors or not in order to adjust the same in their work bills.

- In the case of 10 contracts of Rs.114.85 crore finalised between February 2003 and September 2005 no action was taken by the companies for issue of CED exemption certificates even though the supplies of machineries were made after 9 January 2004.

As per the terms of contracts, the contractors were required to furnish price break up for machineries and equipments. The price break up were, however, not obtained and kept on record by the companies. In view of the same, Audit could not ascertain the amount of CED exemption foregone by the Companies.

The Government stated (June 2007) that the Chief Engineers have been directed to arrange for necessary exemption certificates and to watch the availment of exemption and to recover the same from the work bills of the contractors.

Internal control

2.3.37 Internal control is a management tool used to provide reasonable assurance that management objectives are being achieved in an efficient and effective orderly manner. Audit observed that Internal Control:

- in respect of survey, preparation of estimates of schemes is weak as seen from grossly inaccurate estimates.

- in respect of scrutiny of tenders and award of contracts need to be strengthened.

- on contract management is weak resulting in incurring of avoidable expenditure.

- in respect of demand, collection of water charges is weak.

Acknowledgement

Audit acknowledges the co-operation and assistance extended by the staff and the Management of the Companies at various stages of conducting the performance review.

Conclusion

The LIS were taken up for providing water to those who could not be provided water through flow irrigation. There were substantial delay in completing the schemes as the funds required for completing the schemes were not made available. Though the irrigation companies were formed for expeditious completion of the ongoing projects, fresh schemes were taken up without due prioritisation and adequate planning and allocation of available resources on many projects resulted in non-completion of ongoing projects. The LIS schemes were not properly synchronised as in some cases canal works were completed without ensuring completion of head works; in some cases sub projects were taken up without first completing the main projects. Many LISs were lying unutilised for period ranging from four to seven years for want of repairs though substantial amounts were invested in these LISs.

Recommendations

- **Allocation of available funds needs to be streamlined / prioritised so that works of LIS are not left incomplete.**
- **Action needs be taken to synchronise completion of canal works, head works, installation of pumps and electrification works, development of atchkat *etc.***
- **The Company should expedite repairs/maintenance of LIS so as to put them into operation.**
- **Company should pursue State Government to share cost of Power incurred for operating LISs for sustaining them.**

2.4 KARNATAKA FOREST DEVELOPMENT CORPORATION LIMITED

PULP AND MISCELLANEOUS PLANTATION ACTIVITIES OF THE KARNATAKA FOREST DEVELOPMENT CORPORATION LIMITED

Highlights

The Company has not reconciled the land available/transferred to it from Forest Department and handed over back to Government.

(Paragraph 2.4.7)

The re-plantation was done in 4,464 Ha as against the target area of 16,115 Ha (28 *per cent*).

(Paragraph 2.4.10)

In the Urban Fuel Wood project the Company deviated from its intended objective of providing the produce as poles and fuel wood deprived the area of social benefit as poles and fuel wood was not made available to local people. Loss of revenue of Rs.4.28 crore was incurred on the project.

(Paragraph 2.4.12)

In the Small Timber and Fuel Wood project at Kolar, the Company deviated from its intended objective of providing the produce to local people. Also, the society was deprived of social benefits such as rural employment, encouragement to cottage industries and amelioration of the environment. Loss of revenue of Rs.1.71 crore was incurred on the project.

(Paragraph 2.4.13)

Going in for a full fledged project without waiting for the results of pilot project coupled with lack of proper maintenance rendered the Tamarind orchard project unviable.

(Paragraph 2.4.16)

The internal control mechanism and the management information system were not commensurate with the size and nature of the Company. The Company has not maintained basic records relating to raising of nurseries in Bangalore division and plantation, extraction and maintenance of pulpwood plantations in all the divisions. Further, the Company had not maintained cost records and has not constituted Audit Committee as prescribed under Companies Act, 1956.

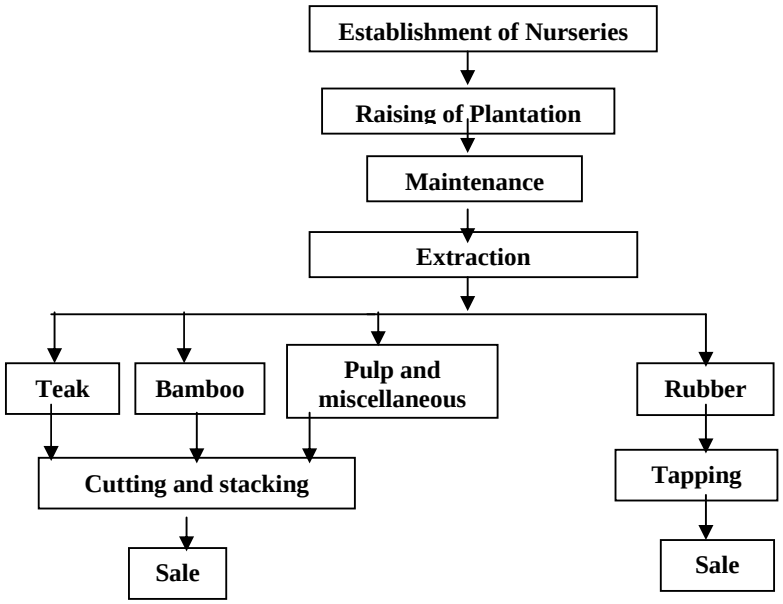
(Paragraph 2.4.17)

Introduction

2.4.1 The Karnataka Forest Development Corporation Limited (Company) was incorporated (January 1971) with the following main objectives:

- to develop land for raising of forest plantations and in particular eucalyptus, tropical pines, rubber, teak, bamboo, cocoa, cashew and such other species in the State of Karnataka for the purpose of development of wood based industries;
- to plant, grow, cultivate, produce and raise plantations of all kinds of forest plants, trees and crops and market them;
- to carry on the business of planters, cultivators, sellers and dealers in timber, pulpwood *etc*., and to establish, administer, own and run industries for manufacturing of forest product;
- to take up fuel wood/fodder Projects in the State to minimise the biotic pressure on natural forests.

The activities of the Company are presently confined to management of plantations of rubber, eucalyptus, teak *etc*., already raised by Forest Department and Karnataka Pulpwood Limited (a Government Company) and transferred to the Company. It is also engaged in raising of Rubber, Eucalyptus, Bamboo, Teak and other miscellaneous plantations in clear felled areas transferred by the Forest Department on lease basis; tapping of rubber plants for collection of latex at fixed intervals of time and commercial operation mainly felling, cutting of trees and transportation, recovery of centrifuged latex from field latex and sale of plantation produce by auction/tender. Flow chart of the activities of the Company is given below:



The Management of the Company is vested in the Board of Directors (BoD) consisting of seven Directors including the Managing Director (MD). The MD is the Chief Executive Officer and is assisted by three Executive Directors who in turn are assisted by a Finance Manager and a Chief Accounts Officer.

The Company presently has seven divisions under three sectors *viz*., Pulpwood Division at Bangalore under Bangalore Sector; Shimoga, Chickamaglur and Dharwar under Shimoga Sector; Rubber Divisions at Puttur, Sullia and Aivernadu; and a Rubber Factory at Sullia under Mangalore Sector. The financial position and working results of the Company are given in **Annexure-15.**

The area covered under the plantations (as per accounts) as at the end of March 2006 was 54,604.61 hectare (Ha) which consists of 42,582.91 Ha of Pulpwood[76] plantations, 7,578.38 Ha having natural growth **(**to be replanted) of species like honne, mati, bamboo and other jungle plants and 4,443.32 Ha of rubber Plantations.

The working of the Company for the five years ended 31 March 1997 was last reviewed and reported in the Report of the Comptroller and Auditor General of India for the year ended 31 March 1997 (Commercial), Government of Karnataka. The report was discussed (May 1999 and August 2000) by the Committee on Public Undertakings (COPU) and recommendations were made in 84th Report of the COPU in August 2000. The Company has not yet complied with the recommendations given by the COPU (March 2007).

Scope of audit

2.4.2 The performance audit conducted between January to May 2007 covers the Performance of Pulp and miscellaneous wood division (commonly referred to as Pulpwood Division) relating to raising and harvesting of pulpwood, fuel wood, timber and tamarind plantations and its sale by the Company during the last five years ended 31 March 2007. Audit examined the records of projects initiated, plantation harvested/extracted and sale of the produce during the period 2002-07 at Corporate office and Bangalore, Shimoga, Chickamaglur and Dharwar Divisions. The projects which were taken up after 1993-94 involving first cut/extraction during the period 2002-07 and also the projects taken up during 2002-07 though not extracted/harvested were also reviewed in audit**.**

Audit objectives

2.4.3 The performance review on pulp and miscellaneous plantation activities was conducted with a view to ascertain whether:

- the Company maintained proper account for the land held by it and achieved its mandated objectives of raising, maintenance and harvesting of pulp wood and miscellaneous plantations effectively;

[76] Pulpwood refers to timber grown with the principal purpose of making wood pulp for paper production.

- fuel wood/small timber projects were taken up efficiently, effectively and economically to minimise the biotic pressure[77] on natural forests;
- adequate funds were available and utilised judiciously;
- economy and efficiency in raising of nurseries and re-plantation of felled land was achieved;
- the business of planters, cultivators, sellers and dealers in timber, pulpwood *etc.*, were carried out profitably;
- the yield and revenue per hectare achieved was as per the Project Report and projects were finalised/executed on realistic basis; and
- internal control mechanism was effective and efficient.

Audit criteria

2.4.4 The Audit criteria adopted for assessing the achievement of audit objectives were:

- prescribed procedures and policies, provisions in the forest manual and forest code;
- instructions/guidelines issued by BoD, State Government and GOI from time to time
- working plans for extraction and regeneration/re-plantation;
- budgets, targets and other parameters contained in the Project Reports; and
- the provisions of Cost accounting records (Plantation products) Rules, 2002.

Audit methodology

2.4.5 The following mix of Audit methodology was adopted for achieving the audit objectives with reference to audit criteria of the performance review:

- Minutes and Agenda papers of meetings of the Board of Directors and those of its Sub-Committees;
- Certified Annual Accounts, Internal Audit Reports and Project Reports;
- Records relating to Plantation activities like raising of nurseries, plantation and their maintenance, felling *etc*.,
- Working Plan and guidelines issued by the Company and procedures adopted for extraction and sale of produce;
- Test check of vouchers; and,
- Issue of Audit enquiries and interaction with the Management.

[77] **Pressure on environment.**

Audit findings

2.4.6 Audit findings arising from the performance review were reported (May 2007) to the Government/Management and were discussed in the meeting (12 July 2007) of Audit Review Committee on Public Sector Enterprises (ARCPSE). The meeting was attended by the Secretary to the Government of Karnataka, Forest, Ecology and Environment Department and the MD of the Company. The views expressed by the representatives of the Government/Management and replies furnished (July 2007) by the Management have been taken into consideration while finalising the review.

The Company has not maintained/updated basic records[78] relating to raising of nurseries in Bangalore division and plantation, extraction and maintenance of pulpwood plantations in all the divisions (Bangalore, Shimoga, Chickamaglur and Dharwar). Audit findings discussed in succeeding paragraphs are based on information furnished by the Company/records made available to audit.

Non-reconciliation of land transferred by Forest Department

2.4.7 The Company held land to the extent of 86,640.63 Ha as per the latest ten year working plan for the period 1999-00 to 2008-09. The details of land held by various sectors (excluding rubber plantation)[79] are as follows:

Sector	Land held as per working plan (Ha)	Land surrendered/ transferred back to Forest Department (Ha)	Balance land with Company as at March 2006
Bangalore	22,425.23	3,693.00	18,732.23
Shimoga	64,215.40	29,425.43	34,789.97
Total	**86,640.63**	**33,118.43**	**53,522.20**

The Company has not reconciled the land available/transferred to it from Forest Department and handed over back to Government.

The above table shows that out of 86,640.63 Ha land available with the Company as per working plan 1999 to 2009, the Company handed over/transferred back 33,118.43 Ha land to the Forest Department (2003-06) as the raising of plantations was not economical on this land. The balance land available with the Company as on 31 March 2006 was thus 53,522.20 Ha. It was, however, noticed that as per annual accounts for the year ending 31 March 2006, the land held by the Company was 50,161.29 Ha. There was, thus, a difference of 3,360.91 Ha between the land as per working plan and as shown in the annual accounts. The Company had neither reconciled the difference and nor the reasons for the difference were available in the Company's records. Besides, information in respect of expenditure incurred on the surrendered land was not available.

The Management stated (July 2007) that transfers of land between Company and Forest Department was a regular feature and as such reconciliation was an ongoing process and cannot be taken as final at any point of time. The reply is

[78] plantation journals, extraction registers, register indicating the details of plantations expenditure *vis-à-vis* sanctions, nursery register, sanction order register.

[79] the rubber plantation held by the Company (Mangalore sector) is 4,443.32 Ha.

not acceptable as the Company should have information of land held by it at any particular time.

Financial performance of Pulpwood division

2.4.8 The financial performance of Pulpwood division as furnished (January/ July 2007) by the Company for the five years ended 31 March 2007 is given below:

Year	Total revenue	Total expenditure	Loss	Cumulative loss
	(Rs. in crore)			
2002-03	7.59	9.82	2.23	11.44
2003-04	4.13	7.27	3.14	14.58
2004-05	8.24	20.49	12.25	26.83
2005-06	10.16	15.56	5.40	32.23
2006-07	8.59	11.28	2.69	34.92

The Company, in none of the years during last five years ended 31 March 2007 earned profit from its Pulpwood activities and the accumulated loss was Rs.34.92 crore. The Company had not been analysing plantation-wise profitability of its operations and remedial action taken to increase profitability.

The Management accepted (July 2007) the audit observation and agreed in the ARCPSE meeting (July 2007) to study the system of segment-wise/ plantation-wise accounting prevalent in Mysore Paper Mills Limited (another Government Company engaged in plantation activities) and make efforts to adopt the same.

The Company raised 4,114 Ha of Pulpwood plantations during 1995 to 1999 in Bangalore, Chickamaglur, Dharwar and Shimoga divisions under "Pulpwood project 1995-97", "Acacia project 1998-99" and "Pulpwood project 1999". Audit scrutiny revealed that in respect of following plantations there was a shortfall in revenue of Rs.4.13 crore compared to the revenue anticipated as per Project report.

Division/Plantation	Year	Area (Ha)	Expen-diture	Revenue		Shortfall
				as per DPR	actual	
			Rs. in lakh			
Chickamaglur						
Bisilemane	1997	60.50	16.37	62.92	1.34	61.58
Ganidal	1998	25.50	6.62	33.25	2.96	30.29
Kanagalsara	1999	54.00	17.80	61.00	13.97	47.03
Shimoga						
Muddinakoppa	1996	100.00	30.08	104.00	13.67	90.33
Bharathipura	1996	55.00	12.55	57.20	10.99	46.21
Mrugavadhe	1996	50.00	10.51	52.00	8.27	43.73
Dhanasale	1996	34.00	7.89	35.36	3.26	32.10
Guddinakoppa	1997	75.00	21.75	78.00	16.07	61.93
Total		454.00	123.57	483.73	70.53	413.20

Reasons for loss were not on record.

The Management stated (July 2007) that the plantation in the above regions were found to suffer from die back (drying from top), pathogen attack and fire damage. The Management further stated that there was plantation available for extraction in part of the land and that all the above projects except for Muddinakoppa and Dhanasale would turn to be profitable in the future.

The reply is not acceptable, as the shortfall of Rs.4.13 crore has been worked out after considering the actual revenue from the harvested plantations and also yield expected from the plantation pending[80] to be extracted. Further, as compared to expenditure incurred on these plantations, there was a loss of Rs.53.04 lakh.

Unrealistic project report

2.4.9 The Company has been preparing project reports for implementation of various projects. The Company had taken up Urban Fuel Wood project for Bangalore City and Small Timber and Fuel Wood project for Kolar during 1994-97 and the Internal Rate of Return (IRR) projected were 10.14 *per cent* and 11.50 *per cent* respectively. The IRR's of these projects were not achieved as the actual revenue realised was far less than projected revenue.

Further, the Company under took projects during 2001 to 2004. The projected IRR in respect of the test check cases is given below:

Project	Project Area (Ha)	Total cost (Rs. in lakh)	Yield assumed (tonne/Ha)	Selling rate assumed (Rs. Per tonne)	IRR of the Project (*per cent*)
Pulpwood project (2001) Project for raising pulpwood plantation of high yielding species in Shimoga/ Chickamaglur/Dharwad Division.	300	62.85	80	821	18.65
Pulpwood project (2001) Project for raising pulpwood plantation in Bangalore Division during 2001.	100	10.85	35	821	16.75
Pulpwood project (2004) Pulpwood plantation project – Shimoga sector during 2004.	800	223.14	Aca Hy- 100 Aca Spi- 60 Eucalyptus- 80 Euc Com- 40	1,250	19.65
Pulpwood project (2004) Project for raising clonal pulpwood plantation during 2004-Bangalore Division	393	70.41	Under veg propagation- 50 Seed origin- 30	1,250	19.99

[80] **expected yield from balance Kanagalasara plantation was 1,700 MT; balance eucalyptus plantation for second/third cut in the above lands was only 29.5 Ha.**

It was observed in audit that:

- the projected IRR varied from 16.75 to 19.99 *per ce*nt even though the IRR of earlier projects were lower (10.14 / 11.50 *per cent*) and that too was not achieved (as projects were under loss as discussed in paragraph 2.4.12 and 2.4.13).

- Compared to a project (Girishringa- acacia), which had the highest yield of 61 tonne per hectare, the average return on investment was 'Nil' (at 8 *per cent* compound interest).

Thus, IRR ranging from 16.75 *per cent* to 19.99 *per cent* envisaged in the project reports during 2001 to 2004 were not realistic.

In this connection, it is pertinent to mention that during the Board meeting (August 1993) one of the Directors stated that in almost all projects, the IRR had been arrived at projecting higher yield as well as assuming the selling price on the higher side as compared to the actual yield and selling price fetched by the Company. He further opined that the projects were cleared for the purpose of seeking the approval of Banks/NABARD/Government.

The Management stated (July 2007) that seedlings of earlier projects upto 2003 were of 'seed origin' and its genetic makeup was not known. Further, it was stated that from 2004 onwards clonal (genetic-high yielding varieties) of plantations were being raised and as such, the high IRR was achievable in future.

The reply of the management that earlier projects were based on seed origin and its yield was not predictable confirms to the audit observation.

Physical performance

Shortfall in target area for raising pulpwood plantation

2.4.10 As per the Working Plan approved (2000-01 and revised approved in 2005-06) by the GOI the targeted areas for third cut in the case of eucalyptus and first cut in the case of acacia would form the target for replanting in the immediate next year of such cut/harvest made. The table below indicates the annual replanting target fixed for plantation of pulpwood by the Company and the plantations raised against them during the period 2002-07.

Year	Targeted area	Area planted	Shortfall
	in Ha		
2002-03	4,041.08	0.00	4,041.08
2003-04	3,054.15	5.00	3,049.15
2004-05	1,901.56	1,194.90	706.66
2005-06	3,799.89	1,651.88	2,148.01
2006-07	3,318.71	1,611.94	1,706.77
	16,115.39	**4,463.72**	**11,651.67**

The replantation was done in 4,464 Ha as against the target area of 16,115 Ha (28 *per cent*).

It was observed that the Company had identified the targeted area for replanting based on the annual target area in working plan, it had not fixed any physical target for actual replacement of plantations. The Company raised plantation in 4,464 Ha as against the target area of 16,115 Ha (28 *per cent* achievement). It was also noticed that the Company had not replanted during 2002-03 and 2003-04 due to financial constraints/austerity measures. The reasons for shortfall in respect of other years were not on record. Further, as per divisional records, the Company has plantations in an area of 30,142 Ha as against 48,472 Ha of land held as at 31 March 2007 representing 38 *per cent* of land without plantations. Non-replantation would hamper future yield.

The Management stated (July 2007) that due to paucity of funds, there was shortfall in replantation. Further, the Management stated that in some of the areas, eucalyptus plants had good coppice[81] growth even after their third cut and thus were not replanted.

The reply is not tenable as the details of areas not replanted due to good coppice growth (after third cut) were not made available to audit and also this fact was not considered in the working plan for replantation. By not achieving the replantation target, the Company is not only foregoing future revenue but also contributing to environmental degradation.

Extraction of Pulpwood – Shortfall in Potential Revenue

2.4.11 The Company identified 27,999 Ha of plantations raised by it due for extraction during the period 2002-03 to 2006-07 as per its Annual working plan for the period 1999-2000 to 2008-09. The division wise extraction performance of the Company during the period 2002-03 to 2006-07 is given below.

Name of the Division		Area due for extraction (Ha)	Area extracted (Ha)	Total yield obtained (tonne)	Yield per hectare (tonne)			Work in progress (as on Mar-07) Ha	Extraction not done (Ha)
					Lowest	Highest	Average		
First cut									
Shimoga	Eucalyptus	358	229	4,544	18.00	24.00	19.84	19	110
	Acacia	1,112	1,000	60,649	19.10	103.00	60.65	112	-
Chickmagalur	Eucalyptus	454	280	4,489	3.30	111.41	16.03	174	-
	Acacia	182	122	6,836	6.62	106.73	56.03	60	-
Bangalore	Eucalyptus	3,357	3,151	38,858	1.15	39.41	12.33	98	108
	Acacia and Casuarina	921	738	9,338	0.41	38.95	12.65	12	171
Dharwad	Eucalyptus	201	184	4,643	10.36	44.87	25.23	17	-
	Acacia	691	686	31,029	9.88	100.28	45.23	5	-
Second cut									
Shimoga	Eucalyptus	2,353	858	5,078	1.28	25.10	5.92	-	1,495
Chickmagalur	Eucalyptus	3,605	2,844	31,130	2.88	35.30	10.94	-	761
Bangalore	Eucalyptus	1,796	1,796	17,457	0.63	35.64	9.72	-	-
Dharwad	Eucalyptus	2,296	1,187	2,647	0.78	12.13	2.23	-	1,109

[81] **wood sprouts from cut stumps.**

Name of the Division		Area due for extrac-tion (Ha)	Area extrac-ted (Ha)	Total yield obtained (tonne)	Yield per hectare (tonne)			Work in progress (as on Mar-07) Ha	Extraction not done (Ha)
					Low-est	High-est	Aver-age		
Third cut									
Shimoga	Eucalyptus	3,058	694	5,287	2.44	18.86	7.62		2,364
Chickmagalur	Eucalyptus	625	392	4,562	0.36	19.67	11.64	202	31
Bangalore	Eucalyptus	5,220	3,819	20,009	0.47	19.34	5.24	199	1,202
Dharwad	Eucalyptus	1,770	978	3,125	0.21	8.65	3.19		792
		27,999	**18,958**	**2,49,681**				**898**	**8,143**

It was observed that:

- the anticipated yield of eucalyptus wood was 25 to 50 tonne per hectare for first extraction and 20 tonne per hectare in the second extraction in respect of plantation raised prior to 1993. As per the project report, the anticipated yield of plantations raised during 1994 to 1997 was 40 tonne, 30 tonne and 25 tonne for the first, second and third cut rotation respectively. The average per hectare yield obtained, however was lower and ranged from 12.33 to 25.23 tonne in the first cut, 2.23 to 10.94 tonne in the second cut and 3.19 to 11.64 tonne in the third cut.

- the anticipated yield as per the project report in the case of acacia and casuarina was 80 tonne per hectare. The average yield obtained, however, ranged from 12.65 to 60.65 tonne per hectare.

- out of 27,999 Ha, as on March 2007, the Company extracted 18,958 Ha of plantations in full. An area of 110 Ha of plantations (Basavapur 20 Ha and Hanumapura 90 Ha) was not extracted as it was handed over to the State Government as wild life area. The plantations to the extent of 8,033 Ha were not extracted due to poor density of pulpwood trees and existence of natural growth of jungle plants. The extraction work is in progress in the balance area of 898 Ha.

- considering the lowest anticipated yield of 25 tonne per hectare, the yield deficit in respect of first and second cut harvested during the last five years ended 31 March 2007, worked out to 1,20,954 tonne with a shortfall in potential revenue of Rs.9.68 crore. On the same analogy, the potential revenue loss for not extracting 3,473 Ha of plantations due to poor growth, which were due for first and second cut during 2002-03 to 2006-07 worked out to Rs.5.60 crore.

It was further observed that out of 8,143 Ha not extracted, 4,572 Ha in Shimoga Division were proposed to be transferred to the State Government without considering for harvest as these were not economically viable. The details of actual transfer/proposed to be transferred were not available on record.

The Management stated (July 2007) that the balance plantation was not extracted as there was poor density of pulpwood trees and high density of natural growth. The Management while accepting the shortfall in yield in many areas, further stated that these were due to poor soil, poor rainfall and other natural calamities. The reply is not acceptable as these factors were not unknown to Company and Annual Working Plan should have been prepared considering these factors.

Miscellaneous activities

Urban Fuel Wood Project for Bangalore city

2.4.12 The Company approved (January 1993) a Project for Urban Fuel Wood Project for Bangalore city. The main objective of the project was to sell the produce as poles and fuel wood. The State Government approved (April 1994) the project proposal of the Company. As per the Project Report, the total area to be planted was 2,400 Ha at the rate of 800 Ha per year from 1993-94. The total cost of the project was Rs.5.68 crore which was to be financed by grants from National Waste Land Development Board (NWDB) (Rs.64.14 lakh), investment by the State Government (Rs.2.18 crore) and loan from Banks (Rs.2.86 crore). The total revenue expected[82] to be realised from sale of poles and wood was Rs.9.02 crore (internal rate of return 10.14 *per cent).*

The Company, during the years 1994-97, raised plantations in 2,359.76 Ha, eucalyptus in 1,940.29 Ha, acacia in 183.86 Ha and casuarina plants in 235.61 Ha of land. The first cut of the plantations was expected in 2002-03/ 2003-04. The total cost incurred towards plantation and maintenance was Rs.3.94 crore. In addition, Rs.3.02 crore was paid as interest charges on the loan of Rs.2.86 crore availed from banks. Hence, the total cost incurred on the project was Rs.6.96 crore as on August 2007.

It was observed that:

In the Urban Fuel Wood project the Company deviated from its intended objective of providing the produce as poles and fuel wood deprived the area of social benefit as poles and fuel wood was not made available to local people. Loss of revenue of Rs.4.28 crore was incurred on the project.

- Between 2003-04 and 2006-07 the Company harvested 2,273.33 Ha of the above plantations and realised a total quantity of 27,830 tonne (23,323 tonne of eucalyptus 3,966 tonne of acacia and 541 tonne of casuarina). The cut produce was sold[83] as pulpwood and revenue of Rs.1.87 crore[84] was realised. Thus, selling the produce as pulpwood instead of poles and fuel wood defeated the very objective of the project. Justification for the deviation in usage of wood was not on record.

- Out of 2,359.76 Ha, only 2,273.33 Ha was harvested. In the balance area, there was no yield due to failed plantations (72.35 Ha), illicit felling (8 Ha) and dispute (6.08 Ha). The proportionate revenue

[82] the expected yield and revenue per Ha from sale of fuel wood was in the form of poles – 600 poles/Ha at selling rate of Rs.40 per pole and in the form of fuel wood – 16 tonne per Ha at Rs.850/tonne.

[83] to Harihara Polifibres Limited and Mysore Paper Mills Limited.

[84] 24,950 tonne at Rs.660/tonne and 2,579 tonne at Rs.800/tonne.

expected from the plantation harvested was Rs.8.54 crore (based on project report estimations). Against this, the Company realised revenue of Rs.1.87 crore only. Compared to the investment of Rs.6.96 crore (proportionate cost for 2,353.68 Ha) on the project, operation of the project resulted in a loss of Rs.4.28 crore (considering the revenue of Rs.0.81 crore[85] in second and third cuts).

- The projection was made in numbers of poles per Ha and fuel wood in tonne per Ha. Since Company sold entire produce as pulpwood, the projected yield per Ha could not be ascertained/compared.

- NWDB, while approving (April 1992) the grant of Rs.64.14 lakh in seven installments had, *inter alia*, stipulated that the Company had to furnish satisfactory quarterly physical and financial progress reports alongwith funds utilisation certificate. The Company had received (1992) the first installment of Rs.9.76 lakh. As the Company failed to submit the periodic progress reports/utilisation certificate, NWDB did not release the balance grant of Rs.54.38 lakh**.**

Thus, deviation of the project from its intended objective of providing the produce as poles and fuel wood has not only resulted in loss of revenue, but also deprived the area of the social benefit, as poles and fuel wood was not made available to local people and the Company failed to avail the grant of Rs.54.38 lakh.

The Management stated (July 2007) that the reasons for deviation from its intended objective was not immediately forthcoming from the records of the Company. The Management further stated (July 2007) in the ARCPSE meeting that the girth of the plants was not achieved (in the eighth year) as there was drought during 2001-04 and due to disease to the casuarina plants. Thus, due to non-uniformity in girth/height of plants and to maintain the balance rotation period (second/third cut) the crop was sold as pulpwood. The reply of the management is not tenable as no records in support of the justification were made available to audit.

Small Timber and Fuel Wood Project

2.4.13 The BoD approved (September 1991)the Project for providing Small Timber and Fuel Wood in Kolar District (under Bangalore division). The Company prepared (July 1993) a Project Report. As per the Project Report, the total area to be planted was 2,500 Ha at 500 Ha per year for five years with a total outlay of Rs.4.96 crore. The project was to be financed by grant from NWDB (Rs.50 lakh), financial assistance from the State Government (Rs.1.28 crore), loan from Banks (Rs.2.50 crore) and income from the project (Rs.68 lakh). NABARD approved (March 1994) the project over an area of 1,500 Ha for Rs.1.42 crore. (Promoter equity: Rs.65.58 lakh; Bank loan: Rs.76.75 lakh). One of the conditions of NABARD while sanctioning the project was that the Company should ensure that only pest-resistant, fast

[85] Based on average yield of 12.02 tonne per Ha (23,323 tonne/1,940 Ha). The land available for second and third cuts was 1,674.41 Ha (after handing over 250 Ha land to Airport project of State Government). The anticipated revenue would be Rs.80.51 lakh (considering 50 *per cen*t yield) *i.e.*, 10,063 tonne * Rs.800 per tonne.

growing and drought resistant varieties were planted and the Company must adopt proper species mix and avoid mono culture. The State Government subsequently approved (April 1994) the project over an area of 1,000 Ha for Rs.1.42 crore (Equity from State Government: Rs.35.58 lakh; Grant from NWDB Rs.15 lakh; Loan from banks; Rs.76.75 lakh and internal resources: Rs.15 lakh). The total revenue expected[86] to be realised as per project report from sale was Rs.4.61 crore (internal rate of return of 11.50 *per cent).*

The Company, during the years 1994-1997 raised plantations in 1,499 Ha with 1,093.90 Ha of eucalyptus, 336.50 Ha of acacia and 68.60 Ha of casuarina plants and first harvest was in 2002-03/2003-04. The total cost incurred on the project was Rs.3.30 crore (plantation and maintenance of Rs.2.50 crore; and interest of Rs.79.76 lakh).

It was observed that:

- Between 2002 and 2006 the Company harvested 1,278.40 Ha of the above plantation and the yield obtained was 15,124 tonne (consisting of 11,979 tonne of eucalyptus, 3,116 tonne of acacia and 29 tonne of casuarina). The cutting of (28 Ha) plantation was under progress (July 2007). The balance 192.60 Ha was not extracted as the plants had failed during initial plantation (1994-97) and the area was not replanted. The cut produce was sold as pulpwood and revenue of Rs.1.04 crore[87] was realised. The BoD had stipulated (September 1991) that the material (Small Timber and Fuel wood) obtained from the plantations should not be sold to industries and these materials should be sold to public through authorised depots in towns of Kolar District. These were, however, sold as pulpwood to industries**.** Reason for deviation was not on record**.**

The Company deviated from its intended objective of providing the produce to local people. Also the society was deprived of social benefits such as rural employment, encouragement to cottage industries and amelioration of the environment. Loss of revenue of Rs.1.71 crore was incurred on the project.

- Out of 1,499 Ha the produce was harvested in 1,278.40 Ha. The proportionate revenue expected to be realised was Rs.3.92 crore (based on project report estimations). As against this, the Company realised Rs.1.04 crore only. Even if 50 *per cent* of normal yield of first cut is considered for second and third cut, the additional revenue to be realised will be Rs.47.92 lakh. Compared to the investment of Rs.3.23 crore (proportionate cost for 1,471 Ha) the project had resulted in a loss of Rs.1.71 crore.

- The plantations raised in 41.10 Ha of acacia and 57.60 Ha of casuarina and 93.90 Ha of eucalyptus had not been harvested as the plants had failed. The reasons for failure were not analysed by the Company (August 2007).

[86] The expected yield per Ha at 5th (thinning)- 4 tonne per Ha for fuel wood; at 9th year harvesting – 28 tonne per Ha of fuel wood and 2.5 cubic tonne per Ha of Small timber at an expected selling rate of Rs.850 per tonne of fuel wood and Rs.1,400 per cubic metre of Small Timber.

[87] 12,269 tonne at Rs.660 per tonne and 2,854 tonne at Rs.800 per tonne

- Though NABARD had sanctioned (March 1994) the project for 1,500 Ha, the State Government approved (April 1994) the project for 1,000 Ha, the Company, however, raised plantation in 1,499 Ha during 1994 to 1997. The reason for deviation was not on record.

- The State Government contributed only Rs.25 lakh by way of share capital. The Company availed (1995-2001) Bank loan of Rs.76.74 lakh and paid interest charges of Rs.79.76 lakh. Further, the Company did not receive the grant of Rs.15 lakh from NWDB, the reasons for which were not on record.

It was observed that the main reason for loss was low yield. No analysis was made to take remedial action for improving the profitability. Besides, deviation of the project from its intended objective of providing the produce to local people. It has resulted in depriving of the society of the social benefits such as rural employment, encouragement to cottage industries and amelioration of the environment.

The Management stated (July 2007) that due to continuous drought situation the Company could sell the produce as pulpwood only. It further stated that the casuarina species was planted on an experimental basis in a smaller area as the environmental conditions in Kolar did not support such species and as such the plantation failed.

The reply is not acceptable as the Company should have planted fast growing and drought resistant varieties of species as per conditions stipulated by NABARD while sanctioning the project.

Non-reconciliation of seedlings utilised

2.4.14 The total requirement of seedlings as per project report including casualty replacement is detailed below:

Project	Net area (Ha)	Seedling required (per Ha)	Total seedling required (in lakh)
Urban fuel wood Project for Bangalore City (1994-97)	2,359.76	3,000	70.79
Small timber and fuel wood at Kolar (1994-97)	1,499.00	2,000	29.98
Total	**3,858.76**		**100.77**

On a check of field note books produced to audit, it was noticed that the divisions had raised 1.35 crore seedlings of different species. The Company did not furnish all the field note books and also the stock register of nurseries raised and utilisation of seedlings in Bangalore Division and hence the total seedling raised and utilised could not be verified in audit. Considering usage of seedlings as per the project report (100.77 lakh), the excess 34.23 lakh seedlings valued Rs.28.75 lakh (at Rs.0.84/seedling) remained unutilised. The division did not reconcile the nursery seedlings account for these projects. Details of usage of balance seedling was not available on record.

In the ARCPSE meeting, the Management stated (July 2007) that the reconciliation of seedlings was in progress and would be furnished.

Unfruitful expenditure due to raising of plantation in wild life areas

2.4.15 As per State Government notification (1974), certain areas (Hanumapura and Basavapura in Shimoga division), were classified as wild life areas and no timber operations[88] for exploitation of any forest produce of any kind could be done.

The Company raised (1995-97) teak plantation in 152 Ha of these areas under Shimoga Division by incurring Rs.41.80 lakh. As these plantations were falling under Bhadra wildlife sanctuary, the land was transferred (1998-99) to Karnataka Forest Department.

It was observed that despite of handing over the above plantation raised in wild life areas, the Company again raised (1997 to 2001) pulpwood, bamboo and teak plantations in 298.80 Ha in Hanumapura and Basavapura under Shimoga division by incurring an expenditure of Rs.62.60 lakh. These plantations were subsequently handed over (September 2004) to the Karnataka Forest Department rendering the investment unfruitful.

The Management stated (July 2007) that the Forest Department had transferred this land to the Company and the Company was allowed to plant, extract and replant in these areas. It further stated that after the Honorable Supreme Court's order (February 2000), raising of plantation in wild life areas was not continued and the Forest Department has been requested to reimburse the total investment made in wild life areas.

The reply is not tenable as the Management had not produced the relevant approval of the State Government for raising of plantation in these areas.

Tamarind Orchard Project

2.4.16 The BoD approved (April 1993) a pilot project for raising tamarind plantation on 25 Ha of land at Dalasanur State Forest, Kolar District at a total cost of Rs.29.47 lakh during the period from 1993-94 to 1999-2000. The project was to be implemented on an experimental basis so that a bigger project of raising tamarind plantations could be taken up depending on the success of the pilot project. The Company raised tamarind plantations under pilot project in 1993 on 50 Ha of land of Dalasanur village at a total cost of Rs.17.94 lakh against 25 Ha decided by the Board. Against DPR norm of 5,000 trees at 100 trees per Ha, 4,250 trees finally survived in Dalasanur pilot plantations as on 31 March 2006.

Going in for a full fledged project without waiting for the results of pilot project coupled with lack of proper maintenance rendered the Tamarind orchard project unviable.

Without waiting for the success or otherwise of the pilot project, the BoD approved (August 1993) the full scale tamarind plants project on 5,000 Ha of land with a financial outlay of Rs.43.28 crore. The Company proposed (July 1996) to NABARD for assistance of Rs.20.73 crore (for eight years

[88] **activity related to extraction of living wood from the forest for use as building materials.**

raising and maintenance for 5,000 Ha). NABARD, however, sanctioned (1996) the project for Rs.1.89 crore (three year raising and maintenance over an area of 1,270 Ha). The State Government approved (July 1998) the same *post facto*.

The Company raised (1996 and 1997) tamarind plantations on 410 Ha of land in Bangalore Division against the 1,270 Ha approved by Government/NABARD. No further plantation was carried out. The total amount spent on raising and maintenance of tamarind plantations raised under this project upto 2005-06 was Rs.1.73 crore (including interest of Rs.94.40 lakh).

In this connection it was observed that:

- As on 31 March 2006, against 41,000 trees planted in 410 Ha, 11,400 plants/trees had survived. The Company earned (2002-03 to 2005-06) revenue of Rs.0.07 lakh as against Rs.17.40 lakh anticipated in the project report. Further, the cost of trees existing as on 31 March 2006 represents only Rs.48.03 lakh against Rs.1.73 crore incurred on the project.

- The Company had carried out watering and other maintenance works for five years *i.e.,* upto 2001-02 from the year of plantation and 30,160 plants had survived during that period. At the end of March 2006, however, only 11,400 plants remained. The Company did not analyse the reasons for the death of plants in the interim period (2002 to 2006) even though the plants attained considerable growth to withstand adverse climatic conditions. It was, however, noticed that tamarind plants raised under pilot project (in Dalasanur village) had a survival rate of 85 *per cent* and watering, manuring and other cultural operation were carried out upto eighth year of plantation. Thus, had the Company taken preventive steps by way of carrying out the required culture operations, it could have at least avoided the death of 18,760 trees which survived upto the end of six years of plantation. By not doing so, the Company suffered a potential loss of Rs.79.16 lakh due to failure of plants in tamarind orchard plantation. The Company admitted (September 2005) to the State Government that there was 50 *per cent* diminution in the value of tamarind plantations.

- Further, it was noticed that plants grown on 15 Ha of land in Yeshwanthpur (approximate 1,500 trees) were destroyed by locals/villagers, which indicated that the failure of trees was due to biotic pressure and lack of watch and ward.

- In terms of project report, the tamarind trees were to start yielding from the eighth year and the expected yield was five kg per tree during first and second year and expected revenue was Rs.25 per tree. The basis for determining the yield and selling rate were, however, not on record. At the time of initiating (1996) the tamarind project, the Company had about 19,000 old tamarind trees in the plantation transferred by the State Government. The sale proceeds details of

tamarind yield from these trees during the period prior to 1995 were not made available to audit to compare the same with the yield and revenue projected in the project report.

Thus, going in for a full fledged project without waiting for the results of pilot project coupled with lack of proper maintenance rendered the project unviable.

The Management stated (July 2007) that during 2001-04 there was severe drought in Kolar in which 17,085 seedlings died. During this period the Company faced severe financial crisis and as such cultural operations were not carried out. It further stated that the existing trees had a life span of over 100 years and the future yield would cover the investment cost.

The reply is not tenable as there was no mention of drought and its effect on plantation in the plantation registers. Further, details of taking up the matter with the State Government for making available funds for cultural operations were not made available to audit.

Internal control

2.4.17 Internal Control System is an essential management tool. An efficient and effective Internal Control System helps the management to achieve the objectives laid down. The following deficiencies in the internal control system in the Company were noticed.

- Though the Company was established in January 1971, it has not prepared Accounts Manual till date.
- The Company has also not prescribed/maintained the list of records to be maintained by the Head Office/Divisions in respect of raising of nurseries, utilisation of seedlings, raising of plantations with details of plantation wise and activity wise expenditure.
- Sales registers showing details of quantity sold to various agencies/Company's, revenue realised were also not maintained. In the absence of basic records for all the activities, audit could not ensure the correctness of the information furnished.
- The Company has not developed an adequate Management Information System (MIS) to apprise the top management regarding status of various activities of the Company, *viz.*, utilsation of land leased by Forest Department, raising of nurseries, plantation activities of different divisions *etc*.
- Progress reports on quantity of Pulpwood extracted and sold by the divisions, revenue realised were not maintained properly.
- The Company had also not brought to the notice of the Board the extent of failed plantations and low yield.
- Cost records have not been maintained by the Company as prescribed under sub-section (1) of Section 642, read with clause 'd' of Sub-section(1) of Section 209 of the Companies Act, 1956 in respect of

Commercial Plantation products including seeds thereof with effect from October 2002.

- As per section 292 A of the Companies (Amendment) Act 2000, every Public Company having paid up capital of not less than five crores of rupees shall constitute an 'Audit Committee'. The Company, however, has not constituted the Audit Committee so far.

The Management stated that it was maintaining records as required under the Companies Act and following the prescribed Accounting Standards. Further, though accounting manual was not available, it had prepared manual for maintaining records at head office/divisions. The Management stated that Audit Committee was not constituted as it was a Private Limited Company and Section 292A of the Companies Act was not applicable to it.

The reply is not tenable as the Company is not maintaining basic records as stated in paragraph 2.4.6. The Company was also not maintaining cost records in the prescribed format as per Cost accounting records (Plantation products) Rules, 2002. Further, the manual for maintaining records at head office/divisions was not produced to audit. The reply with regard to constitution of Audit committee is not tenable as the Company was incorporated as a '*Limited*' Company and had equity capital of more than rupees five crore; as such constitution of Audit Committee was mandatory.

Acknowledgement

Audit acknowledges the co-operation and assistance extended by the staff and the Management of the Company at various stages of conducting the performance review.

Conclusion

The Company has not reconciled the records relating to land available/transferred to it from Forest Department and handed over back to Government. The diversion from its intended objective of providing fuel wood and poles to cater to needs of local people under Urban Fuel Wood for Bangalore City and Small Timber and Fuel Wood for Kolar deprived the social benefits such as rural employment, encouragement of cottage industries and increased the biotic pressure on forests. The projects have also resulted in loss of revenue due to low yield. The Government and National Wasteland Development Board had not kept up their financial commitments for the projects. The re-plantation of land was achieved only in 28 *per cent* of identified area mainly due to financial constraints. In respect of Tamarind Orchard project, the full project was taken up without awaiting the results of pilot project. Non-maintenance of plants and increased biotic pressure resulted in high casualty in tamarind trees. New projects were undertaken by projecting unrealistic internal rate of returns. The non-maintenance of basic records, cost records and poor MIS affected the internal control and decision making process in the Company. Internal Control System was also very weak.

Recommendations

The Company needs to:

- **re-orient and streamline its planning process to achieve the objectives envisaged in the Project Report of plantations thereby reducing biotic pressure on environment;**
- **improve the performance of plantation, minimise the failure of seedlings plants, introduce continuous watch and ward to monitor the plantations for taking timely remedial action;**
- **develop a long term strategy to maximise land utilisation through replantation; and**
- **strengthen the Internal Control System and introduce effective Management Information System.**
- **ensure all lands in its control are under plantation.**