Chapter - II

2. Performance Audits relating to Government Companies

2.1 Performance Audit on 'Construction and performance of Bellary Thermal Power Station of Karnataka Power Corporation Limited'.

Executive Summary

The Company

The Karnataka Power Corporation Limited was incorporated (July 1970) as a wholly owned State Government company under the Companies Act, 1956, with the main objective of planning, promoting and organizing development of power including construction, generation and maintenance of power stations in Karnataka State.

As part of mitigating the power deficit, the Company commissioned two units at BTPS having a combined capacity of 1,000 MW; 500 MW each in March 2009 (Unit I) and February 2013 (Unit II).

Audit objectives

The performance audit was conducted to examine and analyze the deficiencies in planning and execution of Unit II and the reasons for failure to achieve targeted generation and operational efficiency in respect of Unit I; verify, examine and analyze the cost of operations with a view to study the reasons for the losses incurred; and assess whether BTPS has been able to achieve environmental and pollution control norms.

Audit findings

Mega Power Project

The Mega Power Project (1,000 MW and above) Policy of GoI envisaged benefits such as exemption of customs duty, tax holiday *etc*., to bring down power tariffs.

Though the Board and the Technical Committee of the Company had favoured implementing Unit II simultaneously with Unit I with a combined capacity of 1,000 MW, considering the expected benefits of substantial savings in project cost by ₹ 1,257 crore, the Company dropped the idea of implementation of both the units simultaneously due to the reason that this would delay the commissioning of Unit I. This has resulted in additional burden on consumers by ₹ 1,257 crore.

Non-availment of concessions under the Infrastructure policy

Notification about implementation of Infrastructure Policy of the GoK was announced in May 2009, which envisaged that power generation projects were exempt from payment of entry tax.

As the Company was late in getting exemption certificate from the GoK, the entry tax of ₹ 27.31 crore including avoidable tax of ₹ 5.88 crore considered in the project cost of Unit I and Unit II stands recovered through tariff, which is an additional burden on the consumers.

Coal supply

In the absence of coal supply arrangement from KECML for Unit II, the Company was forced to procure coal from other sources at higher rates than the rates at which coal was supplied by KECML. This resulted in additional expenditure of ₹ 377.95 crore.

Slippage of project schedule

The works of Unit II were completed with delay of 27 months from the scheduled date of completion due to delay in completion of certain critical works. The Company suffered loss of potential revenue amounting to ₹ 1,391.33 crore during the delayed period of completion.

The State had procured energy from private sources at higher rates to mitigate the shortfall imposing an additional burden of ₹ 1,518.69 crore during delayed period of 2010-13.

The actual expenditure capitalised included interest amounting to ₹ 178.70 crore paid on loan for the delayed completion period, which would ultimately be passed on to the consumers.

Failure to invoke contractual provisions

Award of contract without proper survey resulted in extra financial implications and delay in completion of works. The Company failed to levy penalty of ₹ 5.42 crore on the contractors for the delay in completion of works of Stage I and Stage II of raw water pond.

Underutilization of capacity

The capacity utilization of Unit I had continuously decreased over the years from 84.67 *per cent* in 2009-10 to 80.86 *per cent* in 2013-14 due to the fact that the components of the plant, such as boiler, cooling tower *etc*., were not functioning at the optimum levels. The loss due to underutilization of capacity amounted to ₹ 102.28 crore.

Increased Station Heat Rate

The Station Heat Rate was much above the normative SHR of 2,450 kcal/kWh prescribed by CERC/PPA; the actual SHR ranged between 2,808 kcal/kWh and 3,093 kcal/kWh. The loss on account of increased station heat rate was ₹ 239.14 crore during 2009-13.

Debt-equity mix

The Company raised bills on ESCOMs considering debt-equity mix of 80:20 contemplated in the DPR instead of actual fund mix resulting in net excess recovery of ₹ 45.31 crore, which was an additional burden on the consumers during 2009-14. This would continue to burden the consumers by ₹ 181.24 crore during the remaining period of the PPA.

Non-compliance with the norms of Ministry of Environment and Forest

BTPS achieved fly ash utilization of only 45 *per cent* by March 2014 against 100 *per cent* prescribed by MoEF, as arrangements for evacuation of fly ash were not properly managed.

Our conclusions and recommendations are given at the end of the Performance Audit Report.

Introduction

2.1.1. The Karnataka Power Corporation Limited (Company) was incorporated (July 1970) as a wholly owned State Government company under the Companies Act, 1956, with the main objective of planning, promoting and organizing development of power including construction, generation and maintenance of power stations in Karnataka State.

With rapid industrialization, successful rural electrification and large scale use of electricity for irrigation purpose, the demand for electricity registered a steep increase in the Southern Region, particularly in Karnataka. The Sixteenth Electric Power Survey of India (2001-02) projected an increase in power deficit in the State from 702 MW in 2001-02 to 1,381 MW in 2005-06 and increase in the base energy deficit from 1,711 million kilowatt hour (kWh) in the year 2001-02 to 3,872 million kWh in 2005-06.

In order to meet the deficit of power, the Company proposed (December 2001) to set up a thermal power station at Bellary with a capacity addition of 1,000 MW (2x 500 MW), which was approved (January 2002/June 2002) by the Government of Karnataka. The Company commissioned two units at Bellary (Bellary Thermal Power Station-BTPS) having a combined capacity of 1,000 MW (2 x 500 MW) in March 2009 (Unit I) and February 2013 (Unit II).

The Management of the Company is vested with the Board of Directors (Board). The Chief Minister of the State is the ex-officio Chairman of the Board. As at the end of March 2014, there were 11 members on the Board including the Chairman. The Managing Director is the Chief Executive of the Company. The Executive Director, BTPS, assisted by four Chief Engineers and two Deputy General Managers, is responsible for the day-to-day operations and maintenance.

Audit Objectives

2.1.2. The objectives of the performance audit are to

- examine and analyse the deficiencies in planning and execution of Unit II and the reasons for failure to achieve targeted generation and operational efficiency in respect of Unit I;
- verify, examine and analyse the cost of operations with a view to study the reasons for losses incurred; and
- assess whether BTPS has been able to achieve environmental/pollution control norms.

Scope of Audit

2.1.3. The Performance Audit on the working of the Company was included in the Audit Report (Commercial), Government of Karnataka (GoK), of the Comptroller and Auditor General of India for the year ended 31 March 2010.

The Report covered the planning, award and execution of works relating to Unit I of BTPS and its performance up to March 2010.

Further, a Compliance Audit Paragraph on 'Mining in captive coal blocks' allocated for BTPS was included in the Audit Report on Public Sector Undertakings, GoK, of the Comptroller and Auditor General of India for the year ended 31 March 2013.

The Committee on Public Undertakings is yet to discuss the Performance Audit Report and the Compliance Audit Paragraph (October 2014).

The present Performance Audit deals with planning and execution of works relating to Unit II, operational performance of Unit I, and environmental issues relating to Unit I and Unit II during the period April 2009 to March 2014.

The works relating to each of the Units were bifurcated into (i) Engineering, Procurement and Construction (EPC) contracts, consisting of supply and service portion[18] of the Unit and (ii) Non-EPC contracts, which were ancillary to the working of the Units, which mainly included construction of Raw Water Pond, Ash Pond, Railway siding and laying of water supply pipeline to the Units.

While the EPC contracts for Unit II were through a Memorandum of Understanding (September 2007) with M/s.Bharat Heavy Electricals Limited (BHEL) based on the terms of contract concluded for Unit I, the non-EPC contracts of Unit I and Unit II were awarded to other agencies through tendering process.

Audit reviewed the EPC contracts for Unit II valued at ₹ 1,680 crore and Non-EPC contracts related to Unit I and Unit II using sampling technique. Out of 108 non-EPC contracts having contract value of ₹ 344.83 crore, audit selected[19] 52 works with contract value of ₹ 335.33 crore for review.

Audit Methodology

2.1.4. The methodology adopted for attaining the audit objectives involved explaining audit objectives to the top management, scrutiny of records at Head office and Units, analysis of data with reference to audit criteria and issue of audit observations. Besides, information available on the official websites of the Central Electricity Authority (CEA), Electricity Regulatory Commission (ERC) and Ministry of Power (MoP) were utilized.

[18] Supply included design, engineering, procurement, manufacturing, inspection & testing of all electrical & mechanical equipment / systems and design & engineering of civil works. Service included transportation, erection and testing, commissioning and other works till handing over of the unit.

[19] 21 works having the contract value of above ₹ 50 lakh each aggregating to ₹ 327.79 crore (100 *per cent* selection); 31 works with contract value of less than ₹ 50 lakh each totaling ₹ 7.54 crore (using simple random sampling).

We explained the objectives of the performance audit to the Government and to the Management of the Company during an 'Entry Conference' held in April 2014. The draft Performance Audit Report was issued to the Government in September 2014. The Exit Conference was held in November 2014 wherein the audit findings were discussed with the Government represented by the Additional Chief Secretary to the GoK, Energy Department and the Managing Director of the Company.

Audit Criteria

2.1.5. The following criteria were adopted for the achievement of audit objectives.

- Guidelines/norms/orders of Central Electricity Regulatory Commission (CERC), CEA, Karnataka Electricity Regulatory Commission (KERC) and Southern Regional Power Committee (SRPC), and instructions of the MoP, Government of India (GoI) and GoK;

- Detailed Project Reports (DPR), Feasibility Reports, Design specifications, Project implementation schedule, Power Purchase Agreements (PPA);

- The Karnataka Transparency in Public Procurements (KTPP) Act, 1999, Guidelines of the Central Vigilance Commission (CVC), tender documents, agreements;

- Internal targets of the Company, manuals/ guidelines of the Company, national averages on operational performance of thermal stations as published by CEA and CERC;

- Environmental norms fixed by the Central Pollution Control Board (CPCB) and Karnataka State Pollution Control Board (KPSCB).

Audit Findings

2.1.6. The audit findings are discussed in the succeeding paragraphs. The views of the Government have been considered while finalizing the Performance Audit Report.

Planning

2.1.7. The planning process plays a vital role in implementation of the Project. It involves setting up of milestones for each stage of implementation, project deliverables, identification of resources and their optimum utilisation, anticipation of potential delays and remedies so as to attain the project objectives. We observed the following shortfalls in planning.

Mega Power Project

2.1.7.1. GoI introduced (November 1995) the Mega Power Project (MPP) Policy aimed at improving the overall power supply scenario in the country by

setting up power plants having a capacity of 1,000 MW or more. The policy envisaged certain benefit for MPPs such as exemption of customs duty for these projects, tax holiday for any block of ten years within the first fifteen years and exemption of sales tax and other local levies so that these concessions would bring down tariffs to provide much needed relief to State Electricity Utilities, both in the public and private sector. As per the policy, projects of capacity of 1,000 MW and more and catering to more than one State would fall under the category of Mega Power Projects.

- GoK accorded (January 2002/June 2002) approval for setting up of coal based thermal plant units of 500 MW each at Bellary. The total cost of the project (Unit I and Unit II) was estimated at ₹ 4,191.75 crore[20]. As the implementation of both the units simultaneously would entail mega power project status for BTPS, the Board decided (October 2003) to explore the possibility of obtaining MPP status. The Board further noted (April 2004) that other States had expressed their willingness to take power from Unit II of BTPS at the meeting of the Southern Regional Electricity Board (SREB) and subsequently approved (December 2004) to sell a part of the power from BTPS to other States, through Power Trading Corporation (PTC).

- The Technical Committee of the Company discussed (February 2004/ July 2004) the benefits that would accrue to the project and consumers at large through competitive tariff if BTPS got the MPP status and estimated the savings of ₹ 133 crore in the cost of the project and ₹ 1,124 crore by way of reduction in tariff for a period of 25 years. The Committee noted (April 2004) that creation of common infrastructure facilities would economise the cost, reduce implementation time and ease construction and maintenance.

We observed that

- the Department of Energy, GoK, addressed (October 2004) a letter to Central Electricity Authority (CEA) seeking MPP status for BTPS, without insisting on the condition of inter-state sale of power. CEA turned (November 2004) down the request of GoK stating that BTPS did not meet the criteria of MPP as the power from Unit II was allotted to Karnataka Power Transmission Corporation Limited (KPTCL).

- GoK had sought the exemption without making efforts for meeting the eligibility conditions of the MPP policy. Further, when other States were willing to buy power from Unit II, seeking exemption from the condition of inter-state sale of power did not have rationale.

- the Board and the Technical Committee of the Company had favoured implementing Unit II simultaneously with Unit I, considering the expected benefits of substantial savings in project cost and consequent reduction in tariff. The Company, however, dropped the idea of

[20] Unit I - ₹ 2,230.75 crore; Unit II - ₹ 1,961 crore.

implementation of both the units simultaneously stating that this would delay the commissioning of Unit I.

- the Company had neither completed the Unit I on schedule which was delayed by 15 months nor utilised the opportunity of economizing on the project cost and reduction in tariff.

The Government stated (November 2014) that it would be difficult for the State to agree to sell the power outside the State when the State had a power crisis. The Company further stated that its financial health did not support the concept of undertaking the projects on a bigger scale.

The reply is not tenable, as there was under-utilisation of available capacity of BTPS, as indicated in subsequent paragraph 2.1.11.3, and this power if generated could have been sold outside the state. The financial constraint of the Company was never discussed in any forum and the Government could have considered provision of finances in view of future benefits accruing to the consumers.

Hence, the expected savings of ₹ 1,257 crore could not benefit the consumers as the Company did not pursue the issue to its logical end.

Non-availment of concessions under the Infrastructure policy

2.1.7.2. The Infrastructure Policy (Policy) of the GoK envisaged (July 2007) that the power generation projects were exempt from payment of entry tax for capital goods and materials used in construction, for a period of three years from the date of commencement or till the date of completion of the project, whichever was earlier. The exemption was available for machinery, equipment and construction material used for the project.

In continuation to the Policy, the GoK issued (May 2009) a notification implementing the policy decision and requiring the project implementing agency to obtain certificate from the Secretary, Infrastructure Development, to the effect that the project taken up was recognized in terms of the policy.

We observed that

- though the policy implementation was announced in May 2009 itself, the Company approached GoK in October 2010, after a delay of one and half years, seeking exemption from payment of entry tax for Unit I and Unit II of BTPS. The GoK, after seeking (December 2010) certain clarifications from the Company, certified (July 2011) Unit I and Unit II as infrastructure projects under the policy and allowed the Company to seek exemption from entry tax.
- the Company paid (2004-11) entry tax of ₹ 27.31 crore for Unit I and Unit II. This included entry tax of ₹ 5.88 crore paid for Unit II during 2009-11 which could have been avoided, had the application for exemption been sought in May 2009 itself.
- the Company had included the entry tax of ₹ 15.60 crore and ₹ 11.71 crore in the project cost of Unit I and Unit II respectively for the

purpose of claiming through tariff. The tariff for Unit I was approved (November 2010) by KERC considering the entry tax, while the tariff for Unit II was pending approval (November 2014). As the Company had not got the refund of entry tax from the commercial tax department (November 2014), the expenditure on entry tax to the extent of ₹ 27.31 crore including avoidable tax of ₹ 5.88 crore stands recovered through tariff, which is an additional burden on the consumers.

The Government replied (November 2014) that the benefit of reduction of project cost would be passed on to the Electricity Supply Companies once the entry tax is refunded.

The reply is silent on the fact that as the project cost and tariff of Unit I had already been finalised, though GoK had certified the unit to be eligible under the policy, the benefit would not be passed on to the consumers. Further, because of the delay in seeking exemption, the project cost of Unit II included the avoidable expenditure of ₹ 5.88 crore.

Coal supply

2.1.7.3. The GoI allotted (November 2003) coal blocks under the command area of Western Coalfields Limited (WCL) for meeting the coal requirements of Unit I and Unit II of BTPS. Karnataka EMTA Coal Mines Limited (KECML), a joint venture (JV) of the Company was appointed for developing the captive mines and to supply coal to BTPS.

We observed that the mining plan for the allotted coal blocks was finalised and approved (December 2004) only for Unit I, though GoK had already approved setting up of Unit II in June 2002. The Company concluded (May 2007) the Fuel Supply Agreement (FSA) with KECML for supply of coal only to Unit I although the JV provided for increasing the quantity for supply to both the units, and by then the works for Unit II had been finalised. In the absence of coal supply arrangement from KECML for Unit II, the Company was forced to procure (December 2010) the coal from Mahanadi Coalfields Limited and Singareni Coal Company Limited at higher rates than that of KECML.

The extra expenditure up to September 2013 on account of failure to finalise the mining plan for Unit II and consequent procurement of coal at higher rates was commented in the Audit Report of the Comptroller and Auditor General of India on Public Sector Undertakings for the year ended 31 March 2013. The Company had incurred additional expenditure of ₹ 114.17 crore during October 2013 to March 2014 and would incur additional expenditure of ₹ 263.78 crore[21] during 2014-15[22].

[21] ₹ 1,552.15 (difference between average cost of coal ₹ 4,518 per MT charged by SCCL and MCL and ₹ 2,965.85 per MT charged by KECML in 2013-14) multiplied by the coal consumption (7,35,551.52 MTs from October 2013 to March 2014 based on actual consumption; 16,99,440 MTs in 2014-15 estimated based on previous year consumption).

[22] As per the judgement of Hon'ble Supreme Court (August 2014), the captive coal blocks allotted to the Company stands cancelled from April 2015.

The Government replied (November 2014) that the mineable reserves in the captive coal blocks were sufficient only for one unit for its life.

The reply is not tenable as the revised mining plan for Unit II was submitted in August 2011 to meet the requirement of Unit II from the captive mines which could have been done along with the mining plan of Unit I (May 2007) and the Company could have avoided additional expenditure of ₹ 377.95 crore.

Project execution

Slippage of project schedule

2.1.8.1. The cost of construction for Unit II of BTPS was estimated at ₹ 1,961 crore (inclusive of EPC and non-EPC works). The Letter of Intent for EPC contracts were issued to BHEL in August 2006 at a contract price of ₹ 1,680 crore. The works were to be completed in 38 months (November 2010), the zero date being 19 September 2007. The contracts provided for levy of liquidated damages, subject to a maximum of 15 *per cent* of the contract price for delay in the completion of works. The works were completed (February 2013) after incurring an expenditure of ₹ 2035.69 crore[23] with a delay of 27 months from the scheduled date of completion. The Company recovered liquidated damages (LD) of ₹ 240.66 crore from the contractor for the delay.

We observed that

- the delay in completion of the works was due to significant delay in commissioning of Ash Handling Plant, Coal Handling Plant and RCC chimney. The commencement of these critical works had been delayed by 5 to 18 months. Consequently, these works were completed with a delay ranging from 4 to 39 months.

- despite the precedence of delay in commissioning of Unit I by 15 months due to non-completion of these critical works within the timeframe, the Company entrusted the EPC works through MoU to BHEL without going for a competitive bidding process. BHEL continued to show the same tardiness in completion of works of Unit II and the levy of liquidated damages did not act as a deterrent. The reasons for delay in completion of Unit II were not discussed by the Board.

- the Company suffered loss of potential revenue amounting to ₹ 1,391.33 crore (after considering the liquidated damages recovered) due to loss of generation during the delayed period of completion.

- the delay in completion of the Units forced the State to procure energy from private sources at higher rates to mitigate the shortfall during the delayed period. This imposed an additional burden of ₹ 1,518.69 crore during 2010-13 on the State. Further, the actual expenditure

[23] The expenditure arrived at after considering liquidated damages and the sale of infirm power.

capitalised included interest amounting to ₹ 178.70 crore paid on loan for the delayed completion period. As this cost had gone into the cost of the project and the Company was allowed to recover this through tariff as per the PPA, the burden would ultimately be passed on to the consumers.

The Government replied (November 2014) that the benefit of lower cost due to LD recovered has been passed on to the consumers. The reply is not acceptable, as the cost of power purchased by the State Government during the delay and the interest element on borrowings was also included in the project cost which is an additional burden on consumers.

Construction of raw water pond

2.1.9. The annual water requirement of the BTPS (1,000 MW), estimated at 1.03 thousand million cubic (TMC) feet, was proposed to be met from the regenerated water at Maralihalla stream (tributary to Tungabhadra) located 37 kms from BTPS. Since the water was available only for eight to nine months in a year, impounding adequate water into the raw water pond was essential for its use during the off-season of three to four months. The works were completed in two stages. The deficiencies in execution are discussed below:

2.1.9.1. The construction of raw water pond involving embankment up to Reservoir Level (RL) 483.3 metres was awarded (October 2004) to RN Shetty and Company (contractor) for ₹ 25.13 crore, which was 43.81 *per cent* below the amount put to tender. The work was to be completed within 14 months from the date of award, *i.e.*, by December 2005.

Estimation without detailed survey

2.1.9.2. The estimate for the work was prepared with the presumption that the entire pond area had Black Cotton (BC) soil of required thickness based on preliminary survey (2002). During the course of execution, the need for bed treatment to the pond was found necessary (May 2005) as there was no BC soil in the pond area as estimated. The extra financial implication due to change in scope of work was ₹ 9.99 crore. Failure to conduct detailed investigation prior to entrustment of work had not only vitiated the estimate but also the work valuing ₹ 9.99 crore was entrusted to the contractor bypassing the tender process.

The Government replied (November 2014) that the estimate for these works were prepared based on trial pits taken at random locations and during the course of execution the need based bed treatment was found necessary based on site conditions.

The reply is not acceptable as the trial pits were to be taken at specified intervals instead of on random basis so as to have precise estimation of work and also to get the competitive quotes in the bid. Further, the soil strata of Sandur Taluk where BTPS was located consisted of red soil as per the existing geological conditions which the Company should have taken cognizance of.

This was also proved by the subsequent detailed investigation of the site conditions.

Failure to invoke contractual provisions

2.1.9.3. The Company extended the period of contract from the original stipulated period of December 2005 to October 2006 after considering the factors not attributable to the contractor *viz*., change in scope of work, delay in issue of drawings and delay in handing over of borrow area *etc*. The contractor, however, by the stipulated date of October 2006, completed the embankment work up to Reservoir Level (RL) 476 m as against RL 483.3 m which was awarded for construction.

We observed that

- the Company extended the contract up to March 2007 based on the request of the contractor that there was increase in quantities and change in designs and drawings. The Company gave extension up to October 2006 in the first instance. Hence, the second extension without levy of LD was in violation of contract conditions.

- the contractor had not shown any progress of work even in the extension period from November 2006 to March 2007. This indicated that the Company had not ensured the credentials of the contractor while extending the contract without levying the penalty. Considering the extension period of 150 days (November 2006 to March 2007), LD of ₹ 1.88 crore was leviable, but was not levied.

- the contract had been rescinded (April 2007) without invoking risk and cost clause and the balance works (RL 476 m to 483.3 m) valuing ₹ 4.70 crore was included in the second stage works at a cost of ₹ 12 crore at the revised schedule of rates (2007-08). Though the increase of ₹ 7.30 crore in cost was recoverable from the contractor as per contract provisions (Clause 5.03.04), the Company did not recover the same.

The Government replied (November 2014) that LD was not levied and contract was rescinded without risk and cost as the delay was not attributable to contractor.

The reply is not acceptable as the extension up to October 2006 was given considering the reasons not attributable to the contractor. The second extension without levy of LD for the same reasons up to March 2007 and cancellation of contract without the risk and cost, lacked justification and resulted in non-recovery of additional cost.

Undue benefit to contractor

2.1.9.4. The rate for the extra item of work involving BC soil, which was not in the original scope of the work, was to be derived from the schedule of rates. While arriving at the rate for such extra items, the basic cost of the item as per

schedule of rates was to be added to other costs *viz*., cost of BC soil, lead charges and royalty *etc*. Thereafter, tender discount was to be applied on the total cost so arrived. The Company, however, considered (May 2007) only the basic rate of the item, ignoring other costs while applying tender discount. This had unduly benefited the contractor by ₹ 1.73 crore. The payment was in deviation of the procedure followed by the Company in similar cases.

The Government replied (November 2014) that the rate for the work had been approved after observing all formalities. The reply is not correct as the tender discount was applied only on basic cost ignoring other related costs.

Non recovery of cost of BC soil

2.1.9.5. The contractor had utilised 0.41 lakh cum out of 4.14 lakh cum of BC soil from the Ash Pond area of the Company, for which the payment was made without deducting proportionate cost of ₹ 95.75 per cum[24] for the BC soil utilised from the Ash Pond. This had resulted in excess payment of ₹ 0.39 crore.

The Government replied (November 2014) that the Company paid ₹ 135 per cum which was less than the agreement rate of ₹ 150 per cum. The reply is not correct as the rate of ₹ 150 was for homogeneous soil while the payment was made for BC soil. Further ₹ 135 per cum included the cost of BC soil, lead and royalty amounting to ₹ 95.75 cum which should have been deducted while admitting the claim.

Refund of penalty to the contractor in violation of contractual provisions

2.1.10 The Company awarded (March 2010) the work of embankment of raw water pond up to RL 487.50 m to M/s.SEW Infrastructure Limited at a cost of ₹ 58.99 crore under stage II. The work was to be completed within a period of 18 months *i.e.* by September 2011. The contract provided for price variation and any delay in completion of specified milestones[25] beyond the stipulated date attracted penalty.

As per the milestones stipulated in the contract, the contractor was to complete embankment works up to RL 487.50 m by July 2011. The Company, however, revised (February 2012) the milestones for the works to be completed by July 2012. These milestones were revised considering the factors *viz.*, non-availability of soil, modification of designs and ban on excavation. The contractor did not complete the work even by July 2012, citing the same reasons such as non-availability of soil and sought extension (August 2012/June 2013). The Company extended (December 2012/October 2013) the contract period to December 2013. The embankment work up to RL 487.50 m was completed in June 2013, pending ancillary works such as drains and road works.

[24] Include lead charges of ₹ 80.75 per cum, cost of BC soil of ₹ 12 per cum and royalty of ₹ 3 per cum.

[25] October 2010 - RL 476 m; February 2011 – RL 479 m; July 2011 – RL 487 m; September 2011 - other works.

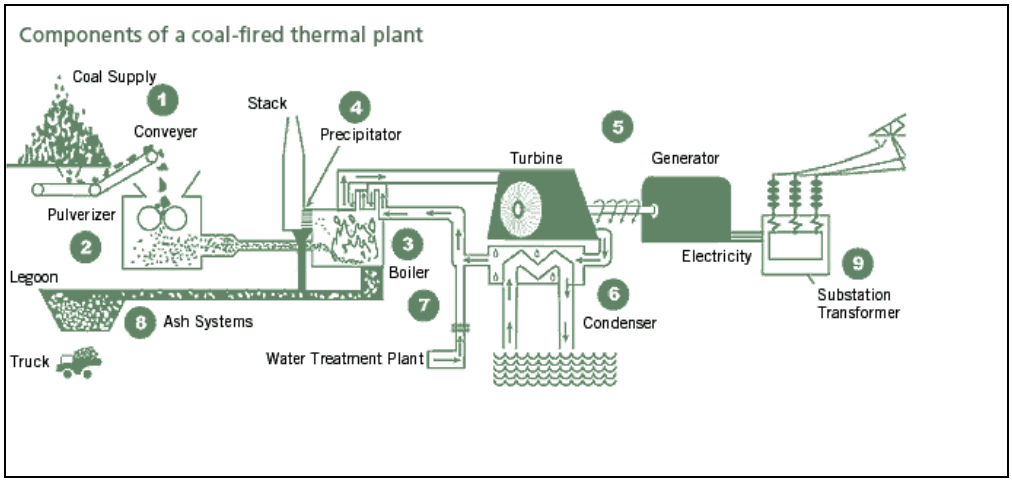
We observed that the Company refunded (December 2012/October 2013) the penalty of ₹ 3.54 crore recovered from October 2012 to August 2013, stating that the reasons for delay were not attributable to the contractor. The refund was in contravention of the terms of the contract due to the fact that the Company revised the targets twice up to July 2012, considering non-availability of soil, modification of designs and ban on excavation which were beyond the control of contractor. Hence, extension of contract period after July 2012 for the same reasons without penalty amounted to extension of undue benefit to the contractor by ₹ 3.54 crore.

The Government replied (November 2014) that the contract period was extended because the reasons for delay were not attributable to the contractor. The reply is not acceptable as the extension from July 2012 to December 2013 was based on the request of the contractor for the same reasons which were considered by the Company while extending the contract up to July 2012.

Operational efficiency

Working of Thermal Plant

2.1.11. The pictorial representation of generation of electricity by a thermal plant is depicted below:



In a thermal plant, water is taken initially into the boiler from a water source. The boiler is heated with the help of coal. The increase in temperature helps in the transformation of water into steam. The steam generated in the boiler is sent through a steam turbine. The turbine has blades which rotate when high velocity steam flows across them. This rotation of turbine blades is used to generate electricity. A generator is connected to the steam turbine. When the turbine rotates, electricity is generated and given as output by the generator, which is then supplied to the consumers through high-voltage power lines.

Low generation due to underutilization of capacity

2.1.11.1 The annual targets for generation were fixed by the Company considering planned and forced outages and expected availability of hydel power. The targets so fixed are forwarded to CEA for approval. The table

below depicts the designed capacity of the plant (Unit I), targets fixed, and the actual generation for the five years period 2009-14.

Table No.2.1.1: Actual generation *vis-à-vis* designed capacity

Year	Installed capacity	Target fixed		Actual generation	
	(MU)	(MU)	(*per cent*)	(MU)	(*per cent*)
2009-10	4,380	3,281	75	2,861	65
2010-11	4,380	3,513	80	2,636	60
2011-12	4380	3,554	81	3,087	70
2012-13	4,380	3,487	80	2,991	68
2013-14	4,380	3,506	80	3,049	70
Total		**17,341**		**14,624**	

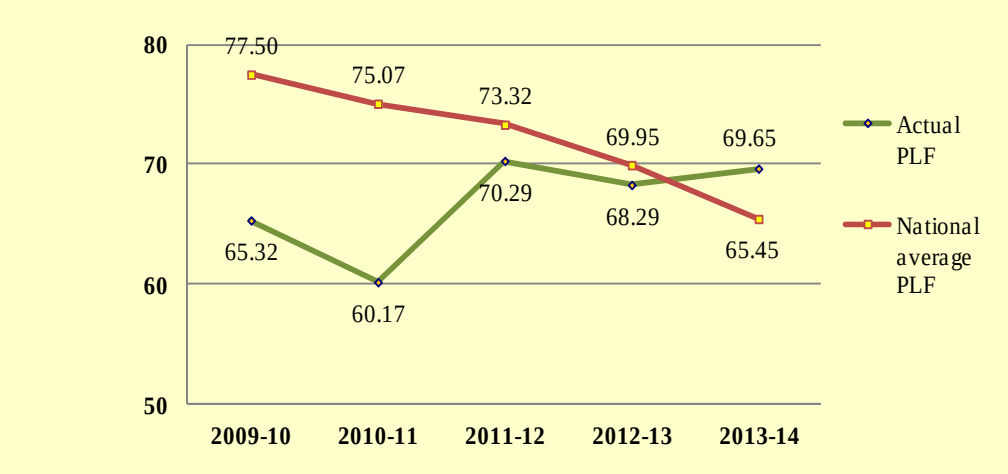
(**Source: Annual budgets, Annual reports and information furnished by the Company**)

We observed that the Company could not attain the targets in any of the years, maximum generation being 70 *per cent* of the installed capacity. Against the targeted generation of 17,341 Million Units (MU) during the five years ended March 2014, the actual generation was only 14,624 MU, resulting in shortfall of 2,717 MU. The lower generation as compared to the installed capacity contributed to lower Plant Load Factor as commented below:

Lower Plant Load Factor

2.1.11.2. Plant Load Factor (PLF) refers to the ratio between actual generation and maximum possible generation at installed capacity. The DPR relating to Unit I had projected Plant Load Factor (PLF) of 77 *per cent*. The comparative position of actual PLF achieved *vis-a-vis* national average PLF[26] is depicted graphically below.

Chart No. 2.1.1: Actual PLF of Unit I *vis-à-vis* national average PLF



We observed that

- the actual PLF recorded during five years 2009-14 was much below the projections made in the DPR. The plant could reach maximum

[26] CEA monthly report of August 2013 and July 2014.

PLF of 70.29 *per cent* in 2011-12 as against projected PLF of 77 *per cent*.

- the PLF of the plant fell short of even the average PLF achieved by the thermal plants at all India level in all the five years except in 2013-14.

The lower PLF with reference to the installed capacity indicated underutilisation of the capacity of the plant. The reasons for underutilisation of the capacity are discussed in the subsequent paragraphs.

Capacity utilization

2.1.11.3. The table below indicates the total available hours, operated hours, and the capacity utilization in respect of Unit I during the five years ended March 2014.

Table No. 2.1.2: Actual generation *vis-à-vis* possible generation

Sl. no.	Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
1	Total available hours	8,760.00	8,760.00	8,784.00	8,760.00	8,760.00
2	Operated hours	6,757.32	6,341.45	7,449.29	7,332.68	7,540.40
3	Possible generation during operated hours (MU)	3,378.66	3,170.73	3,724.64	3,666.34	3,770.20
4	Actual generation (MU)	2,860.83	2,635.53	3,087.13	2,990.59	3,048.73
5	Under utilization (MU)	517.83	535.20	637.51	675.75	721.47
6	Capacity utilization (*per cent*)	84.67	83.12	82.88	81.57	80.86

The capacity utilization continuously decreased over the years from 84.67 *per cent* in 2009-10 to 80.86 *per cent* in 2013-14. This was due to fact that the components of the plant, such as boiler, cooling tower *etc*., were not functioning at the optimum levels as indicated in the succeeding paragraphs. Considering average capacity utilisation at 83 *per cent* during 2009-14, the short fall in generation was 2,562.84 MU. The loss due to underutilisation of capacity amounted to ₹ 102.28 crore.

The Government replied (November 2014) that the Company had entrusted to Central Power Research Institute (CPRI), the task of analysing the technical reasons for the inefficiencies observed and the Company would review the measures suggested by CPRI to increase the efficiency.

Audit scrutiny of records revealed the inefficiencies in the various components of the plant. These are discussed in the following paragraphs.

Increased Station Heat Rate and lower boiler efficiency

2.1.11.4. The specific consumption of coal increased from 0.62 kg/kWh in 2009-10 to 0.70 kg/kWh in 2013-14 against the designed specific coal consumption of 0.4850 per kWh. This was mainly due to poor quality of coal.

Consequent to this, the Station Heat Rate[27] (SHR) was much above the normative SHR of 2,450 kcal/kWh prescribed by CERC/PPA, the actual SHR ranged between 2,808 kcal/kWh and 3,093 kcal/kWh. As a result, the efficiency of the boiler had come down to as low as 62.8 *per cent* and 69.2 *per cent* which was far less than 88.98 *per cent* considered by BHEL.

Since the energy charges were determined considering the fixed SHR of 2,450 kcal per kWh, the increased SHR beyond the specified SHR resulted in under-recovery of energy charges. The underrecovery, on account of increased station heat rate, was ₹ 239.14 crore during 2009-13[28].

Government replied (November 2014) that SHR variation was due to age of the plant, diminishing turbine and boiler efficiency, bad performance of cooling towers and non-operation of the plant at the rated capacity, and that for improving the efficiency, the plant needed an additional investment of ₹ 8.50 crore. Thus, the Government accepted that the performance was below desired levels and that there was need to implement additional measures to improve efficiency.

Sub-optimal performance of cooling tower

2.1.11.5. The primary task of the cooling tower in the plant is to reject heat absorbed in the hot water from heat exchangers into the atmosphere. The BTPS Units are equipped with Natural Draft Cooling Tower having PVC film type fill. The scrutiny of the records revealed that

- raw water analysis sourced from Maralihalla stream indicated (February 2004) turbidity and total dissolved solids (TDS) levels at 100 Nephelometric Turbidity Units (NTU) and 1313 parts per million (PPM) respectively.

- the Company noticed (September 2012) that the PVC fills of the cooling tower relating to Unit I were blocked due to turbidity of water and took note of the fact that this could affect the structural stability of the pre-cast beams and hence required replacement.

- the Company started evaluating the performance of the cooling tower of Unit I only with effect from November 2013 and the average reading up to March 2014 was as under:

Table No. 2.1.3: Performance of cooling tower

Parameters	Designed specification	Actual reading	Indicators of good performance
Range (ºC)	10.20	9.80	High range
Approach (ºC)	5.00	20.00	Low approach
Effectiveness(*per cent*)	67.10	32.88	High effectiveness
Liquid / Gas (Ratio)	1.873	3.29	Low ratio

(Source: BHEL agreement and information furnished by Company)

[27] Station Heat Rate is the heat energy input in kilocalories (kcal) required to generate one unit of electrical energy at generator terminals.

[28] The under recovery charges were as per the workings of the Company. The charges for 2013-14 were not available as the cost audit had not been finalised.

The actual readings varied adversely against the designed specification. The level of TDS remained as high as 1,500 PPM despite using clarified water. The performance of the cooling tower relating to Unit I was sub-optimal, thus negatively impacting the heat transfer process in the condenser.

Despite being aware of the fact, in May 2007 itself, that PVC film type fills could not be used in water with high turbidity, the Company decided to go in for PVC Film Fill instead of exploring the possibility of using some other types of Fills such as 'Low clog film fills' which were better equipped to handle high turbidity in the water, as per the Bureau of Energy Efficiency.

Excess auxiliary power consumption by cooling water pumps

2.1.11.6. Unit I had four cooling water pumps supplied by BHEL. Of these, three pumps were in operation at any point of time while one was held as stand-by. The combined capacity of the pumps as designed and performance guaranteed (April 2010) by BHEL was 57,300 cubic metres of water per hour with a power input of 4,260 kilowatt. The performance guarantee test of the pumps was conducted only in April 2010. Based on the designed and tested parameters, 7,435 units of energy were required to circulate one lakh cubic metres of water. We observed that the cooling water pumps had consumed auxiliary power in excess of the designed specifications during 2010-14 and the value of power consumed in excess of the designed specification amounted to ₹ 4.43 crore.

Government replied (November 2014) that action would be taken to maintain the salt and algae contents of the water to the minimum and during the annual overhaul of the unit all the choked nozzles and PVC fills would be replaced. The reply indicates that the Company had not taken cognizance of the effect of the raw water analysis done in 2004 which affected the performance of cooling towers resulting in excess consumption of power and recurring expenditure due to replacement of nozzles and fills.

Outages and Plant availability

2.1.11.7. Outages refer to the period for which the plant remained closed for attending to planned/forced maintenance. The plant availability is the average of the declared capacity for all the time blocks during the period, expressed as a percentage of the installed capacity.

We observed that

- forced outages, which represented 22.86 *per cent* of total available hours during 2009-10, had declined to 7.06 *per cent* in 2013-14. The forced outages were within the permitted levels.

- as per the norms of CERC and the PPA approved (November 2010) by KERC, the target for plant availability was 80 *per cent* of the installed capacity. The plant availability was 77 *per cent* and 72 *per cent* in 2009-10 and 2010-11 respectively. This had, however, improved

during 2011-14, which ranged between 84 *per cent* and 86 *per cent*, conforming to the norms.

Ineffective maintenance

2.1.11.8. To ensure long term sustainable levels of performance of the plant, it is important to adhere to periodic maintenance schedules. The efficiency and availability of the equipment is dependent on strict adherence to annual maintenance and equipment overhauling schedules.

The table below indicates the details of the dates of annual overhauling of Unit I, forced outages during the year before and after overhauling work, for the four years ended March 2014.

Table No. 2.1.4: Forced outages before and after overhauling

Year	Period of planned shut down for overhaul	Total forced outage hours during the year	Forced outage hours after overhaul	Forced outage hours before overhaul	Percentage of column (4) to column (3)
1	2	3	4	5	6
2010-11	14 September 2010 to 30 October 2010	1,162.24	1,062.43	99.81	91.40
2011-12	2 September 2011 to 3 October 2011	515.95	244.38	271.57	47.40
2012-13	1 September 2012 to 30 September 2012	603.66	603.66	Nil	100.00
2013-14	2 August 2013 to 28 August 2013	484.65	263.35	221.30	54.34

(Source: Outage details furnished by the Company)

The incidence of outage hours after overhauling were abnormally high in 2010-11 and 2012-13 when compared to that of before overhaul. In 2011-12 and 2013-14, the outages had not come down substantially after the overhaul. This indicated ineffective execution of overhaul works. The main problems encountered after overhauling were boiler tube leakages and generator vibrations which could have been avoided with better maintenance.

Government accepted (November 2014) the audit observations.

Financial Management

Debt-equity mix

2.1.12. The DPR of Unit I envisaged debt-equity mix of 80:20. The PPA relating to the sale of energy generated by Unit I was approved by KERC in November 2010, based on which the PPAs were concluded (December 2010) with ESCOMs for a period of 25 years. The project cost, as per PPA, for fixation of tariff comprised a maximum equity component of 30 *per cent* and a

minimum debt component of 70 *per cent*. The actual debt-equity mix of Unit I ranged between 84:16 and 89:11 during the five years ended March 2014.

We observed that

- the Company raised bills on ESCOMs considering a debt-equity mix of 80:20, as contemplated in the DPR instead of actual composition of debt and equity which was within the range indicated in the PPA, resulting in underrecovery of interest on debt amounting to ₹ 44.73 crore during 2009-14. Similarly, the return on equity exceeded the return that the Company would have been entitled to by ₹ 90.04 crore during the same period. Consequently, the additional burden imposed on the consumers amounted to ₹ 45.31 crore.

- based on the average interest and return on equity for the five years ended March 2014, the Company would suffer underrecovery of interest (₹ 178.92 crore) and claim return on equity in excess (₹ 360.16 crore calculated with respect to PPA) through the tariff mechanism during the remaining period of the PPA (20 years up to 2034), thus imposing an additional burden of ₹ 181.24 crore on the consumers.

The Government replied (November 2014) that as the project has been envisaged with a debt equity ratio of 80:20, the same ratio has been considered for the purpose of claiming the revenue irrespective of the loan availed for the project and had approached (October 2014) KERC for approval. The reply is not acceptable as the claim was in violation of the Power Purchase Agreement.

Under recovery of Fuel Escalation Charges

2.1.13. In accordance with the PPA for Unit I, the cost of primary fuel was to be arrived at after adding normative transit and handling loss of 0.8 *per cent.* We observed that the Company failed to include transit and handling loss as enunciated in the PPA, while determining the cost of coal for the period April 2009 to March 2012. The Company, however, included the transit and handling losses for the purpose of cost of fuel with effect from 2012-13.

Failure to include the transit and handling loss at 0.8 *per cent* during the period 2009-12, resulted in underrecovery of ₹ 10.90 crore towards primary fuel cost, which had to be absorbed by the Company.

The Government replied (November 2014) that the necessary action has been taken to claim the differential fuel escalation charges from ESCOMs for the period 2009-12.

Inclusion of demurrage charges in the cost of fuel

2.1.14. The supplies of primary fuel (coal) and secondary fuel (Heavy Furnace Oil (HFO) and Light Diesel Oil (LDO)) are received through railway wagons at BTPS. To facilitate unloading of these wagon receipts, the Railways permitted a detention time up to five hours per rake free of cost and levied demurrage charges thereafter.

The Company incurred demurrage charges of ₹ 32.68 crore during the period from 2009-14.

We observed that

- the rake detention time allotted to Raichur Thermal Power Station (RTPS) was seven hours as against five hours allotted to BTPS. The minimum detention time of seven hours was required per rake as per estimation of the Company. Yet, the Company failed to pursue with the Railways for enhancement of detention time for BTPS.

- as per approved PPA of Unit I, recoverable cost of primary fuel and secondary fuel included only the cost of the commodity, taxes, transportation charges, port charges, insurance and other handling charges. Demurrage charges, though, paid due to inefficiency of the Company, were included as part of fuel cost and were passed on to ESCOMs, thus imposing additional burden of ₹ 32.68 crore on the consumers.

While accepting the audit observations, the Government replied (November 2014) that the Company would take up the matter with the Railways to increase detention time and take corrective action on the demurrage charges included in the fuel charges.

Environmental norms

Non-compliance with the norms of Ministry of Environment and Forest

2.1.15 With a view to restricting the excavation of top soil for manufacture of bricks and for other works which involve use of top soil and for promoting utilization of fly ash produced by coal or lignite based thermal power plants in the manufacture of building materials and construction activity, the Ministry of Environment and Forests (MoEF) notified (November 2009) that all thermal power stations in operation before the date of the notification were to achieve 100 *per cent* fly ash utilization on a graduated scale within five years from the date of the notification.

We observed that the BTPS achieved fly ash utilization of only 45 *per cent*, by March 2014, as arrangements for evacuation of fly ash were not properly managed as discussed below.

Evacuation of fly ash

2.1.15.1. The Company awarded (December 2008/June 2011) the contract for collection of dry fly ash from Unit I and Unit II to M/s.Rain Commodities Limited (RCL) and M/s.Ultra Tech Cements Limited (UTCL) respectively.

As per the terms and conditions of the agreements, RCL and UTCL was required to lift the entire quantity of fly ash generated in Unit I and Unit II and allotted to them on monthly basis, which was intimated at the beginning of each quarter at a contract price of ₹ 469 and ₹ 240 per Metric Tonne (MT)

respectively to be escalated by 5 *per cent* annually. The contracts provided for levy of penalty at 125 *per cent* of the contract price for quantities of fly ash remaining unlifted.

We observed that

- RCL had lifted only 12.29 lakh MTs out of 18.21 lakh MTs of fly ash generated and allotted during 2009-14. Penalty of ₹ 44.17 crore (up to March 2014), though levied by the Company for non-lifting of the stipulated quantity of fly ash, was yet to be recovered from RCL (August 2014).

- UTCL lifted only 1.76 lakh MTs of the fly ash of 3.04 lakh MTs generated and allotted (September 2013 to March 2014) from Unit II, leaving a balance of 1.28 lakh MTs. The penalty of ₹ 3.04 crore levied on UTCL was yet to be recovered by the Company (August 2014).

- the accumulated and unlifted fly ash of 14.51 lakh MTs of Unit I and Unit II, having a market value of ₹ 64.49 crore, was pumped into the ash pond.

The Government replied (November 2014) that the Company would determine the quantity of unlifted fly ash in order to levy the penalty.

Maintenance of Ash Handling System

2.1.15.2. As per the terms of the Letter of Award (December 2008/June 2011), RCL and UTCL were to maintain the ash handling plant at their cost, including procurement of necessary spares at their cost. The spares that were procured by the Company and lying in inventory were to be taken over by them at cost.

We observed that the Company, instead of shifting the incidence of operation and maintenance expenditure on them as per contractual terms, absorbed ₹ 2.40 crore during 2009-14. We further observed that the Company procured and held the inventory of spares worth ₹ 2.97 crore required for Ash handling Plants of Unit I and Unit II, although the responsibility of holding these inventories rests with the contractors. Thus, funds to this extent which should have been the contractors' burden were borne by the Company.

The Government replied (November 2014) that as the contractors did not procure the spares in the initial stage, the Company had procured spares for smooth running of the plant and would pursue with the contractors to take over the spares. The fact, however, remains that recovery of ₹ 5.37 crore was yet to be made by the Company from the contractor.

Suspended Particulate Matter and Respirable Particulate Matter

2.1.15.3 Suspended Particulate Matter (SPM) in flue gas is a pollutant when its concentration in a given volume of atmosphere is high. Electrostatic Precipitator (ESP) is used to reduce SPM concentration in flue gases. Control

of SPM level depends on the effective and efficient functioning of ESP of the thermal plant. ESPs installed at BTPS were designed to achieve an SPM level of 100 µg/m^3. We observed that the average SPM level exceeded the prescribed levels and ranged between 112.5 µg/m^3 and 125.5 µg/m^3 during 2009-12. The SPM levels were within the designed range thereafter.

2.1.15.4. Respirable Particulate Matter (RPM) is emitted directly into the atmosphere from elemental carbon and organic carbon compounds as a result of physical and chemical transformations during operation of the thermal plant, which could adversely affect human health and impact on climate and precipitation. We observed that the levels of RPM at Unit I had exceeded the permissible level of 40 µg/m^3 notified by CPCB. The average RPM levels at Unit I ranged between 42 and 64 µg/m^3 during 2009-12. The RPM levels, however, were within the norms from 2012-13 onwards.

The Government replied (November 2014) that the SPM and RPM levels, as tested during September 2014, were well within the norms.

Acknowledgement

We acknowledge the co-operation extended by the Energy Department of GoK and the Company in facilitating the conduct of performance audit.

Conclusions

We concluded that

- **the Company had foregone the envisaged benefits under mega power project policy of GoI, thereby foregoing the opportunity of reducing the project cost and bringing down the cost of power generation by ₹ 1,257 crore.**

- **the delay in approaching the Government to avail exemption from entry tax under infrastructure policy and inclusion of the same in the project cost resulted in an additional burden on the consumers by ₹ 27.31 crore.**

- **the Company incurred an additional expenditure of ₹ 114.17 crore towards coal purchases for Unit II in the absence of coal supply arrangement from the captive coal blocks during the period from October 2013 to March 2014 and would continue to incur ₹ 263.78 crore during 2014-15.**

- **despite the precedence of delay in commissioning of Unit I due to incompletion of certain critical works within the timeframe, the Company entrusted the EPC works through MoU through BHEL without going for a competitive bidding process.**

- **the Company could attain maximum generation of only 70 *per cent* of the installed capacity as against the targeted generation of 80**

per cent **during 2009-14. The shortfall in generation during this period was 2,717 MU.**

- **the capacity utilization of Unit I had continuously decreased from 84.67 *per cent* in 2009-10 to 80.86 *per cent* in 2013-14, indicating suboptimal performance of the plant. The loss due to underutilisation of capacity was ₹ 102.28 crore.**

- **the increased Station Heat Rate which was higher than the stipulated norms, resulted in underrecovery of cost by ₹ 239.14 crore during 2009-13.**

- **the Company did not achieve the norms fixed by MoEF in respect of fly ash utilization.**

Recommendations

We recommend that the Company

- **consider obtaining competitive bids for future thermal power station works.**

- **adhere to strict regime of annual overhaul and preventive maintenance to ensure smooth running of the units for their optimum utilisation.**

- **ensure that the specific coal consumption and Station Heat Rate are well within the norms so as to keep the cost of generation at desired levels.**

- **identify more prospective buyers of fly ash like National Highways Authority of India, Central and State Public Works Departments to ensure hundred *per cent* evacuation as prescribed by MoEF.**

2.2 Performance Audit on 'Irrigation Projects in Karnataka'

Executive Summary

Introduction

In order to mobilize financial resources for speedy implementation of the major and medium irrigation projects within the targeted period, the Government of Karnataka established three Special Purpose Vehicles *viz.*, Krishna Bhagya Jala Nigam Limited (KBJNL), Karnataka Neeravari Nigam Limited (KNNL) and Cauvery Neeravari Nigama Limited (CNNL) under the Companies Act, 1956.

Objectives of the Performance Audit

The performance audit was carried out to examine and analyse the reasons for non-achievement of the targeted creation of irrigation potential and socio-economic benefits as envisaged in the projects and to verify, examine and analyse whether the projects were executed as planned with a view to study reasons for cost and time overruns including extra financial implications (EFI).

Audit Findings

Non-achievement of objectives

Out of 78 works selected across 17 projects, 21 works were completed without any delay, 14 works were completed with a delay up to 57 months, 4 works were ongoing without any delay and 39 works were ongoing with a delay up to 62 months.

The objective of taking up these project *viz.*, improvement of efficiency, arresting seepages, providing water to the tail-end reaches, filling MI tanks and supply of drinking water have been only partially achieved as the works are not fully completed. Further, the contemplated irrigation potential (52,937 ha) was yet to be achieved.

Deficiencies in survey and design

There were delays in completion of works due to deficiencies in survey and design *viz.*, failure to propose an alternate alignment before taking up the work (KBJNL-NRBC distributary 9A); improper survey and design resulted in EFI (CNNL-CC lining for Km.0 to 20 of Kabini RBC); change in the alignment to achieve savings in the cost was defeated as there was increase in cost (KBJNL - ALBC Km. 68 to 77); award of work for preparation of DPR to the consultant after commencement of the original work (KBJNL-modernisation of NLBC) *etc*.

Deficiencies in estimation

The estimates were inflated due to non deduction of initial lead of one kilometre while calculating additional lead charges (CNNL-Kattepura Anecut Canals); errors in adoption of item rates (CNNL-Package-I & V of modernization of VC Canal system and modernisation of Devaraya Anecut Canals); inclusion of overheads and taxes on the wrong base and provision of higher sales tax (CNNL-Alambur DWS); absence of standard/basis for utilizing the excavated soil; adoption of the item of work for embankment under the head 'preliminary and maintenance works' of Schedule of Rates instead of 'canal and allied works' (KRBC Km.0 to 60); and allowing weightage even on items falling under the heads 'CD works', 'Maintenance works' *etc.* (TLBC Main canal and distributaries).

Deficiencies in tendering

There were instances of inviting short-term tender without approval of the competent authority, non finalization of tenders within the validity period (KNNL - Varahi Common canal CC lining Km.12 to 13 and Km.13 to 14), faulty tender evaluation process (KBJNL-NRBC distributary 9A), extra expenditure due to defective tender clause (CNNL-Gulur Hebbur DWS) and variation from the standard tender document prescribed by the Government.

Deficiencies in acquisition of land

Due to deficiencies in acquisition of land, there were delays in completion of work (KNNL-construction of minors under Kamatagi distributary), award of work without acquiring land (KNNL-Varahi common

Canal) and delay due to non availability of land for dumping excavated soil (KNNL-GRBC).

Deficiencies in execution

There were deficiencies in execution, non-achievement of desired irrigation potential (KNNL-Varahi Project), non-synchronization of the work of branch canal along with the work of distributary (KBJNL-NRBC 9A), execution of excess thickness of lining as compared with the prescribed standard in all the three companies, delay in providing work-slips for enhanced quantities and handing over the site (CNNL-CC lining from Km.83 to 84 of Tumkur Branch Canal), deeper excavation which was not need based (CNNL-PSC Bridge across Hemavathy River) and defective geo-technical survey by the consultant (KNNL-Interconnecting canal work of Kalasabandura Nala).

There were instances of extra/ineligible payments *viz.*, payment of EFI at enhanced rates for erection of box type steel cribs support (KBJNL-aqueduct of distributory 9A of NRBC), extra expenditure due to payment made for the thickness and length of MS Pipes as envisaged in the contract than actually executed by the contractor (CNNL-Alambur DWS), payment of ineligible lead charges for dumping excavated soil and thereafter for re-use from dumping yard to the compaction area (KNNL-Construction of inter-connecting canal from Kalasa reservoir to Malapraba river from ch (-) 145 to 5005 metre (m)- Phase II), approval for ineligible price adjustment for steel and cement (KNNL-Malaprabha RBC with CD from Km.131 to 142) and application of wrong index for price adjustment (KBJNL-aqueduct of distributory 9A and box culvert of NRBC).

There were instances of non-recovery towards various charges during execution *viz,* non-recovery of the cost of stones and charges for non-stacking (CNNL-Package-II to V of VC Canal system, CC lining of Km.0 to 20 of Kabini RBC), non-recovery towards ledge cutting (CNNL-CC lining of Km.0 to 20, Km.20 to 40 of Kabini RBC), non recovery for shrinkage quantity and payment for slipped muck (KBJNL-Remodelling of NLBC); Non-recovery of penalty for delay in execution of the work (KBJNL-Package I, III and IV of NRBC distributary 9A and CNNL - KRBC Km.0 to 20, Km.20 to 40, Km.40 to 60 & KLBC Km.0 to 25.25).

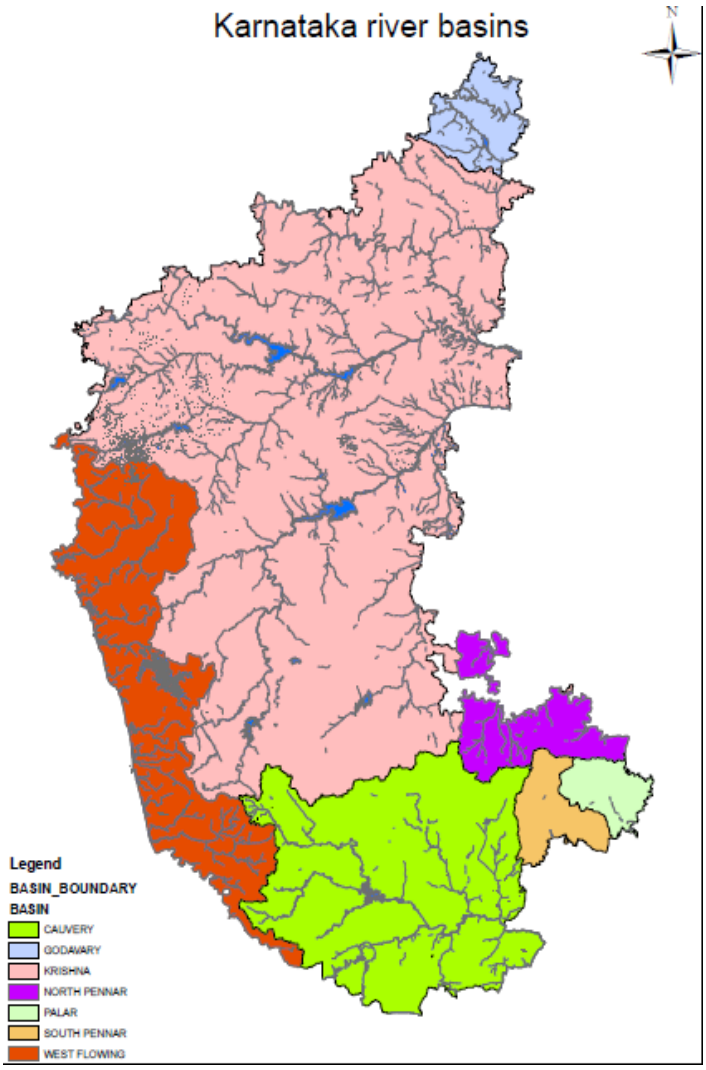
Our conclusions and recommendations are given at the end of the Performance Audit Report.

Introduction

2.2.1. The geographical area of Karnataka is 1.92 lakh square kilometre (sq. km.) with a cultivable area of 1.41 lakh sq km. As of March 2014, there were 211 major and medium irrigation projects[29] (60 completed and 151 ongoing) in the State with a gross command area of 28.37 lakh hectares (ha), against the ultimate potential of the State estimated at 35 lakh ha.

In order to mobilise financial resources for speedy implementation of the major and medium irrigation projects within the targeted period, the Government of Karnataka (GoK) established three Special Purpose Vehicles under the Companies Act, 1956.

- Krishna Bhagya Jala Nigam Limited (KBJNL) was incorporated in August 1994 for implementation of the Upper Krishna Project (UKP).
- Karnataka Neeravari Nigam Limited (KNNL) was incorporated in June 1998 to expedite the completion of ongoing irrigation projects of Krishna Valley.
- Cauvery Neeravari Nigama Limited (CNNL) was incorporated in June 2003 to accelerate the implementation of projects in the Cauvery Basin.



[29] Culturable command area (CCA) of 10,000 ha or more are major irrigation projects; CCA between 2,000 ha and 10,000 ha are medium irrigation projects.

Organisational set up

2.2.2. The Chief Minister of the State and the Minister of Water Resources are the Chairman and Deputy Chairman respectively of these three Companies. The administrative control of the Companies is with the Water Resources Department (WRD) headed by the Additional Chief Secretary. The Companies are headed by Managing Directors who monitor the day-to-day activities. The Technical Sub Committee (TSC) deliberates the projects/works, technical reports and approvals and submits its recommendations to the Board of Directors (BoD) for approval. The projects/works taken up are monitored at the field level by the Chief Engineers at the zonal offices. The circle offices and divisions assist the zonal offices. KBJNL has five zonal offices, six circle offices and 29 divisions, KNNL has seven zonal offices, 14 circle offices and 81 divisions, and CNNL has three zonal offices, eight circle offices and 28 divisions.

Audit Objectives

2.2.3. The objectives of the performance audit were to

- examine and analyse the reasons for non-achievement of the targeted creation of irrigation potential and socio-economic benefits as envisaged in the projects.

- verify, examine and analyse whether the projects were executed as planned with a view to study reasons for cost and time overruns including extra financial implications.

Scope and Methodology of Audit

2.2.4 The present Performance Audit covered the works of Construction, Modernization, CC lining of canals and distributaries, Drinking Water Supply Schemes and works with Extra Financial Implications (EFI) / Extra Item Rate List (EIRL)[30] undertaken by the three Companies during 2008-09 to 2013-14. The works were selected based on random sampling method and are as follows.

- **KBJNL:** 21 works[31] in seven divisions covering six projects *viz.*, Agasarahalla, Almatti, Almatti Left Bank Canal, Narayanpur Left Bank Canal, Narayanpur Right Bank Canal and Drinking Water Supply Schemes.

- **KNNL:** 60 works[32] in 22 divisions covering seven projects *viz.*, Varahi, Malaprabha, Tungabhadra, Bennithora, Kalasabandura Nala, Dandavathi and Hippargi.

[30] When the work exceeds the approved/tendered quantities either due to increase in quantities, change in designs, entrustment of additional items not awarded *etc*., EFI and EIRL are proposed.
[31] 16 works and five EFIs.
[32] 28 works and 32 EFIs.

- **CNNL:** 41 works[33] in 15 divisions, covering four projects *viz*., Hemavathi, Harangi, Kabini and Krishna Raja Sagar.

We explained the objectives of the performance audit to the Government and to the Management of the Companies during an 'Entry Conference' held in April 2014. The draft Performance Audit Report was issued to the Government in September 2014. The 'Exit Conference' was held in November 2014 wherein the audit findings were discussed with the Government represented by the Additional Chief Secretary to the Government of Karnataka, Water Resources Department and the Managing Directors of the three Companies. The views of the Government have been considered while finalising the Performance Audit Report.

Audit Criteria

2.2.5. The Audit Criteria adopted for assessing the achievement of the audit objectives were derived from the following sources.

- Guidelines issued by WRD, Central Water Commission (CWC), Directions issued by TSC and BoD.

- Provisions of the Karnataka Transparency in Public Procurement (KTPP) Act, 1999, and KTPP Rules 2000, Land Acquisition Act, 1894. Guidelines issued by Central Vigilance Commission (CVC).

- Survey/ Investigation reports, specifications and targets in the Detailed Project Reports (DPR), Annual Work Programmes/Annual plans, Consultancy/third party reports, estimates and Bureau of Indian Standards (BIS)/specifications.

- Notice Inviting Tenders (NIT), agreement conditions, schedule of rates, bill of quantity.

Audit Findings

2.2.6 The audit findings are discussed in the succeeding paragraphs. The replies received from the Companies have been considered while finalizing the Performance Audit Report.

[33] 34 works and seven EFIs.

Status of works

2.2.7. The status of works selected for Performance Audit is given below.

Table 2.2.1: Status of selected works

Company	No of works test checked (excluding EFI)	No of works completed in time	No of works completed with delay (months)	Increase in cost of the delayed works as compared to original cost (₹ in crore)	No of works under progress but with delay	Increase in cost of the delayed works as compared to original cost (₹ in crore)
KBJNL	16[34]	5	Nil (0 to 6 months)	Nil	Nil (0 to 6 months)	Nil
			3 (6 months to 3 years)	3.05	2 (6 months to 3 years)	49.66
			1 (above 3 years)	48.87	2 (above 3 years)	Nil
KNNL	28	9	1 (0 to 6 months)	10.47	3 (0 to 6 months)	7.25
			5 (6 months to 3 years)	48.00	8 (6 months to 3 years)	60.38
			Nil (above 3 years)	-	2 (above 3 years)	6.13
CNNL	34[35]	7	1 (0 to 6 months)	1.01	3 (0 to 6 months)	72.11
			3 (6 months to 3 years)	14.38	14 (6 months to 3 years)	167.61
			Nil (above 3 years)	Nil	5 (above 3 years)	64.42

(Source: Data compiled from information obtained from the Companies)

We observed that there were delays in projects leading to time and cost overruns, which resulted in non-achievement of the objectives. The extent of achievement of objectives (project-wise) is given in the table below.

Achievement of objectives of the projects/works

2.2.8 The following table summarizes the number of projects test checked and its present position with regard to achievement of objectives.

[34] Three works are in progress, but without delay.
[35] One work is in progress, but without delay.

Table 2.2.2: Status of achievement of objectives of the selected works

Project	No. of works test checked	Status of works	Extent of achievement of objective
Krishna Bhagya Jala Nigam Limited			
Almatti Left Bank Canal	1	• Work in progress with a delay of 30 months.	Irrigation facilities to be provided for 4,035 ha were not yet achieved
Narayanpur Left Bank Canal	3	• All works were completed in time.	Objectives of restoration of slips in canal, improvement of canal efficiency, elimination of canal seepages were achieved.
Narayanpur Right Bank Canal	6	• 2 works were completed with delay up to 57 months. • 2 works were in progress without delay. • 2 works were in progress with delay up to 46 months.	Irrigation potential to the extent of 15,700 ha was not achieved.
Drinking Water Supply Scheme	2	• 1 work was in progress without delay. • 1 work was in progress with a delay of 31 months.	Objectives of filling up irrigation tanks by lifting water from the River Krishna and Bhima for the purpose of irrigation, drinking and raising ground water table were not achieved.
Agasarahalla	1	• Completed with a delay of 16 months.	Objective of improvement in canal efficiency was achieved, but after delays.
Almatti	3	• 2 works were completed in time. • 1 work was completed with a delay of 15 months.	Objective of providing security for dam and allied works was achieved.
Karnataka Neeravari Nigam Limited			
Bennitora	2	• Both works were ongoing with delay of 13 months.	Objective of Improvement of efficiency and arresting seepage is not achieved.
Dandavathi	1	• Not started - was to be completed by October 2011.	Irrigation facilities for 17,500 ha are yet to be achieved.
Hippargi	4	• One work completed with no delay. • Three works were completed with delay up to 28 months.	Irrigation facilities for 74,742 ha are yet to be achieved. System is under trial run.
Kalasa-bandura Nala	5	• All works were ongoing with a delay up to 49 months, out of which 2 works were rescinded.	Objective of diverting water to Malaprabha river was not achieved.
Malaprabha	3	• One work was completed without any delay. • 2 works were ongoing with delay up to 50 months.	Improvement of efficiency and arresting seepage were not achieved.

Project	No. of works test checked	Status of works	Extent of achievement of objective
Tungabhadra	8	• 7 works were completed with no delay. • 1 work ongoing with delay of one month.	Objectives of restoration of slips in canal, improvement of canal efficiency, elimination of canal seepages were achieved.
Varahi	5	• 3 works were completed with delay up to 20 months • 2 works ongoing with delay up to 18 months.	Providing irrigation facilities to 15,702 ha was not achieved.
Cauvery Neeravari Nigama Limited			
Hemavathi	9	• 4 works were completed without any delay. • 2 works were completed with a delay ranging up to 36 months. • 2 works were ongoing with delay up to 18 months • 1 work was ongoing within the original valid period.	The objectives of improvement of efficiency, arresting seepages, providing water to the tail-end reaches, filling MI tanks, supply of drinking water *etc*., have been partially achieved as the works are not fully completed.
Harangi	8	• 2 works were completed without any delay. • 2 works were completed with delay up to 24 months • 4 works were ongoing with delay up to 34 months.	Objectives of improvement of efficiency, arresting seepages, providing water to the tail-end reaches *etc*., have been partially achieved as the works are not fully completed.
Kabini	10	• All works were ongoing with delay up to 62 months.	The objectives of improvement of efficiency, arresting seepages, providing water to the tail-end reaches, filling MI tanks, supply of drinking water *etc*., have not been achieved as the works are yet to be completed.
Krishna Raja Sagar	7	• 1 work was completed without any delay. • 6 works were ongoing with delay up to 13 months.	The objectives of improvement of efficiency, arresting seepages, providing water to the tail-end reaches *etc*., have been partially achieved as the works are not fully completed.

(Source: Data compiled from information obtained from the Companies)

Out of 78 works selected across 17 projects, 21 works were completed without any delay, 14 works were completed with a delay up to 57 months, 4 works were ongoing without any delay and 39 works were ongoing with a delay up to 62 months.

The objectives of taking up these projects *viz.*, improvement of efficiency, arresting seepages, providing water to the tail-end reaches, filling MI tanks

and supply of drinking water have been only partially achieved as the works are not fully completed. Further, the contemplated irrigation potential (52,937 ha) were yet to be achieved.

2.2.9 A summary of the main reasons for not achieving the objectives in the 17 projects test checked is given in the table below.

Table 2.2.3: Nature of deficiencies in the selected projects

Description	KBJNL	KNNL	CNNL	Referred in paragraph at
Total number of projects in the three PSUs	**6**	**7**	**4**	
Nature of deficiencies	**No of test checked projects which had deficiencies**			
Deficiencies in survey and design	4	1	2	2.2.10
Deficiencies in estimation	1	1	3	2.2.14
Deficiencies in tendering	5	7	4	2.2.15
Deficiencies in land acquisition	-	2	-	2.2.21
Deficiencies in execution of work	2	6	4	2.2.25

The observations are given in the succeeding paragraphs.

Deficiencies in survey and design

2.2.10. Prior to taking up irrigation works, surveys, plans, measurements and specifications as may be necessary for assessment of the suitability of the designs are to be undertaken and completed. The survey and investigation work is carried out by in-house engineers or outsourced to consultants. Based on the details collected about the site conditions, the estimate and Detailed Project Report (DPR) of the works are prepared. The works are taken up after receipt of technical sanctions and administrative approvals.

There were deficiencies in the survey and investigation, resulting in cost and time overruns. These instances are given in **Sl. No. 1 to 6 of Annexure-8.** A few illustrative cases of the deficiencies in survey and design are given below.

Non-identification of seepage in the canal

2.2.11. The work of Kattepura Anecut canals (117 kms) in CNNL was awarded (May 2010) to SNC Power Corporation Limited (Contractor) for ₹ 121.39 crore. The excessive seepages in the canal over a length of 24.66 kms due to the presence of Harangi canal which passes in the vicinity were noticed by the contractor at the time of execution. This resulted in EFI of ₹ 12.99 crore.

Government stated (November 2014) that the sub-surface inflows during the monsoon period of canal networks occur, but it could not be noticed as the survey work was undertaken in the summer season.

The reply is not acceptable as CNNL was aware of the existence of Harangi canal in the vicinity and seepages existed in a vast length of 24.66 kms and hence the survey was deficient to that extent, resulting in extra expenditure.

Change in designs

2.2.12. The work of improvements from Km.61 to 65 and from Km.70 to 73 of Malaprabha Right Bank Canal in KNNL was proposed (March 2008) to be taken up to improve the flow of water.

We observed that though the tenders were invited[36] after approval of TSC in March 2008, the TSC visited the site in December 2008 and then approved (February 2009) the tender subject to the condition that the lining works were to be executed without steel reinforcement. This was because of the hard surface of the soil in the canal. This necessitated revision of contract with Sri.N.B.Hosmani (contractor), from ₹ 16.35 crore to (March 2010) ₹ 13.44 crore.

During the inspection (March 2010) of the work, the Chief Engineer observed variations in the top layer of the soil and also change in the side slope as against the design slope, necessitating concrete lining in hard embankment. The TSC approved (August 2010) the proposal for modifications.

The request of the contractor for higher rates was not agreed to by the KNNL and the contract was closed (January 2011). Thereafter, fresh tenders were invited twice (March 2011, November 2011[37]) and after the third attempt the tender was awarded (May 2012) to Sri.Kariyappa Devappa Chennur for ₹ 16.21 crore with completion date as May 2013. The contractor, however, commenced the work only in March 2014. The work was in progress in November 2014.

The proposal for changes after inviting tenders and awarding of the work indicates that the survey was deficient. These resulted in the work, which had to be completed by June 2010, not being completed as of November 2014 and thus defeated the objective of containing seepages for the last six years.

Government replied (November 2014) that the delay was due to sorting out technical problems faced during the process of finalising tenders as necessitated by the site conditions and could not be foreseen. The reply is not tenable, in as much as the condition of the site would have emerged during preliminary survey and this had not been factored in before preparing the estimates and inviting tenders.

Non-adherence to the recommendations of the expert committee

2.2.13 The Expert committee nominated by TSC of KBJNL, which inspected (1 March 2007) the aqueduct from Km.8.18 to 10.48 of Distributary No.9A of Narayanpur Right Bank Canal, had directed KBJNL to ascertain the techno-economic feasibility of the proposal and confirm that the proposed alignment would not pass through the mines area of Hutti Gold Mines Company Limited (HGML).

[36] In four packages: Km.61, 62 (package 11), Km.63, 64, 65 (package 12), Km. 70, 71 (package 14), Km.72, 73 (package 15).

[37] Together with additional works of ₹ 6.51 crore.

We observed that KBJNL, invited (22 March 2007) tenders without confirming from HGML and awarded the work to M/s.APR Construction Company for ₹ 25.78 crore. Subsequently, HGML informed (January 2008) that the proposed aqueduct was liable to be damaged due to vibration from heavy and secondary blasting from mining operations. The request of the contractor for enhanced rates was not agreed to and the work was rescinded (October 2010). The balance work was recast at ₹ 47.49 crore work and re-tendered (February 2011). The work was awarded (August 2011) for ₹ 67.27 crore to Sri.G.Shankar, who completed it at a cost of ₹ 73.21 crore in February 2014.

Thus, failure to take up the issue of the proposed alignment with HGML and propose an alternate alignment before taking up the work resulted in delay in execution by four years and consequent increase in cost of the project by ₹ 22.01 crore[38].

Government replied (November 2014) that the TSC had accorded clearance for the work and tender proposals as per original estimate. The reply is not acceptable because the TSC during inspection stated that KBJNL should confirm that the proposed alignment would not pass through the mines area and the instructions of the TSC had not been complied with before inviting the tenders.

Deficiencies in estimation

2.2.14 The key to effective contract management is the completion of all required preliminary steps before a contract is awarded *i.e.*, DPR should contain justification for taking up the work, details of survey and investigations conducted, estimates of cost and time prepared and availability of materials ensured.

We observed that the Companies failed to make proper estimation of costs, leading to undue delay and additional expenditure. The cases indicating the deficiencies in the estimation and its impact are given below.

Table 2.2.4: Deficiency in estimation

Deficiency	Inflating the estimate (₹ in crore)	Reply of the Government and remarks
Initial lead of one kilometre was not deducted while providing additional lead charges for two items[39] of work in Modernisation of Kattepura Anecut Canal in CNNL. In addition loading/unloading charges, which were already part of the rates were also included separately in the estimates.	1.00	Government accepted (November 2014) the observation and stated that recovery would be effected.

[38] ₹ 67.27 crore less (₹ 47.49 crore less 5 *per cent* below premium quoted by APR Constructions) less ₹ 0.13 crore savings.

[39] Providing impervious/pervious casing embankment with soil from borrow areas and providing and laying 80 mm thick in situ 'M15 grade' with 20 mm downsize for canal lining.

Deficiency	Inflating the estimate (₹ in crore)	Reply of the Government and remarks
There were errors in adoption of item rates[40], in respect of Package-I and Package-V of modernisation of Vishweswaraya Canal system and Devaraya Anecut Canals in CNNL.	0.72	Government replied (November 2014) that the rates arrived at were correct. The reply is not acceptable as difference in calculation was mainly due to the fact that negotiation in respect of Packages mentioned in the observation were held in the 3rd quarter (2012-13), while the rates considered for updation were of 4th quarter (2012-13) thereby overestimating the updated cost. Further, the adoption of basic rate in respect of grass turfing was incorrect.
While arriving at the item rate, the taxes (VAT) and other overheads were worked out on finished item rates instead of basic rates for the item of work[41] of construction of Raising main in Alambur DWS work of CNNL. In addition, a component of sales tax at 10.36 *per cent*, which was not envisaged under the Statute, was provided in addition to composite value added tax at 4 *per cent*, in the estimate on 'finished rate *less* fabrication charges of materials'. This resulted in inflating the cost per running metre (Rmtr) of MS pipes to ₹ 34,402 instead of ₹ 28,889 per Rmtr, thereby boosting the estimate by ₹ 24.23 crore for actual length of 43,953 Rmtr of raising main.	24.23	Government stated (November 2014) that while arriving at the estimated cost of MS Pipes, overheads, other charges, contractor's profit and a component of Sales Tax at 10.36 *per cent* were correctly considered. However, it is evident that the calculation of overheads, taxes on the final cost arrived at, and sales tax at 10.36 *per cent* in addition to the composite VAT at 4 *per cent* is incorrect. Hence, reply is not acceptable.
In respect of eight works[42], excavated soil was under-utilized and in three works[43], it was not utilized fully in CNNL. There was neither any standard/base proposed for utilizing the excavated soil nor were any soil test/quality control reports annexed to the estimates justifying the quantum of	8.68	Government replied (November 2014) that the excavated soil was not re-usable due to site conditions. In support of their claim, no soil test report or Quality control reports of the excavated soil and

[40] Providing fabricating and placing in position steel bars, providing grass turfing to side slopes and filling murrum/gravel or by earth masters and power rollers.

[41] Item of work of manufacturing, providing, transporting, rolling, levelling, laying and jointing, testing, commissioning of Mild Steel (MS) pipes.

[42] Package-II, III, IV, V of Vishweshwaraya Canal system (30 *per cent*), Km.0 to 25.25 of Kabini Left Bank Canal (46.47 *per cent*) and CC lining to Km.0 to 20, Km.20 to 40 and Km.40 to 60 of Kabini Right Bank Canal (6.54 *per cent*).

[43] Modernisation of Chamaraja Anecut Canals, Modernisation of Mirle and Ramasamudra Anecut Canals and Modernisation of Devaraya Anecut Canals.

Deficiency	Inflating the estimate (₹ in crore)	Reply of the Government and remarks
non-usable excavated soil. Had the excavated soil been re-used in the works, additional cost of ₹ 8.68 crore paid for getting the balance quantum of soil for the works could have been avoided.		the borrowed soil by the contractor were furnished to audit. In the absence of the said reports, audit is unable to verify the veracity of the claim.
Though the works[44] were in the nature of providing fresh CC lining works, CNNL adopted the item of work for embankment under the head 'preliminary and maintenance works' instead of 'canal and allied works'.	1.79	Government contended (November 2014) that the item of works under the head 'canal and allied works' is for fresh works. Hence suitable specification for the items under 'preliminary and maintenance work' head was adopted. During the review of works of modernization of Kattepura Anecut Canals, Mirle and Ramasaudra Anecut Canals, Chamaraja Anecut canals *etc.*, it was observed that the divisions adopted the correct item of work under 'Canal and allied works'. Hence, the reply is not acceptable.
During the execution (August 2008) of the work[45] in KBJNL, there were defects in estimate in working out the ground levels, quantities of surface boulders and strata classification. The Managing Director had also observed (January 2010) that although strata classification was done by a geologist; it was the ultimate responsibility of the Executive Engineers. The excavated quantity was 18.87 lakh cum as against the estimated quantity of 13.91 lakh cum, resulting in EFI/EIRL amounting to ₹ 7.82 crore.	7.82	Government replied (November 2014) that during the course of execution it was found necessary to carryout controlled blasting as per the actual site condition encountered and also mainly due to objection from the public in that area, due to which essential deviations were made in the alignment. Also, due to variation in ground levels, quantities of excavation exceeded the estimates. Reply is not acceptable as the correctness of the site conditions in the survey should have been ensured by KBJNL. Failure to do so resulted in EFI of ₹ 7.82 crore.
In respect of five works[46] in KNNL, weightage of 25 *per cent* was allowed even on items falling under the heads 'Cross Drainage works', 'Maintenance works' *etc* in Schedule of Rates	22.64	Government replied (November 2014) that CD works were also part of 'canal and allied works' and assured to look into the payment of weightage in final

[44] CC lining of Km.0 to 20, Km.20 to 40 and Km.40 to 60 of Kabini RBC.

[45] Construction of NRBC 9A Distributary Package-I, III & IV.

[46] Modernization of Tungabhadra LBC Main canal (Km.0 to 177) and distributaries of Tungabhadra LBC in five packages.

[47] Considering the period from last bill (January 2012/November 2012/June 2013) to till date (August 2014).

Deficiency	Inflating the estimate (₹ in crore)	Reply of the Government and remarks
instead of allowing only for the items under 'Canal and Allied works' resulting in additional financial burden of ₹ 11.25 crore. Further, in deviation to the SR stipulations, the payment of weightage was released in part bills resulting in interest loss of ₹ 11.39 crore[47].		bills. The reply is not acceptable as the SR has separate set of rates for CD works where the weightage was not provided.

Deficiencies in tendering

2.2.15 Tender means the formal offer made for supply of goods or services in response to an invitation for tender published in a Tender Bulletin. The Government of Karnataka enacted the Karnataka Transparency in Public Procurements Act, 1999, (KTPP), to ensure transparency in public procurement of goods and services by streamlining the procedure in inviting, processing and acceptance of tenders by Procurement Entities, and for matters related thereto.

2.2.16 As per rule 17 of KTPP Rules, the Tender Inviting Authority shall ensure minimum bidding time of 30 days for works costing up to ₹ two crore and 60 days for works costing above ₹ two crore. Any reduction in the time has to be specifically authorized by an authority superior to the tender inviting authority with reasons to be recorded in writing.

We observed that

- CNNL had allowed less than 60 days (for works costing over ₹ two crore) in respect of 30 works. In respect of four works CNNL had sought approval for reduction of time under 17 (2) of KTPP Rules. The reasons for reduction of time were also not kept on record.
- In KBJNL, the stipulated period of 60 days was not provided for eight works and in respect of three works, the stipulated period of 30 days was not provided.
- In KNNL, the stipulated period of 60 days was not allowed in respect of all the selected works.
- Further, none of the Companies had adopted the Standard Tender Document as directed by the Government of Karnataka.

Government stated (November 2014) that due to urgency of work, the time limit prescribed could not be adhered to and this had the approval of higher authorities. The reply is not acceptable as approval of the higher authorities had not been obtained for the short term tender. It also does not explain the fact that works had not been completed within the stipulated time even though the works were said to have been taken up on urgent basis.

The cases indicating deficiencies in tendering are given in the following paragraphs.

Non-acceptance of tender within the validity period

2.2.17. Tenders were invited (March 2006) for the work of earth work excavation, formation of embankment and providing CC lining in Km.12 to 13 and Km.13 to 14 respectively of Common Canal of Varahi Project of KNNL. Several corrigenda changing the scope of work were issued over the next one and a half years, which resulted in opening the bids only in September 2007. The lowest quotes of Ramkey Infrastructures Private Limited at ₹ 3.91 crore and ₹ 4.58 crore were found acceptable. KNNL accepted (June 2008) the tender after the validity date (six months). The contractor refused to enter into an agreement as the rates were not acceptable to him. Though there were delays in paying compensation to farmers and obtaining clearances from the Forest Department, KNNL proceeded with the tendering process.

Both the works were re-tendered (December 2009) and were awarded (April 2010) to Sri.G.Shankar and Sri Manjushree Constructions. These works were completed in May 2012 and June 2013 at a cost of ₹ 10.75 crore and ₹ 13.24 crore respectively.

Thus, non-finalisation of the two tenders in time resulted in an extra cost of ₹ 15.50 crore.

Government accepted (November 2014) that the tenders could not be finalised in time, which resulted in the extra expenditure.

Delay in award of work due to flaws in tendering

2.2.18 The Arkera branch canal which runs for 22.87 kms and Wadavatti branch canal which runs for 40 kms were proposed to be constructed on the distributary of NRBC of KBJNL with the objective of irrigating 5,522 ha and 8,678 ha respectively. The work of the main distributary of NRBC had been completed in February 2014.

The tenders for the work of construction of Arkera Branch Canal, in three packages, were invited in July 2011. However, the tenders were cancelled (January 2012) because of inclusion of a bidder in the financial bid even though the bidder had been disqualified in the technical bid.

Revised tenders were invited between March and July of 2012 and the works were awarded (June and September 2012) after a delay of 14 to 16 months. The work was to be completed in 12 months. However, it has not been completed till date (August 2014).

Similarly, tenders for works of Wadavatti branch canal were invited for ₹ 40.52 crore in four packages in March 2012 (package 1), March 2013 (package 2), November 2013 (package 3) and October 2013 (package 4). Package-1 should have been completed before September 2013 and the other packages by the end of December 2014. While the progress in respect of Package-1 up to March 2014 was ₹ 9.32 crore, work on the other packages was yet to start (August 2014).

Defective tender evaluation process and non-synchronization of works resulted in delaying the project. The objective of providing irrigation facilities

to 14,200 ha in the drought prone area (Deodurga and Manvi taluk in Raichur district), had not been achieved even after seven years.

The reply (November 2014) of the Government was silent on non-synchronization of works which resulted in the delay of the project.

Extra expenditure due to defective tender clause

2.2.19 We observed that, in the work of providing drinking water to 52 villages of Gulur-Hebbur Hobli by CNNL at a cost of ₹ 55 crore, the part '*or at the rate entered in the agreement, which is / are lower*' in Clause 13(b) of the contract for regulating the payment beyond 125 *per cent* of estimated quantity, was deleted. This resulted in additional liability of ₹ 22.47 lakh.

Government replied (November 2014) that the deviation was due to oversight and the payment had been restricted to rates as per standard condition based on the audit observations, and that the Company should not bear any extra expenditure on this account.

Insurance

2.2.20 As per condition no.1 of the Financial Bid, the Contractor shall provide necessary insurance to cover loss of damage due to fire, lightning, collapse, defective workmanship, flood, storm, theft, burglary, malicious damage, third party liability *etc*. The insurance had to be taken in the joint names of the Companies and the Contractor and a copy of the policy should be furnished to the Companies within two weeks from the award of the Contract. We observed that in respect of the test checked works, the contractors had not furnished any insurance document.

Deficiencies in acquisition of land

2.2.21 The land required for the projects were acquired through Revenue Authorities and Special Land Acquisition Officers. The compensation for the land was paid to the landowners. The tender notification issued by the Companies included a condition that if any part or whole of land required for the work was not yet acquired, it should be the responsibility of the contractor to procure possession of such land by consent of the land owner before commencement of work at no extra cost to the Companies.

The cases where there were deficiencies in acquisition of land are given in the following paragraphs:

Delay in completion of work due to land acquisition issues

2.2.22 The KNNL prepared (December 2005) the estimates for the construction of minors[48] under Kamatagi distributary[49]. Tenders were invited

in January 2006 and the work awarded (January 2006) to Dhileep Constructions at ₹ 98.70 lakh with a stipulation to complete the work in four months (May 2006).

[48] Canal having discharge of less than 25 cusecs.

[49] B1-36 of Shirur direct minor Km.1, 2, 3 and Shirur minor Km.1, 2, 3 - earthwork, lining and Cross drainage works.

We observed that KNNL had not provided clear site for execution. The 4(1) and 6 (1) notifications under the Land Acquisition Act, for acquiring the land were issued in April 2006/September 2009[50] and August 2007/May 2010 respectively. The land compensation award was issued in July 2009 / June 2011 after a further delay of two to four years. The work was completed in May 2012, after a delay of six years at a cost of ₹ 1.25 crore.

Failure to provide clear site resulted in a delay of six years in completion of the project and non achievement of creating irrigation potential in 642.88 ha, apart from extra expenditure of ₹ 0.27 crore.

Government (November 2014) stated that the situation was unavoidable as there were delays in payment of compensation to land owners.

The reply is not acceptable as notifications for acquisition of land were issued after awarding the work.

2.2.23 KNNL invited (March 2006) tenders for the work of earthwork excavation, formation of embankment and providing lining including cross drainage works in Km.8.40 to 9 of Varahi Common Canal (VCC). After issue of six corrigenda for changes, KNNL entered into (June 2008) an agreement with the lowest bidder Durga Construction Company[51] (contractor) for ₹ 3.20 crore with a stipulation to complete the works by December 2009. Due to the problems encountered in land acquisition, completion of the work was delayed. KNNL extended the date of completion up to June 2011.

The work progressed very slowly as there was obstruction from Kumki landholders[52] due to non-payment of compensation and the financial progress achieved up to June 2011 was only ₹ 81.89 lakh. The matter of payment of compensation to Kumki landholders was taken up by KNNL with the Government in July 2011 and the Government approved (April 2012) the compensation.

The request (June 2011) of the contractor to pay the then current rates to complete the balance work was not accepted (September 2011) by KNNL and hence the contract was closed (June 2012). The balance work (₹ 2.38 crore) was put to tender by clubbing with other works[53] and awarded (March/April 2012) to SNC Power Corporation for ₹ 6.21 crore[54].

We observed that the decision to award the works before paying compensation to landholders resulted in time and cost overruns.

Government confirmed (November 2014) the facts and stated that the situation was unavoidable as there were delays in payment of compensation to land owners.

[50] For different stretches of land.
[51] Agreement was signed by Sri.K.Subsashchandra Shetty.
[52] Leased / un-authorised construction on government land.
[53] For Km.2 to 3, Km.3to 4, Km.8.4 to 9, Km.10 to 11, Km.14 to 18.725.
[54] Considering only the items related to the work.

Delay in work due to non-availability of land for dumping excavated soil

2.2.24 The estimate for earthwork and lining of Ghataprabha Right Bank Canal (KNNL) - Km.144 and Km.145 (balance works) was awarded (March 2005) to Shri B.J.Jogi (contractor) at ₹ 2.73 crore with a stipulation to complete the work by September 2005.

The contractor could not complete the work within the stipulated time and could achieve a financial progress of ₹ 59.01 lakh only. The contractor represented (February 2006) that the work could not progress due to obstruction by farmers for dumping excavated of soil and for blasting, as the farmers were under the apprehension that water in their bore wells would go dry.

The Chief Engineer granted extension of time sought by the contractor on three occasions for completing the works (up to March 2006, January 2007 and August 2009) with application of penalty on per day basis[55]. Two additional works (road crossing, hard rock) with an extra financial implication of ₹ 67.33 lakh were also entrusted (December 2006/June 2011) and supplementary agreement was entered into in July 2011.

The contractor was not in agreement with levy of penalty while extending the time for completion. The contractor requested for short closure of the work, which was accepted (August 2011). The contractor had shown a financial progress of ₹ 2.70 crore and balance work to be executed amounted to ₹ 70.25 lakh.

KNNL re-tendered (June 2013) the balance work in two packages (Km.144 and Km.145 separately) and awarded them to Sri R. H.Yadahalli for ₹ 69.13 lakh (Km.144) and Sri. M. M. Mundewadi for ₹ 67.46 lakh (Km.145). While the contractor for Km.145 entered into an agreement in June 2014, the contractor for Km.144 did not execute the agreement.

We observed that the work, which should have been completed in six months (by September 2005), is still pending even after eight years, as there was obstruction to the dumping of excavated soil. In the interest of completion of work, KNNL should have taken action to acquire/lease land for dumping the excavated soil. As a result of the delay in execution, the cost of the work increased by ₹ 66.34 lakh.

This was accepted (November 2014) by the Government.

Deficiencies in execution of works

2.2.25 Execution is an important phase of completing the work. Necessary care has to be taken to ensure that the sites are handed over in time, the men and machinery mobilized, periodical monitoring undertaken and work executed as per approved design. We observed that there were deficiencies in the execution of works. The cases are given in **Sl. No. 7 to 17 of Annexure-8.**

[55] ₹ 25 per day (up to March 2006) and ₹ 150 per day (January to August 2009).

A few illustrative cases of the deficiencies in execution of works and billing are given below.

Non achievement of desired irrigational potential in Varahi project

2.2.26 The Varahi Project (KNNL) was approved (March 1979) by the GoK for ₹ 9.43 crore pending approval of the Central Government. After several deliberations and consequent modifications, the final project cost of ₹ 569.53 crore was approved (March 2006) by GoK. Necessary clearance from the Ministry of Environment and Forests (MoEF) was also obtained as the modifications required environmental clearance. Thus, after 26 years of proposal and preparation of DPR, the project work was finally started only in March 2006.

According to the modified proposal, the Project consisted of construction of diversion weir, common canal (VCC) for 18.725 kms, left bank canal (VLBC, 44.35 kms from off take point), right bank canal (VRBC, 43.0 kms from off take point) and lift canal (VLIC for 33 kms starting from 4thKm. of VLBC) to irrigate 15,702 ha of land. By the time KNNL was formed in December 2003, preliminary survey, construction of office buildings and staff quarters, and VLBC works from Km.0 to 4 and Km.7 to 10 had started and ₹ 34.16 crore had been spent (by GoK).

The work of construction of weir was completed in April 2009 at a cost of ₹ 73.20 crore, the work of VLBC up to 29th Km. was in progress (22nd Km. was complete) and the works of VRBC and VLIC were yet to be taken up. The total expenditure on the works of weir, VLBC and VRBC as of March 2014 was ₹ 541.90 crore.

The work of common canal (VCC) was made into 14 packages and work commenced between July 2007 and April 2012. Of these, six works were completed and eight works were under progress. The delay in the execution of these works ranged between six and 72 months. Due to delay and change in design, as against the contracted amount of ₹ 234.46 crore, expenditure of ₹ 257.40 crore including EFI of ₹ 98.85 crore had already been incurred as on August 2014.

The Varahi project was envisaged to make use of tail race discharge from Varahi Hydel Scheme to benefit the villages of Udupi and Kundapura taluks. This project, approved by GoK in 1979, was brought under the Accelerated Irrigation Benefit Programme (AIBP) and had been in receipt of central assistance under AIBP since 2007-08. The extension of the target date for completion of the project from 2010-11 to 2012-13 was accorded as the project could not be completed on time. The completion date has now been extended to March 2015.

The objectives of AIBP were to accelerate ongoing irrigation projects and to realise bulk benefits from the completed projects. In spite of bringing the project under AIBP, KNNL failed to accelerate the works and ensure completion within the time-frame.

On a review of the works, it was noticed that there were instances of change in scope and design, deficiencies in tendering (Paragraph 2.2.17), not making available hindrance free land to the contractor and delay of compensation to the land owners by the revenue department (Paragraph 2.2.23). This led to adoption of subsequent Schedule of Rates, increased soil excavation and increased width of berm and consequent delay in completion of the project.

The project has been delayed and the amount of ₹ 541.90 crore spent (March 2014) on the project did not meet the intended objective of providing water to irrigate 15,702 ha of land in Udupi and Kundapura taluks.

Government accepted the above by stating (November 2014) that the delay was due to land acquisition issues, obtaining forest clearance, technical problems encountered on account of natural calamities and geological problems.

Unnecessary excavation for foundation

2.2.27 The work of construction of high level Pre-Stressed Concrete (PSC) Road Bridge across Hemavathy river with arrangements to ensure the existing drinking water supply to Holenarasipura town was technically sanctioned by the Chief Engineer, CNNL in January 2007. The work was awarded (April 2007) to Sri.S.Narayana Reddy for ₹ 28.36 crore, with stipulation to complete in 18 months.

During excavation, it was decided (May 2007) to excavate strata at foundation level at RL 823 further, and the additional cost worked out to ₹ 4.93 crore.

The proposals for extra expenditure were approved by the TSC and BoD in January 2011 and March 2012 respectively.

We observed that CNNL had *ex-post facto* referred (April 2010) the matter to the Superintending Engineer (Designs) to examine the necessity of going beyond the approved foundation level and the necessity of deepening the floor level in the same strata. The SE had opined (May 2010) that even under the worst loading conditions, jointed hard rock was capable of taking stress at designed level itself and excavation for foundation beyond RL 823 was not necessary. SE also opined that before going for further excavation in the foundation, a geologist should have inspected the site.

Referring the matter after the work was done to SE (Designs), who opined that it was not necessary, lacked justification and the expenditure of ₹ 4.93 crore was not need based.

Excess thickness for cement concrete lining

2.2.28 The code (BIS-IS 3873 of 1993) for CC lining for canals prescribed the thickness of lining based on capacity of canal and depth of water. We observed that the Companies had provided extra thickness than the prescribed norm in the following canals.

Table 2.2.5: Details of canals with excess thickness of CC lining

Canal	Discharge capacity (cumecs)	Depth of canal (in metre)	Thickness of CC lining to be provided (mm)	Thickness of CC lining provided (mm)	Extra cost (₹ in crore)
Wadavatti branch canal	Less than 5	1.25	60	100	2.17
Arkera branch canal	Less than 5	1.35	60	100	2.40
Tungabhadra Left Bank Canal (TLBC) from Km.177 to 200	5-50	2.70	80	100	2.60
Distributary Nos. 17,21,25,31 and 32 (of TLBC)[56]	Less than 5	1.70	60/80	80/100	3.43
Km.6 to 19 of distributary No.6 under Naragund Branch Canal	Less than 5	1.20	60	80	1.26
Halyal, Karimasuthi east and Ainapur combined canals in Athani Division	5-50	1.70/ 1.75	80	100	0.34
Mandagere Right Bank Canal, Mandagere Anecut Left Bank Canal and Hemagiri Anecut Left Bank Canal	5-50	1.80/ 0.80	80	100	15.32

Government replied (November 2014) that the BIS standards specify minimum thickness and varied depending on site conditions. The reply did not provide any justification for using excess lining than the norms prescribed under the standards.

Deficiencies in the construction of Inter-connecting Canal

2.2.29 The Inter-connecting Canal work of Kalasabandura Nala (KNNL) was awarded (August 2008 to February 2011) in four packages at a cost of ₹ 140.53 crore[57], and was to be completed in May 2012. But none have been completed till August 2014.

We observed that the Geo-technical survey for this project was done by Karnataka Power Corporation Limited by taking limited trial bores. However, the TSC directed that estimates be prepared after taking trial bores at 30 metre intervals. Accordingly, geological investigation was carried out and a geological report was obtained from Sri.G.R.Deshpande (consultants), who was a retired officer of KPCL. Both the surveys reported existence of hard rock, but the strata encountered during execution was different. As a result, a committee was formed to investigate, which again comprised of retired officers of KPCL who opined that soil investigation might sometimes be misleading. In view of the strata being different, KNNL had to change the method of execution from 'open cut canal' to 'cut and cover' from ch:750 to ch:2505, at a cost of ₹ 158.69 crore. This eventually led to additional

[56] The H.S.Chinival committee appointed to study the canal suggested (December 2005) provision of CC lining of 100 mm by paver means for main canal of TLBC between Km.0 to 73.60.

[57] Further, one additional work (no. V), as an extension of work no. IV, was awarded in December 2013 at a cost of ₹ 73.32 crore.

expenditure of ₹ 54.54 crore apart from delaying the work by two years as of August 2014.

Due to the incorrect/unreliable report, not only was there an unreasonable delay in completion of the project, but also an increase in cost. As a result of the delay, the drinking water requirements of 13 towns of Hubli and Dharwad District and villages of Malaprabha basin were not met (August 2014).

Government replied (November 2014) that the geotechnical survey done by the first consultant was deficient and hence the second report was based on the actual site conditions. It also stated that the consultants had opined that soil investigation had its own limitations. The reply is not acceptable as trial pit was resorted to, as the first report was prepared unscientifically with the trial bores being taken at only five places. In spite of carrying out the soil test again, the hard rock said to have been present did not exist and a different stratum was encountered. Had the report been correct, the presence of hard rock should have been seen at least in some stretches. The report of the consultants was, therefore, inaccurate. KNNL should have entrusted this important work to a reputed organisation like the Geological Survey of India instead of entrusting it to a consultant, who was a retired official of KPCL. This incorrect report resulted in the Company having to incur extra expenditure.

Non-recovery of penalty

2.2.30 Clause 2(d) of the tender agreement stipulates that in case of shortfall in progress of work, the contractor shall be liable to pay penalty equal to one *per cent* of the estimated cost of the balance work assessed according to the programme, for every day that the due quantity of work remains incomplete, provided that the amount of penalty to be paid shall not exceed 7.5 *per cent* of the estimated cost of the entire work.

In four works[58] executed by CNNL and three works[59] executed by KBJNL, the total penalty leviable as per above clause for delay in completion was ₹ 9.72 crore and ₹ 4.31 crore respectively. Against this, CNNL had recovered an amount of ₹ 5.40 lakh. The balance of ₹ 13.98 crore is yet to be recovered (August 2014).

Government accepted (November 2014) the observation and stated that the penalty amount would be recovered on case-to-case basis.

Acknowledgement

We acknowledge the co-operation extended by the WRD and the three Companies in facilitating the conduct of audit.

[58] Km.0 to 60 (three packages) of Kabini Right Bank Canal and Km.0 to 25.25 of Kabini Left Bank Canal.

[59] Package I, III and IV of NRBC distributary 9A.

Conclusions

We concluded that

In many works, proper survey and investigation had not been carried out. Estimates were inflated as there were errors in adoption of item rates and taxes. Process of acquisition of land was taken up after the works were awarded. There were instances where the works underwent major changes after the works were awarded. Different components / chainages were not synchronized. There was non-compliance to Statutes, contractual terms and conditions resulting in undue benefit to contractors and extra financial implications.

As a result , there was increase in the cost of the works and delays in the completion of projects leading to deprival of the expected benefits thus affecting the livelihood of the farmers.

Recommendations

We recommend that the Government

- **institute a mechanism of the tender issuing authority certifying that acquisition of required land, payment of compensation and obtaining of forest/environmental clearances have been completed before issuing the tender.**
- **consider forming a cell to co-ordinate and expedite clearances from the statutory bodies.**
- **fix responsibility on the consultants for abnormal variations in survey so that extra financial implications are avoided.**
- **fix reasonable time limits for various stages in the tendering process in order to obtain competitive rates.**
- **direct the TSC to approve the tenders after ensuring that all related works in different chainages are synchronized to create the envisaged irrigation potential.**