Chapter-II

2. Performance review relating to Government company

Assam Power Generation Corporation Limited

Implementation of Karbi-Langpi Hydro-Electric Project

Highlights

The 100 MW Karbi-Langpi Hydro Electric Project sanctioned in September 1979 at a cost of Rs. 36.36 crore, was completed at a cost of Rs. 414 crore in March 2007, involving cost overrun of Rs. 377.64 crore and time overrun of over 20 years.

(Paragraph 2.1)

Audit review, covering a period from April 2000 to March 2007, indicated that a delay of over four years and a cost overrun of Rs. 49.22 crore could have been avoided had the Government provided a counter-guarantee to PFC loan promptly instead of delaying it by over four years.

(Paragraph 2.8)

Deficient execution of the project activities led to avoidable extra expenditure of Rs. 10.40 crore.

(Paragraphs 2.9 to 2.14)

Appointment of a consultant in November 2004 for implementation of project ensured that the balance work of the project was completed in March 2007 with minimum delays subsequent to his appointment.

(Paragraph 2.15)

Introduction

2.1 Karbi-Langpi Hydro Electric Project (KLHEP), to be located at Amtereng (Lower Borpani) in Karbi Anglong District, Assam was sanctioned (September 1979) by the Planning Commission at an estimated cost of Rs. 36.36 crore with an installed capacity of 100 MW (two units of 50 MW each) and was scheduled to be commissioned by 1986. The execution of the project was the responsibility of Assam State Electricity Board (ASEB) upto March 2005 and that of Assam Power Generation Corporation Limited (APGCL) thereafter due to restructuring of ASEB. The General Manager (Project) was responsible for the project execution under overall supervision of the Managing Director of the Company. The project was finally completed and commissioned in January 2007[*] and March 2007[**] at a total cost of Rs. 414 crore, involving cost overrun of Rs. 377.64 crore and time overrun of 20 years.

Scope of audit

2.2 The performance audit of the project was conducted during January to April 2008 covering the execution of the project, mainly during the period from April 2000 to March 2007. Audit reviewed the records maintained in the project office, in addition to records at the Headquarters of the Company. Out of total expenditure of Rs. 414 crore on the project, Rs. 288.10 crore was incurred after March 2000. Of this, Audit test check covered an expenditure of Rs. 150 crore.

Audit objectives

2.3 The audit was conducted with a view to ascertain whether:

- the project was implemented economically, efficiently and effectively;
- an adequate and effective monitoring mechanism for the project was in place;
- the funds were arranged and utilised economically; and
- the execution of the work was as per terms of the contracts and agreements entered into.

Audit criteria

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

- the estimated cost of the project envisaged in the Detailed Project Report;

[*] (Unit-I: 50 MW)
[**] (Unit-II: 50MW)

- scheduled date of commencement and commissioning of the Project;
- applicable statutes, rules and regulations and Government orders;
- the terms and conditions of loans by the lenders; and
- the terms and conditions of contracts/agreements entered into by the Company for execution of works.

Audit methodology

2.5 Audit followed the following mix of methodologies for achieving the audit objectives:

- examination of loan agreements entered into with the lenders;
- examination of records relating to project and tendering, evaluation and award of contracts;
- examination of documents relating to execution of contracts; and
- issue of audit observations and interaction with the Management.

Audit findings

2.6 Results of performance audit on implementation of KLHEP were reported to the Government/Management in May 2008 so as to consider the viewpoints of Government/Management before finalising the review. The meeting of Audit Review Committee for State Public Sector Enterprises (ARCPSE) held on 25 July 2008 was attended by the Deputy Secretary to Government of Assam, Department of Power (Electricity), Chief General Manager (Finance & Accounts) from Assam State Electricity Board (ASEB) and General Manager of the Company. The views of the Government and the Management have been taken into consideration while finalising the review. Audit findings are discussed in succeeding paragraphs.

Project initiation and delay

2.7 The project was sanctioned in September 1979 with an estimated cost of Rs. 36.36 crore and was scheduled to be commissioned by 1986. The construction work of the project commenced during 1979-80 with infrastructure development activities. The process of award of contract for all the major works was completed in 1982. The contract for construction of gravity dam was awarded (August 1982) to Sibson Construction Company but had to be terminated (March 1987) due to poor performance of the contractor and the work was handed over (September 1987**)** to National Project Construction Company (NPCC), a Government of India (GOI) enterprise. As NPCC also could not achieve the desired rate of progress, the contract was terminated in December 1992. The commissioning of the project was deferred

due to slow progress of the major components of the project as a result of agitation, restriction on use of explosives, inadequate cash flow and natural calamities.

In the wake of introduction of liberalised economic policy of the GOI, the Government of Assam (GOA) signed (March 1993) Memorandum of Understanding (MoU) with ASEB and Subash Projects & Marketing Limited (SPML) to get the balance work completed. SPML promoted (April 1993) a company in the name of Bharat Hydro Power Corporation Limited (BHPCL). An agreement was signed between GOA, ASEB and BHPCL in April 1993 for completion of the balance work of the project and subsequent operation of the project after completion. However, as the progress of work was unsatisfactory and BHPCL failed to ensure expeditious completion of the project, GOA took over the KLHEP (November 1996) and entrusted the remaining work to the erstwhile ASEB *vide* Ordinance No.11 of 1996 which was ratified by Act No.1 of 1997.

A revised DPR was prepared in May 1999 indicating a cost of Rs. 166.68 crore for the balance work and an estimated completion time of 42 months. The requirement of fund was to be met mainly from a loan Rs. 125 crore from Power Finance Corporation Limited (PFC). However, due to failure of the Government to provide a counter guarantee to PFC, as discussed in ***Paragraph 2.8*** below, the project was again delayed by over four years. This also led to revision of estimates for the balance work to Rs. 215.90 crore in December 2004. The date of completion of project was revised to December 2006 which was also not adhered to resulting in further time overrun of three months with reference to DPR (and of 12 months as per revised target dates) and cost overrun of Rs. 41.24 crore, as described in subsequent paragraphs. This cost overrun is also likely to go up as all the bills have not been finally settled (July 2008).

Project funding

2.8 The funds for execution of the project were arranged as follows:

Sl. No.	Particulars	Amount *(Rupees in crore)*
1.	Public Bond	113.75
2.	PFC Loan	125.00
3.	Equity	68.11
4.	State Government Loan	58.27
5.	State Government Grant	51.66
	Total	**416.79**

By March 2000, the ASEB had already incurred an expenditure of Rs. 125.90 crore on the project. The estimated cost for completion of the balance work of the project was assessed at Rs. 166.68 crore, for which Rs. 125 crore loan was to be availed from PFC and the balance loan amount was proposed to be obtained from North Eastern Council funds. The loan of Rs. 125 crore for

completion of the project was sanctioned (July 1999) by Power Finance Corporation Limited (PFC) subject to submission of counter-guarantee from the State Government before release of the fund.

However, the State Government did not provide counter-guarantee upto September 2004. The Government/Management did not assign any reason for delay in furnishing counter-guarantee. As a result, the Company could not pursue the project as envisaged. The State Government finally issued the counter-guarantee in October 2004. However, the cost of the work had to be revised to Rs. 215.90 crore in December 2004 due to delay.

Failure of State Government to provide counter-guarantee in time led to cost overrun of Rs. 49.22 crore.

Having taken up the project, there appeared to be no justification for not providing the counter-guarantee by the Government. Thus, the failure of the State Government to provide counter-guarantee for a loan not only resulted in delay in execution of project by over four years but also led to cost overrun of Rs. 49.22 crore. This time and cost overrun was avoidable.

Project execution

2.9 The Project was revived in December 2004 (after receipt of counter-guarantee) at an estimated cost of Rs. 215.90 crore. Though as per DPR the commissioning of both the units were planned by December 2006, the Company set the revised target date as December 2005 and March 2006 in respect of Unit I and II respectively. However, due to delay in construction of gravity dam, supply and erection of gate components/generator the commissioning schedule had to be extended from time to time and Unit I and Unit II were finally commissioned in January 2007 and March 2007 respectively. The table below indicates the time overrun ranging from six to fifteen months in respect of five critical contracts:

Sl. No.	Package	Time scheduled as per contract	Actual time taken	Time overrun
1.	Construction of dam	31 March 2006	February 2007	11 months
2.	Supply and erection of gate components	31December 2005	March 2007	15 months
3.	Supply of missing generator parts and supervision of erection	Supervision 1935 man-days	2260 man-days	325 man-days
4.	Erection of TG components	Unit-I: 31 December 2005 Unit II: 31 March 2006	31 March 2007 31 March 2007	15 months 12 months
5.	Tunnel construction	7 May 2006	November 2006	6 months

As against the revised target of December 2005 and March 2006, the units were commissioned in January 2007 and March 2007, resulting in time overrun of 12 months. By March 2007, an expenditure of Rs. 257.14 crore was incurred on the project, thus, registering cost overrun of Rs. 41.24 crore. This cost overrun may increase as all bills have not yet been settled.

Audit test checked 15 works costing Rs. 150 crore and found that there was a time overrun ranging from six to 15 months with reference to revised target of December 2005/March 2006 and cost overrun of Rs. 41.24 crore in these works. Audit scrutiny indicated that of this, time overrun of 12-15 months and

cost overrun of at least Rs. 10.40 crore was avoidable with better planning, execution and monitoring as brought out in the succeeding paragraphs.

Construction of gravity dam

2.10 The work of construction of concrete dam with appurtenant works for 2 x 50 MW Karbi Langpi Hydro Electric Project was awarded to Gammon India Limited (GIL), Mumbai for a contract price of Rs. 64.12 crore in April 2000. As per contract, the entire work was to be completed by October 2002. Due to delay in furnishing the counter-guarantee, PFC loan of Rs. 125 crore could not be availed which resulted in stoppage of work. The work was recommenced in December 2004 after receipt of PFC loan and was finally completed in March 2007 after incurring an extra expenditure of Rs. 16.16 crore with a time overrun of 11 months. This extra expenditure was on account of revision in contract price due to passage of time (Rs. 10.83 crore), idle charges (Rs. 4.43 crore) and interest and finance charges (Rs. 89.54 lakh). The delay was due to poor mobilisation of men and machinery which resulted in non achievement of 600 Cubic Meter concrete per day, break down of plant and machinery, delay in supplying pre-cast beam for bridge dock and geological surprises encountered in the dam site which was not properly surveyed beforehand.

Excess payment on price escalation

2.10.1 The contract price of GIL was enhanced (October 2004) for supply/service rendered during the extended period (November 2002 onwards) of the original contract. The revised contract agreement stipulated that escalation was payable on November 2002 base index. Audit observed that the Company paid escalation to the contractor based on the 1999 base index. Thus, the contractor was paid an excess amount of Rs.3. 54 crore as detailed in the table:

Payment of escalation against the terms of contract agreement resulted in excess payment of Rs. 3.54 crore and interest loss of Rs. 0.44 crore.

Sl. No.	Particulars	Amount paid based on 1999 Base index	Amount payable based on November 2002 Base index	Excess amount paid
		(Rupees in crore)		
1.	Labour	2.22	0.91	1.31
2.	Ancillary Materials	1.72	0.80	0.92
3.	Transportation	2.76	1.45	1.31
	Total	**6.70**	**3.16**	**3.54**

The Management stated (July 2008) that excess escalation on supply of steel, if any, paid to the contractor shall be adjusted from the final bills. The reply of the Management is not justified since in June 2007 the Company had paid Rs. 10 crore as advance for enhancement of contract price. Failure to adjust the excess payment led to interest loss to the Company which amounted to

Rs. 44.10 lakh[*] as on July 2008 and would further increase till the amount is adjusted.

Payment of enhanced rate for supplies made prior to enhancement of contract rate led to excess payment of Rs. 0.20 crore.

2.10.2 In Bill of Quantities (BOQ) the Company had included 310.953 MT of steel at enhanced rate which was supplied prior to October 2002. This resulted in excess payment of Rs. 19.77 lakh[**] as undue benefit to the contractor. The Management stated (July 2008) that the enhanced price would be applicable as this quantity was consumed after October 2002. The reply is not acceptable because the material in question was procured prior to enhancement of rates.

Erection, testing and commissioning of hydraulic gates

2.11 The work of design, manufacturing and supply of balance part and erection of hydraulic gates for concrete dam was awarded to Om Metals and Minerals Limited (OMML) for a contract price of Rs. 21.76 crore in March 2005. As per work order the work was to be completed by December 2005. However, the work was completed in March 2007 with a time overrun of 15 months. The delay was due to late placement of purchase orders for radial gate leafs, gantry crane, latch assemblies and trunnion assemblies as a result of improper planning.

Loss of interest on premature payment for Hydraulic Cylinder

2.11.1 The work order issued (March 2005) to OMML at a contract price of Rs. 21.76 crore, *inter alia,* included the price of hydraulic cylinder which was payable 100 *per cent* at the time of import of materials. The payment of Rs. 5.83 crore in respect of hydraulic cylinders was released in March 2005, whereas the contractor imported the equipment in April 2006. Thus, release of fund to the contractor much in advance, resulted in blocking of Rs. 5.83 crore for one year and loss of interest of Rs. 67.04 lakh calculated at a normal overdraft bank rate of 11.5 *per cent per* annum.

Payment of advance much in advance of the import of materials led to loss of interest of Rs. 0.67 crore.

The Management stated (July 2008) that material was not readily available and had to be manufactured for which advance was considered necessary. The reply is not tenable since advance was released without monitoring opening of Letter of Credit on placement of purchase order.

Un-reasonable price in supply and fabrication of steel materials

2.11.2 For preparation of estimates, guidelines adopted by the Central Water Commission (CWC) were followed. These guidelines *inter alia* provided for profit margin of 15 *per cent* in respect of big works and did not consider transportation cost in respect of fabrication work. While finalising the contract, the Company envisaged Rs. 5.81 crore as a cost of replacement/re-furbishing at the rate of Rs. 1,58,931 per MT in respect of old damaged

Provision of higher rate for supply and fabrication in the contract led to avoidable expenditure of Rs. 0.66 crore.

[*] worked out at the rate 11.5 *per cent* for 13 months.
[**] {(Rs. 31,859-Rs.25,500) x 310.953 MT}

equipments supplied earlier. The Management considered the element of 20 *per cent* as fixed charge (profit margin) and included transportation cost element of Rs. 3,000 per MT towards fabrication cost. This unreasonably increased the cost of supply and fabrication. As worked out in audit the difference in cost was Rs.12,041 per MT totalling to Rs. 65.64 lakh in respect of supply and fabrication of 545.144 MT of mild steel.

Irregular fixation of erection price – extra expenditure

2.11.3 As per CWC guidelines, the erection rate of gate components was equal to 70 *per cent* of the cost of mild steel (Rs. 30,586) and the contractor was to be allowed 15 *per cent* towards overhead and profit as discussed in preceding ***Paragraph 2.11.2***. The erection cost worked out to Rs. 24,622 per MT. Audit scrutiny revealed that the rate of erection was accepted as Rs.26,843 per MT resulting in extra expenditure of Rs. 21.22 lakh on 955.274 MT of gate components.

Fixation of erection price in violation of CWC guidelines led to extra expenditure of Rs. 0.21 crore.

Irregular procurement of crane

2.11.4 The Company placed a purchase order on OMML for supply of gantry crane alongwith girder and rail without ascertaining the cost from the Original Equipment Manufacturers (OEM) like TELCO (Tata Engineering and Locomotives) and Escorts in Indian market. The cost of gantry crane was based on the cost estimate of radial gates used for blocking the dam water whereas gantry crane was to be used for lifting purpose. Therefore, bill of material which was required for manufacture of radial gate was quite different from that of gantry crane. The consultant for the project also remarked that the fabrication rate for radial gate could not be applied for gantry crane as this did not form part of hydraulic gate components. Further, the fabrication cost of radial gate (170 *per cent* of steel cost) was not applicable in fabrication of gantry crane, and instead 117 *per cent* of steel cost as adopted for cat walk-way should have been reckoned. Thus, due to the adoption of radial gate rate for supply and fabrication for gantry crane, the Company incurred an avoidable expenditure of Rs. 89.98 lakh.

Irregular fixation of supply and fabrication price of gantry crane led to avoidable expenditure of Rs. 0.90 crore.

Extra expenditure on excise duty

2.11.5 The contract (March 2005) with OMML provided for fabrication of gate components at Company's workshop situated in Jagiroad, Assam on which excise duty was not payable. The contractor, however, fabricated only 79.344 MT at Jagiroad workshop and remaining 465.80 MT at his Kota factory premises on which he paid excise duty of Rs. 1.21 crore. The reimbursement of excise duty to the contractor was in violation of the contract condition which resulted in extra expenditure.

Loss due to non insurance of the Project

2.11.6 After recommencement of work, it was observed from the joint inspection in March 2005 and physical verification report prepared by the consultant and OMML that, many gate, hoist and crane components could not be located either in the Company's godown at Jagiroad or at the project site. Besides, over the years various gate components had suffered varying degree of rusting and damage due to exposure to vagaries of weather in the open yard. Audit scrutiny of the records revealed that the project had procured 296.296 MT of gate components valued at Rs. 4.71 crore from OMML against missing items. In addition, 248.848 MT of material valuing Rs. 3.95 crore was also procured against partially damaged items. Since the project was not insured after taking over from BHPCL, the Company lost the opportunity of recovering this amount from the insurer.

Due to non-insurance, the Company lost the opportunity to recover the expenditure of Rs. 8.66 crore incurred for replacement of missing/ damaged stores.

The Management stated (July 2008) that as the material was kept in the open yard without any fencing and security arrangements, no insurance company had shown their interest for coverage of risk. The fact, however, remains that the management did not provide proper security arrangements for the safety of the materials.

Supervision of erection and commissioning of electro-mechanical equipments

2.12 The work of erection, dismantling and re-erection of turbine part was awarded to Superec India in April 2005 for a contract price of Rs. 1.95 crore. As per contract, the work was to be completed by December 2005 (unit I) and March 2006 (unit II) respectively. However, the work was completed in March 2007 with a time overrun of 12-15 months. The delay in execution was due to non-employment of skilled man power in adequate strength which resulted in extension of supervision contract executed by Sumitomo Corporation, Japan.

Non-supply of skilled manpower led to avoidable additional cost of Rs.2.41 crore on supervision charges.

The contract for supply of missing components of generator and supervisory work on erection and commissioning of electro mechanical equipments for the project was awarded (July 2005) to Sumitomo Corporation, Japan. The work of erection and commissioning of turbine generator was awarded (March 2005) to Superec India. Sumitomo had agreed not to include overtime cost since skilled workers were to be supplied by Superec. Since, Superec failed to provide skilled manpower, Sumitomo charged supervision charges of Rs.1.59 crore for the period (January 2007 to March 2007) and over time cost of Rs. 82.36 lakh. The Company could not ensure adequate supply of skilled manpower from Superec and incurred avoidable additional cost of Rs. 2.41 crore.

Undue benefit to the consultant

2.13 The work of consultancy services for successful implementation of 2x50 MW KLHEP was awarded (December 2004) to Lahmeyer International (India) Private Limited (LII) at a total value of Rs. 4.89 crore. As per work schedule the project completion in all respect was to be achieved by December 2006. But due to delay in construction and other works of the project, the work of the consultant was extended upto February 2007.

Payment of commissioning charges in violation led to undue benefit of Rs. 0.20 crore to the consultant.

An amount of Rs. 20.09 lakh was payable to the consultant on commissioning of each unit of the project. Since the second unit of TG set was commissioned after the expiry of consultative service, the amount was not payable and the same was also communicated (August 2007) to the consultant by the General Manager of the project. The bill was, however, subsequently passed and forwarded (January 2008) to the Chief General Manager (Hydro) for payment. Thus, payment of consultancy services beyond the contracted obligation led to undue benefit to the consultant.

The Management stated (July 2008) that the consultant had completed his job of commissioning even before the actual commissioning of the second unit. The reply is not acceptable as the consultant did not attend to testing and syncronisation of Unit I and II, performance tests, installation of lift in the dam, compilation of operational manual and final project completion report. As such the consultant was extended undue favour.

Avoidable expenditure on hire charges of DG Set

2.14 The work of construction of low pressure tunnel including approach channel was awarded (March 2005) to Hydel Construction Private Limited (Hydel) at a total cost of Rs. 4.93 crore. As per clause 6.3 of the work order, the contractor was required to make arrangement for generating power during power failures. The hire charges of DG set including operation and maintenance charges were payable as per CWC guidelines for actual hours used or at minimum monthly hour (250 hours), whichever was higher. The consultant of the project assessed (July 2005) the load as 146 KW and recommended power requirement of 110 KVA considering 60 *per cent* of the activities going at the same time. Based on this, the Company was asked to hire only a 125 KVA DG set. In the meantime, the contractor had installed a DG set of 320 KVA in excess of the requirement which was not objected to by the Company.

Hiring of higher capacity D.G. set than the actual requirement led to avoidable expenditure of Rs. 0.43 crore.

The hire charge of 125 KVA DG set and the cost of POL based on CWC guidelines as calculated by audit for the period from June 2005 to August 2006 (during which the 320 KVA DG set was used by the contractor) worked out to Rs.33.01 lakh whereas the Company paid an amount of Rs.76.14 lakh. This led to an avoidable expenditure of Rs. 43.13 lakh.

The Management stated (July 2008) that it had connected 488 KVA at various fronts of the work including colony. However, as the contract provided for using DG set only for the purpose of construction, hiring of 325 KVA DG set was not justified. Moreover, the related work had been sanctioned (May 2005) with connected load of 111 KW. As such, installation of higher capacity DG set was unwarranted.

Project Monitoring

2.15 The Company monitored the project using the Programme Evaluation and Review Technique (PERT) and Critical Path Method (CPM) which are techniques commonly used to monitor the progress of work. The Company instead of preparing revised PERT chart and CPM after revival of the project in December 2004, had adopted the old December 1999 chart in May 2004 and fixed the commissioning by December 2006 considering 84 months from January 2000. Thus, the Company had not properly planned the project commissioning after revival. Moreover, the schedule date of commissioning as seen from various work orders had set December 2005 for unit I and March 2006 for unit II as target without carrying out corrections in the PERT and CPM chart. Further the Company appointed Lahmeyer International (India) Private Limited as consultant for overall supervision. As per contract consultant had to prepare construction schedule to match the overall project schedule. The consultant was monitoring the progress of work and submitting the status monthly to GM (Project) and MD. The progress of work was also monitored regularly by the BOD in its meetings. Thus, though the execution of balance work of the project was delayed by 12 months, the same was completed within 28 months, thereby keeping the delay at minimum, as a result of appointment of consultant in November 2004.

Acknowledgement

Audit acknowledges the co-operation and assistance by the Management and Staff of the Company and the concerned officers of the State Government at various stages while conducting the performance review.

Conclusion

The Karbi Langpi Hydro Electric Project (100 MW) sanctioned in September 1979 at a cost of Rs. 36.36 crore, was completed at a cost of Rs. 414 crore in March 2007, involving cost overrun of Rs. 377.64 crore and time overrun of over 20 years. Both time and cost overrun were partly unavoidable (caused due to delay on account of agitation and natural calamities) and partly avoidable through better planning and execution of project activities and funding.

Audit review, covering a period from April 2000 to March 2007, indicated that the time overrun of over five years could have been avoided had the

Government provided a counter-guarantee to PFC loan promptly and the Company executed and monitored subsequent project activities properly. This time overrun and inadequate handling of the project activities led to increase in cost by Rs. 59.62 crore which was avoidable.

Thus, though the project was commissioned and has commenced generating power, its implementation was neither economical nor efficient. The project funding was not properly planned and executed. The monitoring of the project was not upto the desired level though the appointment of a consultant for the project in November 2004 helped in minimising the delay.

Recommendations

The Government/Company, while executing hydro-electric projects in future, may consider to ensure that:

- **effective system of mobilisation of the funds is in place before venturing into new project; and**
- **modern monitoring techniques like PERT chart, Critical Path Method are actually utilised for executing and monitoring projects.**

The matter was reported to the Government in May 2008; their reply was awaited (September 2008).