

MINISTRY OF POWER

CHAPTER VIII

North Eastern Electric Power Corporation Limited and NHPC Limited

Implementation of 10th Plan hydel projects in North Eastern and Eastern regions

Highlights

NHPC Limited (NHPC) and North Eastern Electric Power Corporation Limited (NEEPCO) planned for capacity addition of 642 Mega Watt (MW) and 85 MW respectively in North Eastern and Eastern regions during the 10th Five Year Plan (10th Plan) period (2002-2007). NHPC could not add any capacity within the 10th Plan while NEEPCO could add only 25 MW during this period. Further, against the 10th Plan revised outlay of Rs.6,853 crore for implementation of 13 Hydroelectric Projects (HEPs), NHPC could utilise only Rs.3,998 crore within the 10th Plan period and Rs.5,165 crore till March 2008. Against the 10th Plan outlay of Rs.2,509 crore for implementation of eight HEPs, NEEPCO could utilise only Rs.692 crore within the Plan period and Rs.983 crore till March 2008.

(Para 8.2)

Such shortfalls were on account of delays in environmental and forest clearance coupled with delays in investment decisions, delays in signing of Memorandum of Understanding (MOU)/Memorandum of Agreement (MOA) with the State Governments, natural calamities, geological surprises, law and order problems and handing over of some of the projects to the private developers by the Government of Arunachal Pradesh. In case of NEEPCO, preparation of deficient Detailed Project Reports (DPRs) further complicated the matter.

(Para 8.2)

NHPC

Finalisation of tenders took inordinately long time. The time taken to finalise tenders ranged between 14.5 to 33 months.

(Para 8.5.1.1)

Due to poor contract documentation NHPC lost Rs.12.05 crore in arbitration.

(Para 8.5.1.2)

Teesta Stage-V HEP was completed with a time overrun of 13 months due to geological surprises and deviations in Bill Order Quantity (BOQ) and extra items.

(Paras 8.5.2.2, 8.5.1.2 and 8.5.2.3)

Commissioning of Teesta Low Dam Project-III (TLDP-III) HEP was delayed by 30 months.

(Annexure XXVII, Paras 8.5.2.1 and 8.5.2.5)

There was wide variation in BOQ in civil works of Teesta Stage-V HEP. The main reasons for deviations with consequent increase in scope of work were on account of change in geological conditions not envisaged in the DPR, change in construction design and drawings, technical specification and site requirement and inadequate provisions in the contract.

(Para 8.5.2.3)

Due to delay in depositing Net Present Value (NPV), the forest clearance was delayed leading to 12 months delay in commencement of work in Subansiri Lower.

(Para 8.5.3.1)

With almost complete withdrawal of NHPC from Siang Basin, the capacity addition programme of NHPC during the 11th and 12th Five Year Plans will be considerably affected with consequent deferment of revenue generation.

(Para 8.5.4)

NEEPCO

In spite of wide dispersion of sites and high values of individual packages, NEEPCO issued work orders for three civil packages to a single contractor because of which progress of work suffered.

(Para 8.4.2.1)

NEEPCO incurred infructuous expenditure of Rs.3.17 crore due to conversion of underground penstock to surface penstock due to inadequate geological information.

(Para 8.4.3.2)

Poor fund and contract management delayed completion of the project in Kopili HEP Stage-II with consequential deferment of commercial operation due to non-availability of adequate water at the end of the rainy season.

(Para 8.4.4)

Summary of recommendations

- 1. The process of acquiring clearances needs to be reviewed in view of delay in obtaining environmental clearances. The Companies should also request Ministry of Power (MOP) to conduct Environment Impact Assessment (EIA) and Environment Management Plan (EMP) through Ministry of Environment and Forests' (MoEF) institutional arrangements to ensure expeditious clearance of hydro electric projects.*
- 2. The companies may request MOP to resolve contentious issues like flood moderation, type of the projects (run-of the river or storage scheme) prior to allotment/ taking-up of a hydel project.*

3. *To ensure transparency in the bidding process, date of submission of pre-qualification documents and technical bid should be specified and pre-qualification of bidders should be finalised within the specified date.*
4. *NHPC may consider entering into strategic tie-ups with reputed international survey agencies for increasing the effectiveness of Survey and Investigation(S&I).*
5. *The time and money stipulated for carrying out S&I may be suitably enhanced in line with global standards.*
6. *In view of cost involved, NEEPCO and MOP need to take early decision regarding continuation of the Tuirial project. Further, future DPRs should be prepared on the basis of adequate investigation to avoid major deviations during execution of projects.*
7. *With the changing policies/rules in allotment of hydel projects, the companies need to vigorously pursue with the MOP, Government of India (GOI) as well as State Governments to avert the loss of potential and attractive sites. The companies may also forward strategic proposal to the GOI for clubbing the relatively easy sites with tougher ones for development by them.*

8.1 Introduction

8.1.1 The North Eastern region (NER) and Eastern region (ER) of India have huge hydro electric power potential. The potential has been estimated at 58971 MW and 10949 MW in NER and ER respectively which together constitutes 47 per cent of the country's total hydro potential. Out of the total estimated potential of 58971 MW and 10949 MW, only 4029 MW (seven per cent) and 5755 MW (53 per cent) has been tapped in NER and ER respectively.

NHPC Limited was set up in 1975 to plan, organise and promote integrated and efficient development of hydroelectric power. The installed capacity of NHPC was 5175 MW of hydropower. During 10th Plan (2002-03 to 2006-07) NHPC targetted a capacity addition of 4357 MW¹. This was subsequently revised to 3252 MW including 642 MW in the ER/NER.

NEEPCO was set up in 1976 with a mandate to plan, organise, promote, investigate, survey, design, construct, generate, operate and maintain hydro and thermal power stations in the NER. As on March 2008, NEEPCO had an installed capacity of 1130 MW (755 MW hydro and 375 MW thermal). During the 10th Plan period, NEEPCO was given a capacity addition target of 85 MW.

8.1.2 Energy security

Going by the nine per cent growth envisaged in the 11th Five Year Plan, the Central Electricity Authority (CEA) assessed a requirement of additional generation of one lakh MW of power by the year 2012 to achieve power for all. The capacity addition planned and achieved during Five Year Plans were as under:

¹ All India target

Table 8.1

Five year Plan	All India Target (MW)	Achieved (MW)	Achievement (%)
8 th	30538	16423	53.8
9 th	40245	19119	47.5
10 th	41110	21180	51.5

The above table shows that actual capacity addition during the last three five-year plans ranged around 50 *per cent*. This was largely on account of delays in environmental clearance, geological surprises, natural calamities, rehabilitation and resettlement issues, appraisal problems, delays in signing of Memorandum of Understanding (MOU) and delays in investment decisions. These led to peak shortage (12.6 *per cent*) as well as energy shortage (7.5 *per cent*) on account of mismatch between demand and capacity. In this scenario and the fact that India is not endowed with large primary energy reserve, expeditious development of hydel power assumes significance. Hydel stations are the best choice for meeting peak demand. In addition, hydel stations are eco-friendly and do not have any emissions.

8.1.3 Scope of Audit

The performance audit covers the implementation of 10th Plan Hydel Projects in North Eastern regions and Eastern regions by NEEPCO and NHPC during 2002-03 to 2007-08.

8.1.4 Audit objectives

The performance audit was conducted to assess whether:

- the capacity addition programmes were drawn up on the basis of detailed study;
- time taken to obtain various clearances from different project clearance authorities were reasonable;
- contract management was sound and effective;
- projects were implemented efficiently and economically; and
- achievement was consistent with the targets set in 10th Plan.

8.1.5 Audit criteria

The following criteria were adopted for reviewing the implementation of 10th Plan projects:

- Guidelines on project clearance issued by Ministry of Power (MOP), Government of India;
- Parameters set in Detailed Project Reports (DPRs);
- CEA and Central Water Commission (CWC) guidelines/Company Guidelines/ Industry best practices on implementation of Hydel projects;
- Central Vigilance Commission (CVC) guidelines on contracts; and
- Geological Survey Reports.

8.1.6 Audit methodology

After a preliminary study and collection of background information, Entry conferences were held on 4 March 2008 (NHPC) and 22 April 2008 (NEEPCO) for discussion of audit objectives and audit criteria with the Managements of the companies. Test audit was conducted during April 2008 to August 2008. Finally, Exit conferences were held on 11 August 2008 (NEEPCO) and 14 August 2008 (NHPC) to discuss the audit findings and recommendations.

8.1.7 Audit sampling

In case of NEEPCO, all major contracts (15) valuing Rs. five crore and above were selected for examination. All the minor contracts in Bichom Dam Complex (Kameng project) valuing Rs.50 lakh to Rs.5 crore were selected and from the remaining contracts (577) valuing less than Rs.50 lakh, 30 contracts were selected by adopting simple random sampling method. In case of NHPC, all contracts (16) valuing Rs. five crore and above were selected by audit. 25 per cent of the 62 minor contracts of Teesta-V, Teesta Low Dam Project (TLDP)-III and TLDP-IV valuing Rs.50 lakh to Rs. 5 crore were selected and from the remaining 2192 contracts valuing less than Rs.50 lakh, 30 contracts were selected by adopting simple random sampling method.

8.1.8 Audit acknowledgement

Audit acknowledges the cooperation and assistance extended by the Managements of NHPC and NEEPCO at various stages of the performance audit.

8.2. 10th Plan targets vis-à-vis achievements

NEEPCO could add a capacity of only 25 MW against the proposed capacity addition of 85 MW (*Annexure-XXIII*). Further, against the 10th Plan outlay of Rs.2,509 crore for implementation of eight Hydro Electric Projects (HEPs), NEEPCO could utilise only Rs.692 crore till March 2007 and Rs.983 crore till March 2008 (*Annexure-XXIV*). Out of eight projects, two projects were under execution (Kameng HEP and Tuirial HEP), one project was commissioned (Kopili Stage-II), two projects were being handed over to the State Government (Lower Kopili HEP and Tuivai HEP) and two projects were awaiting clearance (Pare HEP and Tipaimukh HEP). Further, DPR of Ranganadi Stage-II HEP was not approved due to high tariff and the State Government had also withdrawn all authorisation for undertaking Survey and Investigation (S&I) works and preparation of DPR for projects where no MOA was signed. Thus, execution of this project on which NEEPCO incurred Rs.7.37 crore (upto May 2008) had been stopped.

Against the proposed capacity addition of 642 MW in NER and ER, NHPC could not add any capacity within the 10th Plan. Further, against the 10th Plan outlay of Rs.12,755 crore for implementation of 13 hydel projects, which was revised to Rs 6,853 crore during mid-term appraisal of 10th Plan, NHPC utilised only Rs.3,998 crore within the Plan period (March 2007) and Rs.5,165 crore till March 2008 (*Annexure-XXV*). Out of 13 NHPC projects (*Annexure-XXVI*), two projects were scheduled for commissioning during 10th Plan. However, only Teesta Stage-V HEP has been commissioned till April 2008 after delays of 13 months from the scheduled date of completion. Two projects were handed over to private developers, three projects were abandoned, four projects were facing stoppage and three projects namely TLDP-III, TLDP-IV and Subansiri Lower Project (SLP) were under execution (March 2008). NHPC had incurred an expenditure of

Rs.1,957 crore till March 2008 (*Annexure-XXV and XXVI*) on Subansiri Lower Project without signing the MOU for this project with the Government of Arunachal Pradesh (GOAP). NHPC had taken up the issue of signing of MOU with MOP but it yielded no fruitful result (September 2008).

The reasons for gross under- utilisation of plan outlay were as under:

- Delays in environmental and forest clearance coupled with delays in investment decisions, signing of MOU and Memorandum of Agreement (MOA) with the State Governments (*Annexure-XXVIII, paras 8.3 and 8.5.4*).
- Preparation and approval of DPR with inadequate and invalid data with consequential changes in drawings and design leading to time and cost over-runs (*paras 8.4.1 and 8.4.3*).
- Delays in award of works, delays in supplies and construction by contractors and contractual problems (*paras 8.4.1, 8.4.2 and 8.4.4*).
- Natural calamities and geological surprises (*paras 8.5.2.2, 8.5.2.5 and 8.5.2.6*).
- Handing over of projects to the private developers by one of the State Governments (*para 8.5.4*).
- Law and order problems and lack of effective co-ordination among the multilateral agencies including State Governments (*Annexure-XXVI*).

8.3. Procedure for clearance of Hydro-electric power projects

The guidelines issued (June 2001) by the MOP envisaged three stage development of new Hydroelectric Power Project. Stage-I involved vetting of estimates, Ministry of Environment and Forests' (MoEF) clearance, commercial viability and Stage-II involved preparation of DPR, completion of Environment Impact Assessment (EIA) and Environment Management Plan (EMP), Techno-Economic Clearance (TEC), land acquisition and infrastructure works, Public Investment Board (PIB) meeting and submission of Cabinet Committee of Economic Affairs (CCEA) note. Stage I and Stage II were to be completed within one year and one and a half years respectively. Actual project execution would be done during Stage-III, which begins with the approval of CCEA, which specifies sanctioned cost and the scheduled time for completion of the project.

It was observed that total time taken for two stage clearances of the four ongoing projects in ER and NER of NHPC under 10th Plan ranged between 37 months and 63 months². Scrutiny revealed that the delays occurred as NHPC submitted incomplete proposal forms, delay in examination of proposals by clearance authorities, raising of multiple set of queries in phases by different project clearance authorities³ and Management's delay in submission of compliance report to MoEF for final forest clearance (*Annexure-XXVII*). The delays would have been considerably reduced if the Management had submitted their application form complete in all respects and the statutory authorities had raised their respective queries at one go. Further, simultaneous processing of forest and

² From handing over of projects to the Company to the date of Forest clearances / CCEA Clearance.

³ Central Electricity Authority, Ministry of Environment and Forest, Central Public Investment Board and Cabinet Committee of Economic Affairs.

environmental clearances with preparation of Feasibility Report (FR), EIA and EMP study would have saved the time taken for getting final forest clearance.

It was also observed that time taken for two stage clearance of the two ongoing projects under 10th Plan of NEEPCO ranged between 46 to 68 months. Scrutiny revealed that the delays occurred due to failure to complete pre-construction and infrastructure activities in time, delays in signing of Power Purchase Agreements (PPA) by State Governments, delays in forest clearance and submission of DPR with inadequate data (*Annexure-XXVIII, paras 8.4.1 and 8.4.3*).

Recommendation No. 8.1

The process of acquiring clearances needs to be reviewed in view of delay in obtaining environmental clearances. The Companies should also request MOP to conduct EIA and EMP through MoEF's institutional arrangements to ensure expeditious clearance of hydro electric projects.

8.4 NEEPCO

The audit finding regarding the execution of the projects by NEEPCO and the reasons for delay are discussed in the subsequent paragraphs.

8.4.1 Design changes

Before executing any project, survey and investigation (S&I) to ascertain the geological features likely to be encountered are conducted. DPRs are prepared on the basis of S&I and submitted to CEA for TEC and thereafter to CCEA for final approval. Once CCEA approval is accorded, actual execution of the project commences. CEA/CCEA approval is necessary in case of subsequent changes in the project parameters. DPRs for Kameng HEP (600 MW) and Tuirial HEP were prepared by CWC in 1982 and 1991 respectively.

Audit observed that in Kameng HEP, NEEPCO during the pre-construction stage conducted further geological investigations and modified the drawings and design envisaged in the DPR. This necessitated the shifting of Bichom Dam, Tenga Dam and the power house as well as reduction in the height of the dam and live storage of the reservoirs. However, the NEEPCO failed to suitably apprise the CEA at the time of submission (August 2003) of the revised cost estimate. NEEPCO informed (October 2003) CEA that project parameters and salient features of the project, as approved earlier, were unchanged. Thus, CCEA approval (December 2004) for the revised cost of Rs.2,496.90 crore was obtained for project parameters which were no longer valid. CEA noticed the alteration in design parameters in September 2005. MOP thereafter constituted (January 2006) a committee to examine reasons for the changes in design. The committee also suggested (April 2006) lowering of crest level of the dams and increase of live storage of both Bichom and Tenga Reservoirs. As a result of failure to inform CEA of modifications to original plan, work of Bichom Dam was suspended in April 2006 and was resumed only in April 2008 after finalisation of revised design.

The Management stated that modification was incorporated in the PIB Memo and Note to CCEA.

The reply of the Management was not tenable as the committee constituted by MOP observed that it was a major lapse on the part of NEEPCO.

Similarly in Tuirial HEP, instead of reviewing the project features on the basis of updated data before seeking clearances, NEEPCO merely updated the cost and obtained TEC (August 1998) and CCEA approval (July 1998) for Rs.368.72 crore. After receiving CCEA clearance, NEEPCO undertook fresh investigations which resulted in revision of design and consequential change in the cost. Thereafter the project feasibility report was finalised (December 1999). It was observed that in violation of laid down procedure, NEEPCO did not inform CEA and CWC regarding design changes and cost variations. Consequently, cost was increased by 25 per cent from the original estimate of Rs.368.72 crore. NEEPCO placed Letters of Intent (LOI) for Lots I, II and III only between September 2001 and December 2002. The work was suspended due to law and order problem (June 2004), only 30 per cent of the work was completed. After the improvement of law and order situation, NEEPCO submitted in December 2007 a proposal to MOP seeking a decision on continuance or closure of the project. The project cost was revised to Rs.705.17 crore at January 2008 price level. CEA, however, observed (May 2008) that the completion of the project including claims of the contractors for stoppage of work was estimated to cost Rs.1,100 crore. On the basis of revised project cost, the project has become economically unviable. Thus, on account of delay the future of Tuirial HEP was in jeopardy even after an investment of Rs.266 crore.

The Management accepted (October 2008) that proper planning in investigation was lacking.

8.4.2 Contract management

8.4.2.1 Selection of contractor

Review of placement of work orders for 15 packages/contracts of Kameng HEP and Tuirial HEP revealed that LOI for civil packages (I, II and III) of Kameng HEP were placed with Patel Engineer Limited (as Joint Venture in case of package-I) in December 2004 with the stipulation to complete the work in 51 months. Progress of work was, however, unsatisfactory (*Annexure-XXIX and paras 8.4.3.1 and 8.4.3.2*). The distance between the three main work sites, namely Kimi, Tenga and Bichom ranged between 45 kilometre (km) to 154 km. Considering the need to deploy resources simultaneously in the widely dispersed sites and the magnitude of individual civil packages (Rs.116.40 crore to Rs.143.81 crore) the Management should have avoided selection of common bidder for all the three packages.

Accepting the audit observation, the Management agreed (October 2008) to avoid selection of common contractor for more than one package in future projects.

8.4.3 Inadequate survey and investigation

8.4.3.1 Head Race Tunnel (HRT)

To ensure timely execution of projects, detailed S&I should be carried out and works of critical importance should be executed on priority basis by mobilising adequate men and material. It was observed that detailed investigations before starting boring work of HRT were not carried out in Kameng HEP. Consequently, geological surprises like shear zone⁴, thrust zone, entrapped water, gas and loose muck in the area of HRT were encountered during construction which resulted in deviation in quantities and increase in

⁴ Shear zone is a wide zone of distributed shearing in rock.

the value of works executed from Rs.31 lakh to Rs.1.28 crore. Further, though the work of HRT initially started in March 2005, actual work was delayed by about one year due to delay in deployment of construction equipment by the contractor. Therefore, to complete the excavation within the scheduled time (June 2008), the rate of excavation should have been increased to 660 metre per month. The actual progress, however, was 31 metre per month on an average. NEEPCO thereafter, decided (December 2007) to induct additional tunneling equipment to enhance the rate of tunnel boring with grant of additional interest free advance of Rs.18.50 crore. However, the additional tunnelling equipment had not been commissioned till September 2008. As a result, the completion schedule of the HRT had to be extended till April 2010. It was also observed that the Management did not invoke penal clauses against the contractor as provided for in the agreement.

The Management accepted (October 2008) that despite all round efforts progress was not as per target.

8.4.3.2 Change in penstock profile

On the basis of inadequate geological data, the penstock⁵ was envisaged to be fully underground with inclined shaft at two stages. Accordingly, locations of Adit⁶-V and Adit VI were selected. Construction of Adit-VI, taken up in January 2005, was frequently hindered by a series of heavy and continuous rock fall, chimney formation and heavy ingress of water at different points. On the basis of further geological study and also considering the inability of the contractor to excavate shafts and tunnels successfully, it was decided (May 2005) to convert the underground penstock to surface penstock. Accordingly, the work of Adit-V and Adit-VI was abandoned after incurring an expenditure of Rs.3.17 crore. Moreover, the modified penstock scheme would require extra works for open excavation and other related items estimated (June 2008) to cost Rs.7.40 crore.

The Management stated (October 2008) that HPT layout under revised parameters had been firmed up and boring work of underground pressure shaft had already been taken up.

8.4.4 Time over-run of completed project

The 25 MW Kopili HEP Stage-II was cleared by CCEA in July 1999 at an approved cost of Rs.76.09 crore (1998 price level) with commissioning schedule of July 2003. The project was completed in December 2003 at a cost of Rs.95.02 crore. Analysis revealed that time over-run was mainly due to irregular flow of funds to the site as a result of which payments to the contractors were often delayed affecting the progress of work, delays in settlement of rates of supplementary items of work and discrepancy in construction drawings. It was also noticed that equipment and accessories supplied by Bharat Heavy Electricals Limited were not in conformity with the approved drawings and thus required modifications. Audit also observed that by the time the unit was test synchronised in December 2003, the rainy season was over and the water available was not adequate for 72 hours' trial operation before commercial operation. Therefore, commercial operation started only from July 2004.

⁵ *Pipe which carries water from reservoir to turbines in the power house.*

⁶ *Adit is a type of entrance to underground tunnels (under construction) which is horizontal or nearly horizontal.*

The Management stated (October 2008) that delay was also due to adverse law and order problem, water problem, adverse geological formation and shifting of transmission tower. Thus, poor fund and contract management delayed completion of the project, with consequential deferment of commercial operation.

Recommendation No. 8.2

(i) In view of cost involved, NEEPCO and MOP need to take early decision regarding continuation of the Tuirial project. Further, future DPRs should be prepared on the basis of adequate investigation to avoid major deviations during execution of projects.

(ii) NEEPCO should ensure that CEA/MOP are kept informed of any expected changes in design parameters to avoid delays in completion of project.

8.5 NHPC

8.5.1 Contract management

The total number of major packages for implementation of Teesta-V, TLDP-III, TLDP-IV and SLP were six, three, three and four respectively. The observations of audit on the process of tendering from issue of Notice Inviting Tender to final selection of contractors of these 16 packages are dealt with in the succeeding paragraphs.

8.5.1.1 Selection of contractors

(i) Civil works for Teesta Stage-V were executed in four packages. For each of these packages, pre-qualification of bidder was made by the Tender Committee by August 2000. GIL⁷ along with its JV partner was pre-qualified only for package four. On the representation of three bidders including GIL, NHPC revised the list of pre-qualified bidders for the other three packages. GIL was not included. On further representation by GIL, the NHPC considered (September 2000) GIL for the third package though GIL had failed to pre-qualify twice for this package.

The Management's reply offered no justification for this. NHPC in this process took 60 days for revision of the list. Thereafter, bid documents were issued to nine pre-qualified bidders, six of whom submitted bids and were found technically suitable. On opening of price bids (February 2001), Sikkim JV became the L1 bidder. The Tender Committee, however, disqualified Sikkim JV as it sought to change the Joint Venture partner. As the bid document did not have a suitable penal clause, there was no deterrent to prevent exit of the qualified L1 bidder. Consequently, the contract of Rs.349 crore went to GIL, the L2 bidder, though they had failed to pre-qualify twice on various grounds.

(ii) Pre qualification (PQ) documents for electromechanical work of TLDP-III were sold even after expiry of the validity period.

The Management stated (June 2008) that this was done at the request of three internationally reputed firms as well as for obtaining better competitive rates.

The Management's contention is to be viewed in the light of the fact that 13 firms had purchased PQ documents within the due date.

⁷ Gammon India Limited

(iii) As per June 2004 circular tendering activities from the date of publication of NIT to the date of issue of letter of award were to be completed within 9.5 months. It was observed that out of 16 major packages, tendering activities of 15 packages took 14.5 months to 31.5 months.

The Management stated that extensions during tendering did not have any impact on the award of work, which was linked with CCEA approval.

The contention of the Management was not tenable because even after CCEA approval, the tendering process took 13 to 33 months in 10 cases out of 16 cases.

8.5.1.2 Short comings in contract documentation and monitoring

It was observed that:

(i) Contract conditions of FIDIC⁸ were adopted with certain modifications. These modifications, however, failed to keep a balance between rights and obligations of the NHPC and the contractors. As a result, 74 claims (March 2008) amounting to Rs.905.16 crore were lodged by the contractors.

The Management replied that GOI has constituted (March 2008) a task- force for development of Model Contract Documents for hydro projects.

(ii) As per sub-clause 52.2 of the contract document, in case of deviation of Bill Order Quantity (BOQ) beyond 25 *per cent* to 30 *per cent* and more than two *per cent* of contract sum, contractors would get revised rates for the deviated quantities. The mechanism for working out revised rates for deviated quantities and extra items, however, was not clearly specified. As a result, the rate submitted by the contractor was not accepted by NHPC leading to delay in finalisation of revised rates as well as disputes with the contractors.

The Management replied that recommendation made by a committee formed for developing the mechanism of working out revised rates for deviated quantities and extra items in December 2006 was yet to be approved.

(iii) Contract document relating to the BOQ rates for concrete/short-crete⁹ indicated that payment to contractor shall be adjusted upward or downward at the rate of cement stipulated in schedule 'B'. It was observed that schedule 'B' was missing from the contract document. As a result, when a dispute arose with contractors in respect of fixation of rates for reimbursement of claim of Rs.12.05 crore (March 2008) for use of cement more than nominal content¹⁰, the same could not be settled. The arbitration award went in favour of the contractors.

The Management accepted that absence of schedule 'B' in the contract document was responsible for arbitration award in favour of the contractor.

8.5.1.3 Improper monitoring of claims

As per contractual provisions, in case of any damage contractors were solely responsible for lodging and persuasion of claims with insurance companies. In the event of part settlement and disallowance by insurance companies, the loss was to be borne by the

⁸ *Federation Internationale Des Ingenieurs Council*

⁹ *Concrete applied by spraying*

¹⁰ *Prescribed cement content used in different class of concrete.*

NHPC and the contractors in proportion to their responsibilities. Further, to monitor the follow up of claims by the contractors, project heads were required to appoint a Nodal Officer who would send quarterly report to Corporate Office. Respective engineers-in-charge were also required to maintain a register containing details of insurance claims made by contractors for each major contract package and to complain to Insurance Regulatory Development Authority (IRDA) in case of delay in settlement of claims. Scrutiny revealed that these instructions of the Corporate Office were not followed. As a result, under insurance, contractors' delays in lodging claims, poor follow up with insurance companies; delay in submission of information sought by surveyors, failure to contest the surveyors' final report, and to take up the issue of delayed settlement with IRDA could not be effectively monitored. This led to a loss of Rs.37.19 crore (March 2008) on account of disallowance or part settlement of insurance claims. The Management stated (October 2008) that the observations of Audit had already been acted upon.

Recommendation No. 8.3

- (i) *To ensure transparency in the bidding process, date of submission of Pre-Qualification documents and technical bid should be specified and prequalification of bidders should be finalised within the specified date.*
- (ii) *Evaluation criteria should be incorporated in bid document in clear and unambiguous terms as this criterion is very important to evaluate bids in a transparent manner.*

8.5.2 Project execution

8.5.2.1 As indicated in para 8.2, one project had been completed and three projects were under execution. Teesta Stage-V, commissioned in April 2008, sustained a time over run of about 13 months with consequent cost over run of Rs.450 crore. Other projects were also lagging behind the CCEA approved schedule as indicated below:

Table 8.2

Name of the project	Commissioning schedule	Actual/anticipated commissioning	Major reasons for delay
Teesta -V	February 2007	April 2008	Geological surprises and variation in Bill order quantities (<i>Paras 8.5.2.2 and 8.5.2.3</i>)
TLDP-III	March 2007	September 2009	Delay in settlement of Net present value issue, delayed in availability of drawings and flash flood (<i>Annexure-XXVII, paras 8.5.2.4 and 8.5.2.5</i>)
TLDP-IV	September 2009	August 2010	Delay in handing over fronts, delayed availability of drawings and flash flood (<i>Annexure-XXVI, paras 8.5.2.4 and 8.5.2.5</i>)
Subansiri Lower	September 2010	January 2012	Delay in settlement of NPV issue and landslides (<i>Paras 8.5.3.1 and 8.5.2.6</i>)

8.5.2.2 Geological surprises

NHPC had executed 11 hydel projects in the Himalayan range facing geological surprises like collapses and rock falls, heavy ingress of water under artesian conditions and perched underground reservoirs. Likelihood of geological surprises not anticipated at the

time of preparation of DPR results in increase in the project cost as well as delay in completion of scheduled works. Such geological surprises can be considerably minimised provided adequate S&I is carried out during preparation of DPRs.

Audit observed that despite the frequency of geological adversities, NHPC did not maintain records detailing these occurrences. Because of this, the NHPC also could not develop data bank compiling experiences gathered in course of execution of projects, which could have helped in understanding the critical issues for future reference. It was further observed that the actual expenditure (Rs.38.48 crore) on S&I fell short of the approved cost (Rs.62.56 crore). This was an activity which needs to be done thoroughly since it would have very serious implications on project execution.

The consultants engaged by NHPC for conducting Business Process Re-Engineering and Re-Structuring also opined (October 2008) that the time and money expended for carrying out S&I was on the lower side compared to global standards. The consultants felt that the NHPC needed to enter into international tie-ups for increasing the effectiveness of S&I and to bring internationally adopted methods and techniques to the projects.

It was also seen that most of the NHPC projects, which were delayed, had been affected by geological surprises. For instance, in case of lot-3 and lot-4 in Teesta-V more than 90 *per cent* of time extension (495 days and 1029 days respectively) was due to geological surprises. The magnitude of geological delays was due to either deficiency in S&I at DPR stage or relaxation of condition stipulated in the DPR during execution.

In case of Lot 4 work, in terms of the DPR, the HRT was anticipated to have a length of 35 *per cent* poor to very poor rock. Actually more than 90 *per cent* of the length had poor to very poor rock indicating inadequate S&I. In case of Lot-3, time extension was given to the contractor (GIL) on account of geology without imposition of liquidated damages. The Management's contention that time extension was given on account of formation of cavities and collapses was not tenable as there was no negative variation of rock classification compared to prediction for Lot 3 work.

Audit also observed that in violation of terms and conditions of TEC clearance, NHPC did not request the MOP to constitute an expert committee consisting of representatives of the Government of West Bengal, Geological Survey of India, CWC and CEA for recommendation of enhanced cost due to geological surprises. The Management replied (October 2008) that NHPC would take up the case of geological surprises with the MOP after basic compilation of the information. Further, in the absence of systematic maintenance of record of geological surprises, NHPC may face difficulties in getting the enhanced cost approved by the technical committee.

8.5.2.3 Wide variations in Bill Order Quantity (BOQ)

There were wide variations in BOQ in civil works ranging from (-)100 *per cent* to 39,900 *per cent* (39,680 *per cent* and 39,900 *per cent* at one occasion each) at Teesta-V. Deviations led to additional expenditure of Rs.200.90 crore (upto April 2008). NHPC additionally incurred expenditure of Rs.39.65 crore for the extra items of work not covered in BOQ. Further, there were also wide variations in BOQ at Subansiri Lower, which ranged between 2 *per cent* and 9993 *per cent* leading to additional expenditure of Rs.45 crore. Such wide variations in BOQ quantities and extra items of work led to considerable delays in execution of works. The main reasons for deviations with

consequent increase in scope of work were unforeseen circumstances arising out of change in geological conditions not envisaged in the DPR (*refer to para 8.5.2.2*), change in construction design and drawings, technical specification and site requirement and inadequate provisions in the contract. The Management stated (August and October 2008) that the extent to which variation can be reduced through S&I remained a point of debate and that the extra items and variations in BOQ quantities were unavoidable in the hydro projects due to non-homogeneity of the strata in the Himalayas. While it is accepted that variations in BOQ quantities cannot be eliminated altogether, scope for such variations could have been considerably reduced through adequate survey, investigation and geological exploration at the DPR stage (*refer to para 8.5.2.2*).

8.5.2.4 Delay in availability of drawings

Drawing and Design (D&D) Division is required to deliver construction drawings to the contractor 90 days prior to commencement of civil work. Audit, observed that NHPC could not issue civil drawings in TLDP-III and IV within the scheduled date resulting in stoppage of work. Scrutiny revealed that the main reasons for such delays were delay in furnishing required information to D&D Division by the project, dearth of staff in D&D Division and lack of inter-sectional co-ordination. The Management stated that the time limit of 90 days was not a contractual requirement. However, the fact remained that there was stoppage of works due to non-availability of drawings.

8.5.2.5 Flash flood

TLDP-III and IV experienced two flash floods of above 5000 cubic metre per seconds (cumecs) in July 2007 resulting in a loss of Rs.42.90 crore on damage of project works and cost of restoration thereof. The project authorities took six months to restart work. It was observed that NHPC had planned diversion structure at both the projects based on 10 years' monsoon flood values of 5000 cumecs considering the discharge records at Coronation Bridge down stream of TLDP-IV. NHPC had not taken into account flood values of 5650 cumecs and 5250 cumecs recorded up stream of TLDP-III and TLDP-IV in July 2003. Further as per contract, flood of more than 5000 cumecs in the river Teesta at barrage site was kept under excepted risk exempting the contractor from responsibility. NHPC did not take any insurance cover for the excepted risk. Thus, NHPC could not claim compensation from the insurance company for flood magnitude of more than 5000 cumecs. CEA observed after the flash flood that projects should consider data for 25 years or even more instead of ten years' data for designing diversion structure.

8.5.2.6 Landslides in Subansiri Lower

Subansiri Lower faced landslide at Surge Shaft in August 2005 due to non-implementation of recommendations (April 2005) of geologist. The Management stated that the contractor did not attend to the recommendations of the geologist despite communication from time to time. For this breach of instructions, NHPC did not impose any penalty; rather it paid an amount of Rs.1.99 crore towards claims of the contractor for idling of resources due to landslides and short settlement of claim by insurance company. Subsequently, there were further landslides at the powerhouse of the project in January 2008. This was attributable to non-implementation of support measures suggested (January 2007) by Design Division, non-availability of data on rock movements due to lack of proper calibration of the installed instruments and non-installation of survey targets and slope movement monitoring instruments. Further, the excavated slope behind

the powerhouse was high considering the shear parameters. The Management replied (October 2008) that additional support measures confirmed by Design Division to the project were in the process of implementation when the landslide of January 2008 took place. Thus, delay in extending additional support measures by the contractor led to the mishap.

Recommendation No.8.4

- (i) NHPC may consider entering into strategic tie-ups with reputed international survey agencies for increasing the effectiveness of S&I.***
- (ii) The time and money stipulated for carrying out S&I may be suitably enhanced in line with global standards.***
- (iii) NHPC should expedite compilation of data bank of geological surprises encountered in various projects and ensure compliance with conditions stipulated in TEC/ CCEA clearances.***

8.5.3 Environment and ecology management

Construction of hydro-projects involves submergence of land, reservoir induced seismicity, forest degradation and soil erosion, adverse impact on public health and necessitate rehabilitation and resettlement of project affected families (PAFs). To mitigate the environmental impact, funds were allocated out of project cost. The funds allocated were unevenly utilised. Scrutiny also revealed that Catchment Area Treatment (CAT) Plan essential to check upstream soil erosion, forest degradation and to meet the basic needs of the people was not implemented (June 2008) in TLDP-III due to dispute with State Government over fund requirement. Work on Catchment Area Treatment (1,663 hectare) in Subansiri Lower Project scheduled to be completed in three years from July, 2003 had not been taken up by the State Forest Department in spite of the issue being brought to the notice of MoEF. In Teesta-V, site for muck disposal as stated in the contract agreement could not be fully acquired by the Management. The quantity of disposable muck was also not assessed realistically. This led to unauthorised dumping of muck on the left bank of river at dam site and encroachment on river-bed for which forest department demanded (November 2002) Rs.15 crore as compensation for environmental loss. It was also observed in TLDP-IV that scattered dumping beyond designated areas caused riverbed pollution.

The Management stated (October 2008) that total CAT cost of Rs.6.85 crore had been intimated by the Sikkim State Government (Rs.3.44 crore) and the West Bengal State Government (Rs.3.41 crore) and Rs.1.37 crore was released to the Sikkim State Government in September 2008.

8.5.3.1 Net Present Value (NPV)

In pursuance of the Supreme Court decision, MoEF issued guidelines in September 2003, which stated that power companies would pay NPV of forestland before final forest clearance of projects cleared after October 2002. The Management deposited (March 2004) NPV for TLDP-III within three months of receiving the demand from the State Government. But in case of SLP, they sought waiver of payment of NPV as pre-condition for forest clearance. The Supreme Court directed (September 2004) NHPC to deposit Rs.300 crore. Due to delay in depositing NPV, the final forest clearance was delayed leading to commencement of work in Subansiri Lower 12 months after the scheduled

date. On account of such delays the Management had to pay Rs.24.86 crore to the contractor as idle charges. The Management stated that after vigorous efforts by the project authority with the Government of Arunachal Pradesh, there was revision of NPV rates resulting in saving of Rs.54.11 crore (September 2004). The reply was to be viewed in the light that delays in payment of NPV resulted in delays in the execution of the project and escalation of the cost of the project.

8.5.3.2 Rehabilitation and Resettlement (R&R) packages

The approved cost of implementation of R&R packages of PAFs in four ongoing projects was Rs.8.61 crore, out of which Rs.4.61 crore has been utilised (March 2008). It was observed that no expenditure was incurred (March 2008) in TLDP-III and IV due to demand for revision of the compensation package by the PAFs (TLDP-III) and non-constitution of R&R Monitoring Committee (TLDP-IV). In Teesta-V and Subansiri Lower, R&R packages were partly implemented due to non-development of infrastructural facility like training centre, primary health centre and shopping sheds. It was also observed that existing R&R packages do not provide adequate funds for welfare schemes on a sustained and continuous basis over the life of the projects and that existing packages do not have a suitable grievance redressal mechanism. These packages were also not based on common guidelines but were project specific. These concerns had since been addressed by NHPC which had adopted (February 2008) a comprehensive R&R Policy, which was amended (May 2008) to comply with the National Rehabilitation and Resettlement Policy (NRRP) 2007 framed by the GOI. However, this policy was applicable to all future projects and not for on-going projects.

Recommendation No. 8.5

- (i) The Management should request MOP for constitution of a special cell to liaise with MoEF for expeditious implementation of environmental plans.**
- (ii) NHPC may consider extending the benefits of the new R&R policy to the on-going projects.**

8.5.4 Handing over of projects

Siang and Subansiri Basin Projects were transferred to NHPC by Brahmaputra Board (BB) in March 2000 in compliance with the decision of Ministry of Water Resources. Thereafter, MOP issued (May 2000) a notification authorising NHPC to establish, operate and maintain these projects in the Central Sector. Accordingly, NHPC carried out detailed S&I for these projects and deployed resources in terms of money, manpower and knowledge base. Though MOP had approved the MOU in March 2003, the Government of Arunachal Pradesh (GOAP) did not sign the MOU, despite repeated persuasion by NHPC. Audit observed that there was lack of consensus among the State Governments on the issue of flood moderation and types of hydro schemes (run-of-the river projects or storage schemes) which affected implementation of these projects.

Subsequently, in February 2006 the GOAP unilaterally allotted the Siang Middle Project to Reliance Energy Limited (REL) and Lower Siang Project to Jaiprakash Associates. The State Government also asked (March 2006) NHPC to handover the Pre-feasibility Report, DPR along with other documents to the developers concerned. The GOI Power Policies 1998 and 2003, however, lay emphasis on basin-wise development of hydro

potential; and stipulate that allotment of all the hydel projects above 100 MW are to be decided jointly by the Central and State Government.

This would indirectly affect the continuity of Siang Upper/Intermediate project on which the NHPC had already incurred an expenditure of Rs.32.16 crore. Besides, there would be further delays in execution of the projects due to updating of DPR, obtaining various clearances and mobilisation of resources. In fact, mere change in ownership of projects may not accelerate harnessing hydel power unless contentious issues like moderation of flood and types of hydro schemes to be implemented are sorted out.

The Management stated that handing over of projects to private developers would not affect the perspective plan of the NHPC.

The Management's reply was not tenable because with almost complete withdrawal of NHPC from Siang Basin, the capacity addition programme of NHPC during 11th and 12th Five Year Plan would be considerably affected with consequent deferment of revenue generation.

Recommendation No. 8.6

(i) The Companies may also request MOP to resolve contentious issues like flood moderation, type of the projects (run-of the river or storage scheme) prior to allotment/taking-up of a hydel project.

(ii) With the changing policies/rules in allotment of hydel projects, the companies need to vigorously pursue with the MOP, the GOI as well as State Governments to avert the loss of potential and attractive sites. The Companies may also forward strategic proposal to the GOI for clubbing the relatively easy sites with tougher ones for development by them.

8.6. Conclusion

Despite a mandate for developing hydel projects in the NER blessed with huge hydro power potential, NEEPCO could commission only 755 MW of hydropower during its 32 years of existence due to its poor track record in execution of projects facing time over-run up to six years. It could also add only 25 MW capacity against the 10th Plan hydel capacity addition target of 85 MW while it utilised Rs.983 crore (March 2008) against 10th Plan outlay of Rs.2,509 crore. NHPC also got mandate for execution of a number of projects in the NER and ER. NHPC could not make any capacity addition in the NER and ER against the proposed hydel capacity addition of 642 MW in the 10th Plan. However, Teesta Stage –V of 510 MW had been added subsequently in April 2008. Further, NHPC could utilise only Rs.5,165 crore (March 2008) against the 10th Plan outlay of Rs.12,755 crore for 13 hydel projects to be executed in these regions. Such under-performance was largely attributable to delays in environmental and forest clearance coupled with delays in investment decisions and signing of MOU, MOA with the State Governments, natural calamities, geological surprises and law and order problems and handing over some of the projects to the private developers by the Government of Arunachal Pradesh.

NEEPCO was also responsible for non-achievement of 10th Plan targets due to preparation of deficient DPRs with inadequate and invalid data leading to substantial changes in drawings and design during execution. Further, NEEPCO did not keep the CEA/MOP informed of the expected changes in the design parameters of the projects taken up for execution leading to subsequent complications.

As delay in obtaining requisite clearances had affected most of the projects, the Companies should work for adoption of a fast track mechanism for obtaining the requisite clearances as non-achievement of Plan targets for hydel projects not only affects energy security of the nation but also limits the economic growth of the country. Also geological surprises due to lack of adequate thrust on thorough S&I at the DPR stage being the major concern, the Companies need to focus on providing adequate resources and time for carrying out investigations in detail.

The matter was reported to the Ministry in January 2009; reply was awaited.