

# THIRTY-SECOND REPORT

## PUBLIC ACCOUNTS COMMITTEE (1980-81)

(SEVENTH LOK SABHA)

### LOKTAK HYDRO-ELECTRIC PROJECT

MINISTRY OF ENERGY AND COAL  
(Department of Power)

action taken on 127th Report (Sixth Lok Sabha)]



सत्यमेव जयते

*Presented in Lok Sabha on.....*

*Laid in Rajya Sabha on.....*

LOK SABHA SECRETARIAT  
NEW DELHI

March, 1981/Phalguna, 1902 (Saka)

7A

Price : Rs. 1.35

CORRIGENDA TO 32ND REPORT OF THE PUBLIC  
 ACCOUNTS COMMITTEE (SEVENTH LOK SABHA)

.....

<u>Page</u>	<u>Para</u>	<u>Line</u>	<u>For</u>	<u>Read</u>
V	4	2	thick	thick type
3	1.7	10	geological	geological,
4		Last line	<u>Delete</u> very	
5		23	project	project,
7		5	cost	post
8		21	Min <del>g</del> ustan	Hindustan
8		30	to	no
9		5	cost	cast
9		11	project	protect
14		25	he	the
16		11	were	were not

---

## CONTENTS

		PAGE
	COMPOSITION OF THE PUBLIC ACCOUNTS COMMITTEE (1980-81) . . . .	(iii)
	INTRODUCTION . . . . .	(v)
CHAPTER I	Report . . . . .	1
CHAPTER II	Recommendations/Observations that have been accepted by Government . . . . .	4
CHAPTER III	Recommendations/Observations which the Committee do not desire to pursue in the light of replies received from Government . . . . .	16
CHAPTER IV	Recommendations/Observations replies to which have not been accepted by the Committee and which require reiteration . . . . .	23
CHAPTER V	Recommendations/Observations in respect of which Government have furnished interim replies . . . . .	25
APPENDIX	Conclusions/Recommendations . . . . .	25

PUBLIC ACCOUNTS COMMITTEE  
(1980-81)

Shri Chandrajit Yadav—*Chairman.*

MEMBERS

Lok Sabha

2. Shri Satish Agarwal
3. Shri Subhash Chandra Bose Alluri
4. Shri Tridib Chaudhuri
5. Shri K. P. Singh Deo
6. Shri V. N. Gadgil
7. Shri Ashok Gehlot
8. Shri Sunil Maitra
9. Shri Gargi Shankar Mishra
10. Shri M. V. Chandrashekara Murthy
11. Shri Ahmed Mohammed Patel
12. Shri Hari Krishna Shastri
13. Shri Satish Prasad Singh
14. Shri Jagdish Tytler
15. Shri K. P. Unnikrishnan

Rajya Sabha

16. Smt. Purabi Mukhopadhyay
17. Shri N. K. P. Salve
18. Shri Tirath Ram Amla
19. Smt. Maimoona Sultan
20. Shri Patitpaban Pradhan
21. Prof. Rasheeduddin Khan
22. Shri Indradeep Sinha

SECRETARIAT

Shri H. G. Paranjpe—*Joint Secretary.*

2. Shri D. C. Pande—*Chief Financial Committee Officer.*
3. Shri K. C. Rastogi—*Senior Financial Committee Officer.*

## INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf this Thirty-Second Report on action taken by the Government on the recommendations of the Public Accounts Committee contained in their Hundred and Twenty-Seventh Report (Sixth Lok Sabha) on Loktak Hydro-Electric Project relating to the Ministry of Energy and Coal (Department of Power). The 127th Report dealt with various aspects of Loktak Hydro-Electric Project. In this Action Taken Report, the Committee have commented upon the need to strengthen the organisations entrusted with the responsibility of carrying out geological, hydrological, topographical surveys and preparation of project reports, detailed designs, drawings etc. The Committee have also desired that Government should take steps to ensure that project reports are prepared with due care and the executing agencies are geared up to complete the projects as per schedule.

2. On 20 August, 1980, the following 'Action Taken Sub-Committee' was appointed to scrutinise the replies received from Government in pursuance of the recommendations made by the P.A.C. in their earlier Reports:

1. Shri Chandrajit Yadav—*Chairman*.

2. Shri K. P. Unnikrishnan

3. Shri K. P. Singh Deo

4. Shri V. N. Gadgil

*Members*

5. Shri Satish Agarwal

6. Shri N. K. P. Salve

3. The Action Taken Sub-Committee of the Public Accounts Committee (1980-81) considered and adopted the Report at their sitting held on 2 March, 1981. The Report was finally adopted by the Public Accounts Committee (1980-81) on 11 March, 1981.

4. For reference facility and convenience, the recommendations and observations of the Committee have been printed in thick in the body of the Report, and have also been reproduced in a consolidated form in the Appendix to the Report.

(vi)

5. The Committee place on record their appreciation of the assistance rendered to them in this matter by the office of the Comptroller and Auditor General of India.

NEW DELHI;  
March 11, 1981.  
Phalguna 20, 1902 (S).

CHANDRAJIT YADAV,  
Chairman,  
Public Accounts Committee.

## CHAPTER I

### REPORT

1.1. This Report of the Committee deals with the action taken by Government on the Committee's recommendations/observations contained in their Hundred and Twenty-seventh Report (Sixth Lok Sabha) on Loktak Hydro-Electric Project commented upon in paragraph 11 of the Advance Report of the Comptroller and Auditor General of India for the year 1976-77, Union Government (Civil).

1.2. The Committee's Hundred and Twenty-seventh Report was presented to Lok Sabha on 27 April, 1979 and contained in all 14 recommendations/observations. The action taken notes in respect of all the 14 recommendations/observations have been received from Government and these have been categorised as follows:

- (i) Recommendations/observations that have been accepted by Government:

Sl. Nos. 1, 2, 3, 5 and 7—13.

- (ii) Recommendations/observations which the Committee do not desire to pursue in the light of the replies received from Government:

Sl. Nos. 4 and 14.

- (iii) Recommendations/observations replies to which have not been accepted by the Committee and which require reiteration:

Sl. No. 6.

- (iv) Recommendations/observations in respect of which Government have furnished interim replies:

Nil.

1.3. In this Chapter, the Committee would like to comment on Government's reply to one of the important recommendations made in the 127th Report (Sixth Lok Sabha), namely—

*Geological Investigations (Paragraph 3.57—S. No. 6).*

1.4. Commenting on the inadequate geological investigations carried out before starting work on the Project, the Committee in paragraph 3.57 of the Report had observed:

“The Committee are greatly perturbed at the state of affairs disclosed as above which are confirmed by the results shown in the case of Loktak Project. At this stage they can only deplore the inadequate geological studies made before designing the project and also due attention not being paid to the caution struck in the geological investigation report, however, inadequate it was. The Committee strongly feel that due to inadequate investigations, there has been not only inordinate delay in the completion of the project but also an eight fold increase in its cost which could have been avoided to some extent, if investigations had been properly done. They recommend that Government should ensure that proper and adequate geological investigations are made of project sites so as to give clear directions to the designers of the project. They would also like the Ministries concerned to pay full attention to the geological investigation report before clearing the projects. In this context they would also like to emphasise that since many of the State Governments do not have adequate expertise in project design and planning, the planning and designing of projects involving substantial expenditure from the exchequer should not be entirely left to them. For this purpose, the Centre should make available, on a more liberal basis, services of their own experts in the field.”

1.5. In their Action Taken Note dated 16 April, 1980, the Ministry of Energy (Déptt. of Power) have stated:

“The Ministry shares the anxiety of the Committee. The need to strengthen the investigative capability of organisations in the Central sector and in the States is engaging the attention of the Ministry seriously. The possibility of building up the capability in this regard in terms of adequate personnel and technological inputs is being examined”.

1.6 In the 127th Report (Sixth Lok Sabha), the Public Accounts Committee had expressed their concern over the inadequate geological studies made before designing the Loktak Hydro-electric Project. The Committee had inter-alia recommended that Government should ensure that proper and adequate geological investigations



are made of project sites so as to give clear directions to the designers of the projects. The Committee had also pointed out that since many of the State Governments did not have adequate expertise in project design and planning, the planning and designing of projects involving substantial expenditure from the exchequer should not be entirely left to State Governments. The Committee had desired that for this purpose the Centre should make available, on a more liberal basis, services of their own experts in the field. The Ministry of Energy in their reply have stated that "the need to strengthen the investigative capability of organisations in the Central sector and in the States is engaging the attention of the Ministry seriously. The possibility of building up the capability in this regard in terms of adequate personnel and technological inputs is being examined."

1.7. Heavy over runs both of time and cost have become a common feature of Hydro-electric projects taken up in the country in recent years and the Loktak project provides yet another such example. The Committee, therefore, consider Government's reply to be very unsatisfactory in so far as it indicates lack of urgency in tackling this serious problem. The Committee need hardly emphasise that if the Hydro-electric projects in the country are to be executed with speed and at minimum cost it is imperative that steps are taken without delay to strengthen the organisations entrusted with the responsibility of carrying out geological, hydrological, topographical surveys and preparation of project reports, detailed designs, drawings etc. The Committee, therefore, reiterate the recommendation and desire that Government should take steps to ensure that project reports are prepared with due care and the executing agencies are geared up to complete the projects as per schedule.

## CHAPTER II

### RECOMMENDATIONS/OBSERVATIONS THAT HAVE BEEN ACCEPTED BY GOVERNMENT

#### Recommendation

The Committee note that as per project report prepared in 1967, the first unit of the project was anticipated to be commissioned by March, 1974. The target date for commissioning the first unit was shifted to March, 1976 in first revised estimate of 1974. According to the schedule of programme drawn up for the second revised estimate of 1976, the target date of commissioning was December, 1980. The Government have now stated that the project would be commissioned in March, 1982. The Committee are unhappy to note that the shifting of date of commissioning of the project from time to time has not only delayed its commissioning but has also resulted in the increase in the cost of the project. Initially it was expected that the estimated cost of the project would be to the tune of Rs. 10.90 crores but as per revised estimate of 1977 the project would cost Rs. 80.63 crores. The Committee have gone into the details of various factors responsible for delaying the commissioning of the project in subsequent paragraphs of the report. At this stage they would like to point out that Government took about 2 years time in according approval to the project. The project report prepared in December, 1967 was received in the Ministry of Irrigation and Power in January, 1968 and accorded sanction in February, 1970. To their surprise the Committee find that the Central Water and Power Commission took 8 months to complete the techno-economic appraisal of the project and the question of sharing of the benefits of the power generated from the project among the beneficiary States and the question of taking up the project in the Central Sector remained under consideration of the Ministry for as long as one year. Thereafter, the Planning Commission took another six months to give their clearance for the project. The Committee regret that the urgency of the commissioning of the project according to schedule was not realised from the very beginning. The delay in according sanction is to a great extent responsible for the escalation in the cost of the project. The Committee would like the Ministry of Energy to streamline the existing procedure for processing and appraisal of the project reports at very various stages so that the

minimum time is taken in according sanction to the projects thereby avoiding cost escalation as also delays in the completion of the projects.

[S. No. 1 (Para 1.10) of Appendix IV to 127th Report (6th Lok Sabha)].

### Action Taken

The recommendation of the Committee is accepted. However, the Ministry would like to submit for the consideration of the Committee the procedure obtaining today for the clearance and sanction of projects. Hydro-electric projects costing over Rs. 1 crore are required to be techno-economically cleared by the Central Electricity Authority first, before they are received in the Ministry of Energy. The National Hydroelectric Power Corporation has been set up for the execution of hydroelectric projects in the Central Sector. It would, therefore, be safe to assume that before any such project is taken up for execution the NHPC will prepare a detailed project report which would be sent to the Central Electricity Authority for processing by it before according techno-economic clearance.

After the CEA accords techno-economic clearance, the project report is sent to the Ministry of Energy where further action is taken to bring it before the P.I.B. On clearance by the PIB depending on the cost of the project orders of the Cabinet are taken by the Ministry of Energy and necessary sanction accorded. It will be appreciated that the procedure in respect of the sanction of hydro-electric projects in the Central Sector is fairly clearly laid down. In the light of the recommendations of the Committee the Ministry would keep a closer watch over the progress of processing at various stages.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43/7/79-USG (PT) dated 16-4-1980].

### Recommendation

The Committee note that the original project estimate in 1967 was of the order of Rs. 10.90 crores. It was revised to Rs. 32.94 crores in 1974 and to Rs. 80.63 crores in 1977. Since the cost escalation in the second revised estimates of 1977 was about 150 per cent of the estimate of 1974, the Committee have a feeling that the first revised estimate was deliberately kept within limits to secure its approval. In any case, they would like to stress that the estimates of the projects involving huge outgo from the Exchequer should

be prepared realistically so that Government may have a clear picture of the financial commitments involved therein.

[S. No. 2 (Para 2.15) of Appendix IV to 127th Report (6th Lok Sabha)].

#### **Action Taken**

The recommendations of the Committee that estimate should be prepared more realistically is accepted. With the NHPC in position, the Government is confident that the estimates will be prepared realistically.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43/7/79-USG (PT) dated 16-4-1980].

#### **Recommendation**

The Committee have been informed that the second revised estimate prepared in 1977 and cleared by the Central Electricity Authority/Central Water Commission in May, 1978 is still under examination and consideration of Government for according approval. As about two years have elapsed since the estimate was revised and also in view of the fact that expenditure had already exceeded Rs. 47 crores by 30th June, 1978 it is imperative that the revised administrative approval and expenditure sanction should be accorded without any further delay.

[S. No. 3 (Para 2.16) of Appendix IV to 127th Report (6th Lok Sabha)].

#### **Action Taken**

Revised administrative approval and expenditure sanction of the project have been accorded by the Ministry of Energy (Deptt. of Power) under letter No. 43/2/78DAV dated 7-4-1979.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43/7/79-USG (PT) dated 16-4-1980].

#### **Recommendation**

It has been pointed out to the Committee by no less a person than the Chairman of the Central Water Commission himself that "the (geological) investigations that are being done not only in Loktak but in other parts of the country also are definitely sub-standard in our country", and that is why "we are getting into problems of cost over-runs and time over-runs in our projects". The other point that he made, was that "the person who were put

on the (geological) investigations are those who are not wanted in the department". Agreeing with this view even the Chairman of the Central Electricity Authority informed the Committee that "the people who are posted in investigation organisations are the people who are to be punished; it is not a rewarding cost". He further stated that "we are not suffering so much for faulty investigation as due to inadequacy of the investigation."

[S. No. 5 (Para 3.56) of Appendix IV to 127th Report (6th Lok Sabha)]

### **Action Taken**

In this regard, Shri S. N. Roy, Chairman, C.E.A. has written in July 1979 that what he had referred to "was in respect of inadequate investigation and not sub-standard investigation".

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43/7/79-USG (PT) dated 16-4-1980].

### **Recommendation**

The Committee note that the other reason responsible for the delay in completing the tunnelling work was the emergence of methane gas. Methane gas made its first appearance in face 5 of the tunnel in December, 1972. At that time no efforts were made to identify the exact nature of the gas. The seriousness of the gas was realised when two workers received burn injuries in July, 1974. The precautionary measures as suggested by the Director General of Mines Safety were conveyed to the project authorities in October, 1974 and the project authorities had in the most casual and routine manner conveyed the same to the contractor. The Committee are sorry to note that before these precautions could be fully implemented, a major explosion occurred on 25th January, 1975 resulting in the death of sixteen persons. It was only after this explosion that Government set up a Committee to investigate into and ascertain the causes of the explosions. The Committee found that the officers of the firm employed for the construction work did not seem to possess adequate experience in dealing with situations such as methane gas emissions and for taking timely preventive and safety measures. The Committee regret that precautionary measures were not taken by the contractor and the project authorities when emergence of methane gas was first noticed in 1972 which resulted in the death of workers due to explosions

and brought the work on the project to a grinding halt for well over two years.

[S. No. 7 (Para 3.58) of Appendix IV to 127th Report (6th Lok Sabha)].

### **Action Taken**

The remarks of the Committee are noted for future guidance.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43/7/79-USG (PT) dated 16-4-1980].

### **Recommendation**

The Tenders for tunnel and surge shaft was awarded to M|S. Patel Engineering Company Ltd. Bombay for Rs. 571.05 lakhs in preference to M|S. Hindustan Construction Company, Bombay who had quoted a higher rate. Although the Chief Engineer had pleaded that an attempt should be made to negotiate with M|S. Hindustan Construction Company, Bombay to bring down its tender cost as near as possible to that of M|S. Patel Engineering Company Ltd., Bombay in view of the reputation of the former in tunnel work, the project authorities did not negotiate with M|S. Hindustan Construction Company as in their view M|S. Patel Engineering Company Ltd. were leading tunnel contractors and were in this field for a longer period than M|S. Hindustan Construction Company. It was stated before the Committee that M|S. Patel Engineering Company Ltd. were known to be firm of standing and considerable experience in the work of tunnelling. The Committee are constrained to note that the assessment made by the project authorities about the capability of M|S. Patel Engineering Company Ltd. in the tunnelling work did not come true.

The firm declined to complete the tunnelling after explosion inside the tunnel due to emergence of methane gas in January, 1975 on the plea that they had to experience in tunnelling having such extensive gaseous conditions and had no trained and qualified personnel and suitable and necessary equipment to do such work. Various reasons have been advanced to justify the stand taken by the firm but the fact remains that work between faces 4 & 5 and faces O and I is now being done departmentally and the original contract for the whole work has been modified in favour of the Contractor. According to the modified contract, the value of the contract for the completion of 45 per cent of the total work is:

Rs. 639.78 lakhs against the tendered value of Rs. 571.05 lakhs for the entire work. In the circumstances, the Committee have a feeling that M/S. Patel Engineering Co. Ltd. are being unduly protected by the authorities at various levels. The Committee would like the Ministry to ensure that contractual obligations cost on the firm are being strictly enforced.

[S. No. 8 (Para 3.59) of Appendix IV to 127th Report  
(6th Lok Sabha)]

### **Action Taken**

Government assure the Committee that there has been no attempt by authorities at various levels to protect the contractor. The decisions that were taken in this case were based on detailed enquiries conducted at the highest level and the negotiations with the contractor were also conducted by a high level negotiating Committee whose recommendations were acted upon only after the most careful consideration by the N.H.P.C. Board of Directors. The primary consideration in arriving at their decision was the interest of speedy execution of the project which had suffered serious setback due to unfortunate and unforeseen calamities. The contractual obligations devolving upon the firm are being enforced.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No.  
43/7/79-USG (PT) dated 16-4-1980]

### **Recommendation**

The Committee are constrained to note that although the contract for the project estimate for the tunnel and surge shaft was awarded to M/S. Patel Engineering Co. Ltd. in February, 1971 the formal agreement was signed with the contracting firm only in August, 1977, i.e. after a lapse of 6 years. As for the full 6 years the firm was not bound down to any contractual obligation, it is not unlikely that they would have utilised this advantage in negotiating fresh terms and conditions even in the course of the execution of the project. The suspicion arises from the fact that the contractors were unwilling to render work on faces 4-5 and O-1 and demanded higher costs for a considerably reduced size of work and that both the demands of the contractors had to be accepted by authorities. That this situation was allowed to drift for so long is a sad commentary on the wisdom and efficiency of the authorities responsible for the execution of the Project. The Committee would

like the Ministry to put a stop to such practice and devise procedures making for the signing of the contract immediately on the award of work or soon thereafter.

[Serial No. 9 (Para 3.60) of Appendix IV to 127th Report  
(6th Lok Sabha)]

#### **Action Taken**

Instructions regarding signing of contracts have been issued by NHPC to its formations (June 1979). A copy of the same is enclosed. (Annexure).



## ANNEXURE

Copy of Circle No. CS|4|7 of N.H.P.C. signed by Shri N. V. Raman,  
Company Secretary (No. NH|CS.368 dt. 2-6-79)

Sub:—Delay in signing of contract|issue of acceptance of tender.

The Public Accounts Committee of Parliament while considering an audit para relating to one of the projects of the Corporation has adversely commented and observed that there had been undue delay in signing of contract after the award of the work to a particular contractor resulting in drifting of contractual obligations to a situation of creating a demand for fresh terms and conditions.

2. In order to avoid and stop recurrence of such situations and to avoid legal complications, the following procedures for signing of the contracts on the award of work (including issue of detailed Acceptance of Tender for supply of stores etc.) are hereby laid down for strict compliance by all concerned:—

The formal contract must normally be signed immediately on the award of work but in any case not later than one month of the issuing of formal letter of acceptance/intent or award of work.

3. (a) All cases where signing of the contracts has been delayed beyond one month should be reported to the Corporate office every quarter, by the 10th of the month|following the quarter. Senior Manager (C&MM) will after adding thereof cases of similar delay in signing contracts in the Corporate office, submit the same to C&MD.

(b) The first quarterly report showing the position as on 30-6-79 should be submitted to Senior Manager (C&MM) by 10-7-1979 positively.

(c) Even if there has been no such cases of delay, 'Nil' reports should be sent.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No.  
43|7|79-USG (PT) dated 16-4-1980]

### Recommendation

The Committee regret to note that the project estimates for Ithai barrage and power channel were not prepared realistically. For Ithai barrage, the project estimate was Rs. 13.13 lakhs, the amount indicated in tender notice was Rs. 20 lakhs and the lowest tender of M/s. National Projects Construction Corporation accepted was Rs. 30.62 lakhs. The expenditure incurred upto August, 1977 was Rs. 72.38 lakhs and as per second revised project estimate it would be Rs. 149.11 lakhs. Similarly, for the power channel the provision in the original project estimate was Rs. 124 lakhs, the amount mentioned in the tender notice was Rs. 240 lakhs and the work was awarded to M/s. National Projects Construction Corporation for Rs. 600.57 lakhs. The latest revised cost of the power channel as per second revised estimate was Rs. 1,482.13 lakhs. The reasons for the variation between the estimates and the actual expenditure incurred for the construction of Ithai barrage were stated to be *inter-alia* the change in the design of the structures necessitated by the desire of the Manipur Government to reclaim more land and consequent increase in quantities and items of work, increase in the cost of construction materials like cement, steel, P.O.L. and increase in labour cost. The change in the design was affected, when the construction work was in progress. The main reason for the increase in the cost of power channel was attributed to the sloughing conditions of the soil which resulted in the revision of the channel design. Besides the change in designs, other factors namely increase in the cost of construction materials like, steel, cement etc. were stated to be responsible for the increase in cost of construction.

[S. No. 10 (Para 4.26) of Appendix IV to 127th Report  
(6th Lok Sabha)]

### Action Taken

The revision of estimates became necessary due to the following reasons:

- (a) The earlier estimates which were based on the PWD schedule of rates were unrealistic in relation to the different type of construction methods involving heavy machinery and outside labour.
- (b) Solutions to the major geo-technical problems, resulting in design changes.
- (c) Escalation in cost of the material and labour.

However, the observations of the Committee have been noted, and due efforts will be made to prepare estimates on a more realistic basis.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43|7|79-USG (PT) dated 16-4-1980]

### **Recommendation**

The Committee find it difficult to appreciate the cost escalation from Rs. 13.13 lakhs to Rs. 149.11 lakhs in the case of Ithai barrage project and from Rs. 124 lakhs to Rs. 1,482.13 lakhs for the power channel. Despite the various reasons and explanations offered for this phenomenal increase, the Committee consider that much of the escalation was due to project planning being seriously faulty and without perspective.

[S. No. 11 (Para 4.27) of Appendix IV to 127th Report (6th Lok Sabha)]

### **Action Taken**

The reasons for the revision of estimates have been set out in the reply to para 4.26.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43|7|79-USG (PT) dated 16-4-1980]

### **Recommendation**

The Committee are unhappy to note that the work of fabrication and erection of penstocks scheduled to be completed by 1974 is still in progress. According to the present position of the work, it is expected to be completed by 31st March, 1981. The delay in completion of work is attributed firstly to unstable strata met within certain reaches of the penstock and secondly to the delay in the completion of Face 7 of the tunnel near its outlet. These two factors not only delayed the completion of work but also led to increase in the quantities of work and consequent cost escalation. The Ministry of Energy have admitted that the report of geological investigation on which the project was formulated did not give any indication of unstable strata in the region of the penstock alignment. It was only subsequently when the work was in progress that unstable strata was noticed in certain reaches of the penstock. The Committee regret to observe yet another case of faulty geological investigation resulting in delay in the execution of work and increase in the cost of work from Rs. 109.85 lakhs to Rs. 636.76 lakhs

i.e. about 600 per cent more than the initial estimated cost. The Committee consider the delay of more than 6 years in completion of this work as unjustifiably long and hope every effort will be made to complete the work well before the target date now fixed i.e. 31st March, 1981.

[S. No. 12 (Para 5.9) of Appendix IV to 127th Report  
(6th Lok Sabha)]

#### **Action Taken**

Every effort is being made by the project authorities to complete the work by target date i.e. 31-3-1981.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No.  
43/7/79-USG(PT) dated 16-4-1980]

#### **Recommendation**

The Committee find it interesting that the tender of M/s. Gammon India Ltd. was rejected by the Tender Committee on the plea that it tendered cost was Rs. 79.88 lakhs against the estimated cost of Rs. 40 lakhs whereas the same work was later on awarded to M/s. National Projects construction Corporation a Public Sector undertaking at the tendered amount of Rs. 84.75 lakhs.

The Committee note that the cost of construction of the power house was originally estimated to Rs. 40 lakhs, the work was awarded at the tendered amount of Rs. 84.75 lakhs, while the latest estimated cost of the work is Rs. 370.14 lakhs. The variation between the cost as originally estimated and the latest estimated cost works out to more than 900 per cent. Whatever be the explanation, the Committee regard it as amazingly ridiculous and hardly doing any credit to the officers and personnel engaged in the estimating work for the project.

[S. No. 13 (Para 6.10) of Appendix IV to 127th Report  
(6th Lok Sabha)]

#### **Action Taken**

The tender of M/s. Gammon India Ltd. received in August, 1970 for a value of Rs. 79.88 lakhs was rejected as it was about 100 per cent higher than the original estimated cost of Rs. 40 lakhs for work involving construction of Super-structure in reinforced cement concrete. The recommendations of the Tender Committee for rejection

of the tender were duly ratified by the Central Hydro-electric Projects Control Board in March, 1971. Fresh tenders were invited in December, 1971 for revised scope of work involving different specifications for construction of Steel super-structure for a modified estimated cost of Rs. 66 lakhs. Only one firm namely, M|s. N.P.C.C. Ltd. (A public sector enterprise) offered their tender for a value of Rs. 91.42 lakhs which was negotiated and reduced to Rs. 84.75 lakhs. M|s. Gammon India Ltd. did not submit their tender this time. Therefore, the question of considering their tender did not arise. Accordingly, the only tender of M|s. NPCC which was only 28.4 per cent higher than the modified estimated cost of Rs. 66 lakhs (against 100 per cent higher tender value quoted by M|s. Gammon India Ltd. in the earlier tender) was recommended by the Tender Committee and accepted by the Control Board.

The wide variation in the estimated cost of the work is due to the fact that the original estimate had been prepared as far back as in 1968, on the basis of the then available data and quantum of work envisaged in the original project Report adopting the prevalent local P.W.D. rates which were applicable for minor P.W.D. works. Obviously these rates required to be revised in view of highly technical nature of construction of Power Stations. Besides, substantial design changes were necessitated subsequently due to geo-technical problems during actual execution which resulted in increase in cost.

The observations of the Committee for exercising utmost care while preparing project estimates have been noted.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43|7|79-USG (PT) dated 16-4-1980]

## CHAPTER III

### RECOMMENDATIONS/OBSERVATIONS WHICH THE COMMITTEE DO NOT DESIRE TO PURSUE IN THE LIGHT OF THE REPLIES RECEIVED FROM GOVERNMENT

#### Recommendation

From the facts brought to their notice, the Committee are sorry to note that the work on such a big project was started admittedly without proper geological investigation done were sub-standard and not adequate for making a firm design. Although caution was sounded in the geological report that rock conditions for tunnelling were likely to be ideal and tunnelling would be hazardous, no serious attention was paid to it. In the Committee's view information obtained by drilling more holes as suggested and pressure testing the drill holes, might have helped the geologist and the designer to understand better the geo-technical problems involved in the tunnelling. The net result of the lapse on the part of the project planning authorities was that not only the completion of the tunnel was delayed but also the estimated cost of the tunnel has skyrocketed to an astounding level.

[Serial No. 4 (Para 3.55) of Appendix IV to 127th Report  
(6th Lok Sabha)]

#### Action taken

The work on the project has been taken up after investigations considered adequate and necessary for the commencement of work have been done. In the course of execution of the Project, major geo-technical problems were encountered for which adequate solutions had to be found, resulting in major time and cost overruns, as the scope of the work has increased considerably.

[Ministry of Energy and Coal (Deptt. of Power) O.M.  
No. 43/7/79-USG(PT) dated 16-4-1980]

#### Recommendation

The Committee have in this report pointed out various lapses, irregularities, omissions and inactions which are, in the opinion of the Committee, directly responsible for the delayed execution of

the Loktak Project and an eight-fold increase in its cost. Apart from the various suggestions for action made else-where in the report, the Committee recommend that a high level enquiry committee may be appointed to go into various lapses etc. pointed out in this report as also in the Audit Paragraph with a view to fix responsibility therefor and in the light of its finding lay down guidelines for the execution of projects in future.

[Serial No. 14 (Para 6.11) of Appendix IV to 127 Report  
(6th Lok Sabha)]

### **Action taken**

The Loktak Hydroelectric Project was formulated on the basis of investigations carried out by the P.W.D. authorities of the Manipur Government. The project Report, as originally drawn up in 1967, envisaged an installation of two generating units of 35 MW each (i.e. 70 MW in all) besides providing irrigation benefits to about 23000 hectares through a lift irrigation system and reclamation of fertile land around the periphery of the Loktak Lake by reduction of flood level of the lake. After scrutiny from the techno-economic angle by various scrutinising agencies of the Govt. namely the Central Water & Power Commission, the Ad hoc Committee on Irrigation, Flood Control and Power Projects, the Planning Commission and concerned Divisions of the Ministry of Finance, the project was sanctioned in February, 1970 for an estimated cost of Rs. 10.905 crores. The estimated cost of the project underwent revision twice, once in 1974 and again in 1977. The 1974 estimate was for an estimated cost of Rs. 32.94 crores, out of which about Rs. 1.94 crores was debitable to the Irrigation Component of the project recoverable from the Manipur Government. The 1977 revised estimate (since approved by Govt. *vide* Ministry of Energy letter No. 43/2/78-DA-V dated 7th April, 1979) was for an amount of Rs. 80.63 crores, out of which a sum of Rs. 3.69 crores was recoverable from the Manipur Government on account of the Irrigation Component of the Project.

The main reasons for increase in the cost of the project, first in 1974 and subsequently in 1977, are given below:

#### **A. Reasons for increase in cost between the original estimate and the first revised estimate of 1974.**

- (i) The scope of the project originally covered only two units of 35 MW each (total 70 MW) whereas in the 1974 estimate a third unit of 35 MW was also added comprising Stage II of the Project, thereby increasing the scope to

105 MW in all. The cost of the Stage II comprising the third unit alone resulted in an increase of Rs. 3.93 crores.

- (ii) The original estimate was based upon the local rates both for works as well as labour at the time the original project report was prepared (in 1967) which had undergone very sharp increases by the time the actual construction works and contracts were finalised.
- (iii) The tendered rates for major works for which contracts were finalised were substantially higher than the rates assumed in the original estimate which were actually based upon the local PWD schedule rates meant for small works.
- (iv) Substantial increase in quantities in various components of the project which emerged on preparation of detailed designs.
- (v) Due to additional items not provided in the original estimate and lum-sum items on which provisions was inadequate.

**B. Reasons for increase in cost in the 1977 revised estimate over the 1974 revised estimate:—**

The main reasons for increase between the 1974 revised estimate and the 1977 revised estimate are as follows:—

- On actual execution of the project works, extra-ordinary geo-technical problems were encountered as a result of adverse geological conditions which were not anticipated at the time of Project formulation. These problems emerged on all the sites of the major structures such as the Barrage, Power Channel, Head Race Tunnel, penstocks, Power House and Switchyard. The Barrage design had to be changed from four bays to five bays leading to extensive excavation of the sites and earth-fill behind the abutments. The Power Channel was affected seriously by the sloughing in of the side slopes, on all sides resulting in upheaval of the excavated channel calling for radical design changes. The Head Race Tunnel which became the most critical item on the project affecting its commissioning date, witnessed serious accidents resulting in loss of lives due to the presence of methane gas, the presence and occurrence of which was not known at the initial stages. The penstock slopes were subject to serious



sliding of the hills calling for heavy treatment for stabilising the hills. The Power House Service Bay suffered a collapse calling for design changes and the final switchyard location had to be changed due to adverse geological conditions. In the light of these developments during construction, the designs in respect of each component of the works had to undergo considerable changes which resulted in large increases in quantities, use of sophisticated equipment and processes not earlier contemplated and extensive precautionary and protective measures against the methane gas present in the tunnels. All these factors, together with the substantial and sharp increases in costs due to escalation in material POL and labour components, contributed to increase in the overall cost of the project reflected in the 1977 estimates.

#### **Explosion at Face 5 of Tunnel:**

The work of tunnelling in Loktak H.E. Project was entrusted to Patel Engineering Company who started the work in November, 1971. The work was progressing fairly satisfactorily till January, 1975. In January, '75 when the contractor was working in the longest reach of the tunnel measuring about 3849 metres between face 4 and Face 5 and had done 120 metres from Face 4 and 658 metres from Face 5 there was a fatal accident caused from methane gas explosion at the tunnel head in Face 5 in which 16 persons were killed. Since then the work in this reach of the tunnel was given up completely in Face 5. The excavation of tunnel from Face 4 however, continued at a slow speed and only 28 metres further excavation was done up to March, 1978 bringing the total excavated length to 148 metres when the work from this Face was also stopped completely.

#### **Adverse Geological conditions and problems:**

The actual geological features met with during constructions with particular reference to those originally envisaged are given below:—

- (a) Lake sediments heavily charged with water have been encountered from Face 1 towards cut and cover section. This reach was not proposed to be a tunnel earlier but was later converted to a tunnel due to stability problems faced in open channel construction.
- (b) Terrace deposits have been met from Faces 2, 3 and 4 instead of rock anticipated. As stated in the 1975 report

of Geological Survey of India, the holes drilled near inlet portal in the open channel and surge shaft site showed extremely poor recovery. The interpretation of rock profiles in this reach was based on these cores and the few surface exposures. As such they did not depict the conditions adequately.

- (c) Highly crushed and shattered shales with bands of siltstone and sandstone have been encountered at Faces 5, 6 and 7. The shales encountered exert considerable side pressures. In many reaches the side supports have bulged into the tunnel due to heavy pressures.
- (d) Due to very adverse rock conditions, the following problems have been continuously faced during tunneling:—
  - (i) Sudden roof falls and caving;
  - (ii) Development of excessive rock loads due to high lateral pressures resulting in buckling and bulging of steel supports;
  - (iii) Flowing ground conditions.

#### **Remedial measures:**

In November, 1975 the Ministry of Energy (Department of Power) set up a technical experts committee to advise ways and means for expediting the progress of tunnelling and this committee submitted its report in December, 1975. The Committee recommended various technical measures for constructing the tunnel in different geological features, safety precautions be adopted in tunnels, etc. and the organisational requirements for supervision of the tunnel construction in the changed situation. In July, 1976 the Ministry of Energy (Department of Power) constituted another high power committee (Subsequently came to be known as the organisational Committee) to examine further and make comprehensive recommendations on the organisational arrangements both for construction and supervision of the different reaches of the tunnel to expedite the completion of the Project.

The main recommendations of the Organisational Committee were:—

- (a) Keeping in view the adverse geological conditions and the constraints due to stringent measures to be taken for

safety from Methane gas explosion, it was estimated that average progress of about 20 metres. per month per face could be achieved in the reach between face 4 and face 5 with conventional methods of excavation. Thus it would take about 76 months to complete the excavation, in addition about 6 months time could be required to make necessary arrangements for a proper organisational set up procurement and fixing F.L.P. equipment, arranging safety measures etc. to resume the tunnelling work in these faces, thus requiring about 82 months to complete the excavation by conventional methods. The organisational Committee considered the situation very carefully and was of the opinion that for early commissioning of this project this reach between faces 4 and 5 called for mechanised construction. To expedite boring of the tunnel Mr. Golser the Austrian expert, recommended the use of point excavators. The Committee decided that for the very adverse geological conditions and the show the methane gas in the operation of the tunnel, it should be excavated by point excavators. The Committee recommended to deploy two excavators one at face 4 and the other at face 5.

- (b) Flame-proof locomotive, shot creting machines, gas monitoring units and additional diesel generating sets, etc. to be procured.
- (c) The Project authorities should gear-up their organisation and infra-structure for taking up the tunnel boring at face 4 and face 5 departmentally. The tunnel in the two reaches between faces 2 & 3 and 6 & 7 should be completed through the contractors after negotiating with them workable revised rates and the conditions, under the changed circumstances.
- (d) The establishment and labour, skilled and unskilled required for the departmental construction of the tunnel reach between faces 4 & 5 as indicated by the Chief Engineer should be examined and decided by N.H.P.C.

**Follow-up action on recommendations of organisational committee:**

- (a) The work on reaches between faces 4 & 5 has been taken up departmentally as recommended by the Committee.
- (b) Two Alpine Miner have already been imported. The first was put into operation at face 5 in January '79 and the other at face 4 on 25-5-79.

- (c) Sufficient number of Flame-proof Locomotives, short-creting machines etc. as recommended by the Committee have been procured and put into operation in the project.
- (d) The following measures have also been taken.
- (1) New method of tunnel roof supporting has been deployed.
  - (2) Remote gas monitoring arrangements have been made alongwith use of flame-proof electrical installation.
  - (3) Ventilation system and compressed air system have been augmented.
  - (4) Strengthening the infra-structural requirements for speedy progress including installation of additional diesel sets for construction power supply and effective telecommunication system on the project have been ensured.

In view of the fact that the causes for the delay and reasons for the revision of estimates have been examined on more than one occasion critically by Government. It is not considered necessary to appoint another high level committee to enquire into the same facts.

## CHAPTER IV

### RECOMMENDATIONS/OBSERVATIONS REPLIES TO WHICH HAVE NOT BEEN ACCEPTED BY THE COMMITTEE AND WHICH REQUIRE REITERATION

#### Recommendation

The Committee are greatly perturbed at the state of affairs disclosed as above which are confirmed by the results shown in the case of the Loktak Project. At this stage they can only deplore the inadequate geological studies made before designing the project and also due attention not being paid to the caution struck in the geological investigation report, howsoever inadequate it was. The Committee strongly feel that due to inadequate investigations, there has been not only inordinate delay in the completion of the project but also an eight fold increase in its cost which could have been avoided to some extent, if investigations had been properly done. They recommend that Government should ensure that proper and adequate geological investigations are made of project sites so as to give clear directions to the designers of the project. They would also like the Ministries concerned to pay full attention to the geological investigation reports before clearing the projects. In this context they would also like to emphasise that since many of the State Governments do not have adequate expertise in project design and planning, the planning and designing of projects involving substantial expenditure from the exchequer should not be entirely left to them. For this purpose, the Centre should make available, on a more liberal basis, services of their own experts in the field.

[S. No. 6 (Para 3.57) of Appendix IV to  
127th Report (6th Lok Sabha)]

#### Action Taken

..

The Ministry shares the anxiety of the Committee. The need to strengthen the investigative capability of organisations in the Central sector and in the States is engaging the attention of the Ministry seriously. The possibility of building up the capability in this regard in terms of adequate personnel and technological inputs is being examined.

[Ministry of Energy & Coal (Deptt. of Power) O.M. No. 43/7179—  
USG(PT), dated 16-4-1980]

## CHAPTER V

### RECOMMENDATIONS/OBSERVATIONS IN RESPECT OF WHICH GOVERNMENT HAVE FURNISHED INTERIM REPLIES

—Nil—

NEW DELHI;

March 11, 1981.

Phalguna 20, 1902 (S).

CHANDRAJIT YADAV,

Chairman,

Public Accounts Committee.

## APPENDIX

## Conclusions/Recommendations

Sl. No.	Para No.	Ministry / Deptt. Concerned	Conclusions/Recommendations
1	1.6	Energy and Coal (Deptt. of Power,	<p>In the 127th Report (Sixth Lok Sabha), the Public Accounts Committee had expressed their concern over the inadequate geological studies made before designing the Loktak Hydro-electric Project. The Committee had inter-alia recommended that Government should ensure that proper and adequate geological investigations are made of project sites so as to give clear directions to the designers of the project. The Committee had also pointed out that since many of the State Governments did not have adequate expertise in project design and planning, the planning and designing of projects involving substantial expenditure from the exchequer should not be entirely left to State Governments. The Committee had desired that for this purpose the Centre should make available, on a more liberal basis, services of their own experts in the field. The Ministry of Energy in their reply have stated that "the need to strengthen the investi-</p>

gative capability of organisations in the Central sector and in the States is engaging the attention of the Ministry seriously. The possibility of building up the capability in this regard in terms of adequate personnel and technological inputs is being examined."

2 Energy and Coal  
(Deptt. of Power)

1.7

Heavy over runs both of time and cost have become a common feature of Hydro-electric projects taken up in the country in recent years and the Loktak project provides yet another such example. The Committee, therefore, consider Government's reply to be very unsatisfactory in so far as it indicates lack of urgency in tackling this serious problem. The Committee need hardly emphasise that if the Hydro-electric projects in the country are to be executed with speed and at minimum cost it is imperative that steps are taken without delay to strengthen the organisations entrusted with the responsibility of carrying out geological, hydrological, topographical surveys and preparations of project reports, detailed designs, drawings etc. The Committee, therefore, reiterate the recommendation and desire that Government should take steps to ensure that project reports are prepared with due care and the executing agencies are geared up to complete the projects as per schedule.