CHAPTER – VIII

Conclusion and Recommendations

8.1 Conclusion

8.1.1 Hydro power is a renewable and environment friendly source of energy. As hydro power stations have the inherent ability for instantaneous operations, they are more responsive than most other energy sources, for meeting peak demand and improving reliability of the power system. Performance of operating power stations are gauged through various parameters such as capacity utilisation, annual generation, sale and revenue realisation specified by regulatory bodies like CEA and CERC.

8.1.2 Optimum utilisation of the installed capacity of a power station is important to ensure that the power station is being operated effectively and efficiently. THPS, was designed as a multipurpose project for Full Reservoir Level of 830m. Rehabilitation of families was done by State Government with funds amounting to ₹972.97 crore provided by THDC. However, THDC has not so far been permitted to fill the reservoir beyond EL 825m. Audit observed that due to inadequate flushing and non-maintenance of prescribed reservoir levels, gross and live reservoir capacities of three NHPC power stations reduced by 5.9 to 18 *per cent* and 3.9 to 13 *per cent* respectively during five years ended 31 March 2014. Design energy of power stations forms the basis for recovery of tariff and is required to be reviewed periodically so that end users were not burdened. Design energy of Chamera-I power station of NHPC was however, not reviewed despite the fact that this power station was consistently generating significant secondary energy over and above its design energy since its commissioning in 1994-95. As a result, the consumers were burdened to the extent of ₹274.98 crore during 2009-14.

8.1.3 One of the objectives of CPSEs was to operate and maintain power stations with maximum efficiency. This could be achieved only through effective preventive maintenance to minimise forced outages. It was observed that known defects in various systems of power stations remained unresolved during regular annual planned maintenance of units resulting in subsequent forced outages. As per Operational Norms for Hydro Power Stations fixed by CERC, all machines were required to be available 24 hours for all types of plants during the monsoon period. However, machines of CPSEs suffered forced outages aggregating 9871 hours during monsoon periods of 2009-14. Forced outages ranged from 293 hours in THPS to 2085 in Chutak power station.

8.1.4 CPSEs relaxed the implementation of provisions of payment security mechanism as LCs were either not obtained for required amount or were not used as a means of payment and power of defaulting beneficiaries was not regulated timely. NHPC also allowed rebate of ₹60.48 crore to ineligible beneficiaries due to inadequate amount of LC.

8.1.5 Hydro power stations located in J&K, Uttarakhand, Himachal Pradesh and Sikkim fall in high seismic zone. These power stations are located in the Himalayan region which is prone to heavy rainfall, especially during monsoon and the occurrence of flood and landslides is common. Moreover, absence of any other means of transport, except roads, in Himalayan States, increases the vulnerability of hydro power stations during disasters. Considering the importance of organised efforts to deal with a potential disaster situation, Government of India enacted the Disaster Management Act, 2005. The Act required that every Ministry or Department of the Government of India shall prepare a Disaster Management Plan (DMP) specifying measures to be taken for prevention and mitigation of disasters in accordance with national plan. The Act further required that such DMP should be reviewed and revised annually. Power stations, however, did not review and revise their DMPs as prescribed. Further, DMPs prepared by power stations did not include Emergency Action Plan in case of failure/breakage of Dam (Dam Break Analysis) and did not incorporate provisions of CEA guidelines on disaster management and States' Disaster Management Plans, like setting up of advance warning system, finalisation of commitment contracts for fixed periods. Lately, CPSEs had commenced the process of reviewing the DMPs.

8.1.6 Advance warning centers upstream of dam sites were not established as a measure of preparedness to deal with floods effectively. While dealing with flood of June 2013, DGPS overlooked the requirements of its Reservoir Operation manual as it (i) kept water level up to Full Reservoir Level instead of up to Minimum Draw Down Level (ii) did not carry out required flushing operations due in May and June 2013 (iii) measured silt content at intervals of two hours instead of at prescribed interval of 30 minutes and (iv) failed to close draft tube gates to prevent flooding of power house from tail race tunnel end. This resulted in flooding of the power house. Subsequently, due to restoration of the power station, generation from DGPS remained suspended from June 2013 to May 2014. TPS also overlooked the provisions of Tanakpur Barrage Regulation Rules during management of flood of June 2013 and had to be completely shut down from 11 January 2014 to 28 March 2014 for repairs. Yet till December 2014, the power stations failed to conduct mock drills to deal with natural calamities like earthquake and flooding of power house.

8.1.7 Effective monitoring of operation and maintenance of hydro power stations is essential for safe and efficient operation of the power station. Audit, however, observed that a large number of instruments installed at dams and other structures of CPSEs for monitoring their health were found non-functional during inspections by dam safety teams. NHPC and SJVN had committed to repairing/replacement of such instruments. In case of THDC, most of such instruments were stated to be unapproachable for repair/replacement. However, THDC was yet to take any action to address the issue by preparation of an

Instrumentation Manual describing the type, location, and scope of all reliable instruments as recommended by CWC.

8.2 Recommendations

Based on the audit findings discussed in foregoing chapters, the following recommendations are made to facilitate improvement in operation and maintenance of hydro power stations:

8.2.1 Ministry of Power may

(i) need to take steps for speedy resolution of the long standing issue of non-filling Tehri reservoir up to EL 830 m.

(ii) In line with the objective of National Electricity Policy of balancing the interests of consumers and reasonable recovery of cost by generator, coordinate with other agencies including the Regulator, if necessary, to ensure that design energy of power stations consistently generating substantial secondary energy may be reviewed as per CEA guidelines.

8.2.2 CPSEs may

(i) Ensure maintenance of reservoir level and carry out prescribed flushing operations as per provisions of Reservoir Operation Manuals to avoid sedimentation and consequent reduction in reservoir capacity as well as effective flood management.

(ii) Carry out annual planned maintenance of machines appropriately to minimize forced outages.

(iii) Ensure the compliance with provisions of PPAs regarding opening/renewing LCs and allowance of rebate; and may explore various possibilities for recovery of dues from regularly defaulting beneficiaries including regulation of power as per CERC Regulations.

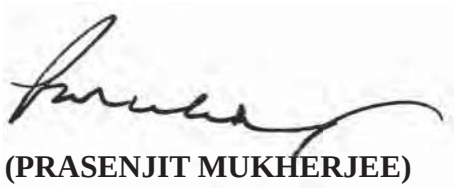
(iv) Establish an advance warning system upstream of the dam site, wherever feasible, so that preventive measures can be taken to ensure safety of dam, power house and population living downstream of the dam.

(v) Ensure regular review and updation of DMPs and prescribe minimum number of mock drills on natural disasters to be conducted by power stations annually for effective preparedness to handle disasters.

(vi) Ensure that compliance to observations of all inspection teams, whether internal or external, relating to safety of structures, including functioning of instruments installed at dam site and power house are carried out promptly.

All the recommendations, except 8.2.1(ii), were generally accepted by MoP/CPSEs. In respect of recommendation 8.2.1 (ii), MoP stated that this was a regulatory issue to be taken

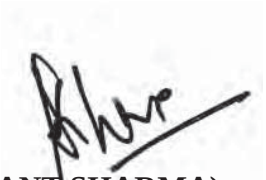
care of by CERC. However, Audit feels that in view of larger public interest as per the National Electricity Policy, MoP may coordinate with the regulator to ensure the desired action.



New Delhi
Dated : 13 November 2015

(PRASENJIT MUKHERJEE)
Deputy Comptroller and Auditor General
and Chairman, Audit Board

Countersigned



New Delhi
Dated : 13 November 2015

(SHASHI KANT SHARMA)
Comptroller and Auditor General of India