Executive Summary

Introduction

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. As such it is important that existing hydro capacity is utilised optimally. Four CPSEs *viz.,* NHPC Limited (NHPC), SJVN Limited (SJVN), THDC India Limited (THDC), and NHDC Limited (NHDC), with 23.72 *per cent* share in the hydro power generating capacity of the country, have a significant role to play in this regard.

(Para 1.1)

What does our audit cover?

This report covers activities from generation to collection of revenue by these four CPSEs between April 2009 and March 2014. In the wake of flash flood incident on 16-17 June 2013 at Uttarakhand, specific aspect of disaster management in these CPSEs has also been covered. Audit selected a representative sample of eight NHPC power stations as on 31 March 2014 using Interactive Data Extraction and Analysis (IDEA) software. In respect of remaining three CPSEs, which had one or two power stations, the only power station or the older one of each CPSE was selected.

(Para 2.1 and 2.5)

Our major audit findings

Performance audit brought out deficiencies in achievement of capacity utilisation, maintaining reservoir level, carrying out flushing operations for desilting, maintenance of generating units, revenue collection and disaster management. Significant audit findings are summarised below:

(i) **Under utilisation of capacity by power stations**

Average Capacity Utilisation Factor (CUF) of Bairasiul, Teesta-V, Chamera-III and Chutak power stations of NHPC during the period covered by performance audit were below their respective Design CUFs.

Tehri Hydro Power Station of THDC, 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.

(Paras 3.1.1 and 3.1.2)

(ii) **Non-review of design energy**

During all the 20 years since commissioning in 1994-95, actual generation at Chamera-I power station exceeded the design energy by 13 to 60 *per cent*. However, its design energy had not been reviewed in terms of CEA guidelines. As design energy forms basis for recovery of fixed costs of power station, non-review of design energy to a realistic level resulted in additional earnings of ₹274.98 crore[1] to Chamera-I power station during 2009-2014 through sale of 3592 MUs secondary energy[2] with consequent additional burden on consumers.

(Para 3.1.3)

(iii) **Decrease in gross and live reservoir capacities due to inadequate flushing operations**

Silt deposition in reservoir can be minimised by (i) keeping water in reservoir up to specified level during monsoon and/or (ii) carrying out regular flushing operations for desilting as per specified norms. Non-adhering to above conditions not only reduces the useful life of reservoir and power station but also makes flood management more difficult. Due to inadequate flushing and non-maintenance of prescribed reservoir levels, gross and live reservoir capacities of three NHPC power stations reduced during five years ended 31 March 2014.

(Para 3.1.4 and 3.1.5)

(iv) **Generation loss due to forced outages during monsoon season**

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.

(Paras 4.3.1)

(v) **Issues in billing and collection**

An examination of energy billing and collection by CPSEs disclosed that compliance to the compulsory conditions of opening LCs for requisite amount and maximum prescribed revolutions of LC per month were not ensured by NHPC. Accordingly, rebate of ₹60.48 crore was allowed by NHPC to beneficiaries who were not eligible for rebate as per the rebate policy.

(Para 5.1.2)

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[1] ***Worked out by multiplying secondary energy generated in the years 2009-10 to 2013-14, with energy charge rate of the respective financial years subject to ceiling of ₹ 0.80 per unit.***

[2] ***Energy generated beyond Design Energy***

Outstanding dues of ₹4112.49 crore remained unrecovered from five beneficiaries[3] by CPSEs as of 31 March 2015. CPSEs may have to seriously review various possibilities for recovery of dues from regularly defaulting beneficiaries.

(Para 5.2.1)

(vi) **Non-review and non inclusion of CWC guidelines in Disaster Management Plans**

Disaster Management Plans (DMP) of all power stations selected for performance audit except Indira Sagar power station of NHDC were not in accordance with CWC guidelines. These DMPs also did not incorporate Emergency Action Plan as a result of dam break analysis. Further, the DMPs were not reviewed annually as per requirement of Disaster Management Act, 2005. Lately, CPSEs have commenced the process of reviewing the DMPs.

(Para 6.3.1, 6.3.2 and 6.5)

(vii) **Ineffective flood management by Dhauliganga and Tanakpur power stations of NHPC**

Damages to Dhauliganga power station during floods of June 2013 were possible to have been mitigated by compliance to the provisions of Reservoir Operation Manual/ Disaster Management Plan regarding advance warning system, maintenance of reservoir levels, flushing of reservoir and lowering of Draft Tube gates in time. After the flood, power generation from Dhauliganga power station remained suspended up to May 2014. Similarly, timely rectification of defects pointed out by Dam Safety team before monsoon season and operation of barrage gates as per Barrage Regulation Rules could have mitigated the damages suffered by Tanakpur power stations (TPS) while managing flood of June 2013. Complete shutdown of TPS had to be taken from 11 January 2014 to 28 March 2014 to rectify the damages.

(Para 6.6.1 and 6.6.2)

What do we recommend?

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

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

[3] ***BSES Rajdhani Power Limited, BSES Yamuna Power Limited, Uttar Pradesh Power Company Limited, Power Distribution Department, J&K and Bihar State Electricity Board.***

stations consistently generating substantial secondary energy may be reviewed as per CEA guidelines.

CPSEs may

(iii) 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.

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

(v) 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.

(vi) 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.

(vii) 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.

(viii) 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 (ii), were generally accepted by Ministry/CPSEs. In respect of recommendation (ii), Ministry 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, Ministry may coordinate with the regulator to ensure the desired action.