

## CHAPTER-2

### 2. Performance Audit of Power Sector Undertakings

#### Performance Audit on “Construction and Operation of Atal Bihari Vajpayee Thermal Power Station, Marwa” of Chhattisgarh State Power Generation Company Limited

##### Introduction

**2.1** Chhattisgarh State Electricity Board (CSEB) was formed on 15 November 2000 to generate transmit and supply power in the State of Chhattisgarh. In January 2009, CSEB was unbundled and activity relating to generation of power was transferred to Chhattisgarh State Power Generation Company Limited (Company), which was incorporated on 19 May 2003.

The CSEB appointed (22 December 2004) M/s Desein Private Limited, New Delhi for preparation of Feasibility Report (FR) at a cost of ₹ 4.41 lakh for setting up of Thermal Power Plant in Janjgir-Champa District who submitted its report in February 2005. CSEB approved (March 2005) establishment of a coal based 2x500 MW green field power project at Marwa in Janjgir-Champa District of the State based on feasibility report. The justification for establishment of Power Plant at Marwa as per feasibility report is as under:

- i) Feasibility Report envisaged availability of 11,011.32 Million Units (MUs) against demand of 15,146.04 MUs during 2005-06 which will increase to 33,945 MUs and 31,527.24 MUs respectively by 2011-12. To meet the growing demand during next five years requirement of plant was felt.
- ii) One of Power plant at Bhaiyathan which was under execution has become uncertain due to local public resistance.
- iii) Easy availability of water, rail and road link.
- iv) Power Finance Corporation also agreed with the suitability of project site.

Accordingly, CSEB appointed (18 July 2005) M/s Desein for preparation of Detailed Project Report (DPR) for the project at a cost of ₹ 5.51 lakh who gave its report in May 2006. M/s Bharat Heavy Electricals Limited (M/s BHEL) was appointed (17 August 2005) for preparation of Environment Impact Assessment (EIA) Report at a cost of ₹ 28.65 lakh and report was submitted by BHEL in January 2007.

Detailed Project Report envisaged demand of 18,834 MUs during 2005-06 against availability of 15,624.80 MUs which were estimated to increase to 38,982 MUs and 46,089.40 MUs respectively by 2011-12. On the basis of DPR and EIA report CSEB accorded (January 2008) approval for awarding of project. Against the estimated demand and availability of power as per DPR actual were 18,908.53 MUs and 18,767.58 MUs respectively during 2011-12. This indicates minor gap between demand and supply.

Chhattisgarh State Electricity Board decided (March 2008) to award the Main Plant (Boiler, Turbine and Generator) work at a cost of ₹ 2,256.91 crore to BHEL on the same techno commercial conditions on which National Thermal Power Corporation Limited (NTPC) had placed order for 2X500 MW TPP

Mauda project. However, important conditions relating to payment terms, liquidated damages, delivery schedule and price variations ceiling were adopted (March 2008) with modification. The agreement was executed with BHEL on 10 September 2009. Similarly, work for Ancillary works (Demineralised Water Plant, Cooling Tower, Coal Handling Plant and Ash Handling Plant) was awarded at a cost of ₹ 1,633.71 crore to M/s BGR Energy System Limited (BGR) in August 2009.

The cost of project as per DPR was ₹ 5,119.84 crore. The project was to be completed on 30 November 2012 however, same was completed on 31 July 2016 with time overrun of three years eight months and cost overrun of ₹ 3,772.67 crore upto 31 March 2019. The Project was subsequently renamed (September 2018) as “Atal Bihari Vajpayee Thermal Power Station (ABVTPS).”

Even after commissioning of the both the units of the Marwa Power Plant the Company failed to achieve the objective of generation of at least 850 MW (at 85 per cent PLF) per hour power it could generate only 575 MW per hour. The main reasons attributable for non achievement of targeted generation during 2016-19 were poor performance of the both the units due to installation of defective turbine, non-availability of spare generator transformer and poor quality of coal.

### **Organisational Setup**

**2.2** The Management of the Company is vested with a Board of Directors (BoDs) comprising five directors appointed by the State Government. The day to day operations are carried out by the Managing Director (MD), who is the Chief Executive of the Company with the assistance of Executive Directors (ED), Chief Engineers (who head each Station), and Superintending Engineers. The Chief Engineer (Generation), ABVTPS is responsible for the day-to-day operations of the plant.

### **Audit Objectives**

**2.3** The Performance Audit was carried out to assess whether:

- Planning of project was adequate and effective to ensure that the project was executed economically, efficiently and effectively.
- The project achieved operational efficiency as per the prescribed norms/standards.
- Internal control and monitoring was effective and adequate.

### **Scope of Audit and Audit Methodology**

**2.4** The Performance Audit covered the planning, construction and operational activities of the ABVTPS (2X500 MW), Marwa since “in principle approval (2004-05)” for the project to operations of the project till March 2018.

Audit methodology involved scrutiny of records maintained by the Company, Chhattisgarh State Power Distribution Company Limited (CSPDCL),

Chhattisgarh Environment Conservation Board (CECB), and ABVTPS. Analysis of data with reference to audit criteria and issue of audit observations. Joint physical verification of assets created under the project was taken up alongwith the Company officers. Besides, information available on the official websites of Central Electricity Authority (CEA), Chhattisgarh State Electricity Regulatory Commission (CSERC), Central Electricity Regulatory Commission (CERC) and Ministry of Power, GoI were utilised.

The objectives, scope and methodology of the performance audit were intimated to the Special Secretary, Department of Energy, Government of Chhattisgarh (GoCG) on 10 January, 2019 but no response was received hence no entry conference was held. The audit findings were reported to the Company and GoCG on May 2019. The Exit Conference was held with the Principal Secretary, Department of Energy and the MD of the Company on 15 May 2019. The reply of the Government was received in November 2019. Views expressed by them in the Exit Conference and reply of the Government have been considered while finalising the Performance Audit Report.

Audit acknowledges the cooperation extended by the Management in timely completion of Audit.

### **Audit Criteria**

**2.5** The source of audit criteria adopted for achievement of the audit objectives were:

- Guidelines/norms/orders of Central Electricity Regulatory Commission (CERC), Central Electricity Authority (CEA), Chhattisgarh State Electricity Regulatory Commission (CSERC) and instructions of Ministry of Power (MoP), Government of India (GoI) and Government of Chhattisgarh (GoCG) with regard to construction and operation of thermal power stations;
- BoDs minutes and agenda papers, FR, DPRs, design specifications, project implementation schedule, tender documents, agreements, Works Department (WD) Manual; and
- Environmental norms fixed by the Central Pollution Control Board (CPCB), Chhattisgarh Environment Conservation Board (CECB) and Ministry of Environment, Forest and Climate Change (MoEF&CC).

### **Audit Findings**

The audit findings are discussed in the succeeding paragraphs.

### **Planning**

**2.6** In this part, audit findings related to deficiencies in planning of pre-execution activities have been discussed:

Activity wise deficiencies noticed in planning have been discussed in succeeding paragraphs:

### **Feasibility Study and Detailed Project Report**

**2.6.1** After conceptualisation of a project, feasibility study report is prepared. This include site specification study, comments on statutory clearances, size of the Thermal Power Plant (TPP), technology to be used, cost estimates, financial analysis and investment approval of the project etc. Thereafter, the DPR of the project is prepared.

The FR (February 2005) and DPR (May 2006) was prepared by M/s Desein Private Limited (Consultant), who was selected<sup>1</sup> on lowest tender basis for which limited tenders were invited.

Audit observed (November 2018) that DPR was prepared in May 2006 while EIA report was prepared by M/s BHEL<sup>2</sup> in January 2007. However, it should have been part of DPR.

Further, it was also observed that nature of available land was not correctly envisaged at FR/DPR there were deficiencies in acquisition of land as discussed below.

- As per scope of work of consultant for preparation of DPR, Desk-top study of maps was to be done by the consultant. There was no provision for detailed survey for selection of site. Further, joint team of CSEB officers and consultant visited at three locations<sup>3</sup> and selected the Marwa site. Accordingly, the consultant prepared the DPR. As per the DPR 80 per cent land was barren and 20 per cent agricultural. However, the Company neither conducted detailed survey nor verify the revenue records of land to assess the nature of land. The Company acquired total 1,728.73 acre land out of which only 283.77 acre (16.41 per cent) land was barren and remaining 1,444.96 acre (83.59 per cent) was agricultural land. These facts were verified<sup>4</sup> (April 2019) by the Audit from the revenue records of department in three days time. This could have been done by the Chief Engineer (Civil-Project 1) *abinitio*. As a result 15 Rehabilitation and Resettlement (R&R) issues, protest of land oustees, strike, *kaamroko*, *talabandi* took place which hampered the project work.

The Government stated (October 2019) that total acquired land was 1,766.60 acre out of which 790.04 acre was barren therefore the actual ratio of barren and agriculture land was 44.72:55.28.

The reply is not acceptable as the Company considered all government land as barren though it was used for agricultural purpose. Hence, ratio of agricultural and barren land was 83.59:16.41.

- Similarly, as per the FR/DPR/EIA there was no forest land in project area. However, while executing the project the Company had to acquire 282.57 acre forest land valuing ₹ 9.58 crore. This resulted in delay of three years and six months in acquisition of 175.93 acre forest land for alternative afforestation although it has no impact on commissioning of plant.

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<sup>1</sup> In December 2004 for preparation of FR and in July 2005 for preparation of DPR.

<sup>2</sup> Awarded cost was ₹ 28.65 lakh

<sup>3</sup> Marwa, Jarwe and Kurda

<sup>4</sup> Land acquired from Villagers/private parties.

The Government stated (October 2019) that identified land for project was forest land.

The reply is not acceptable as during the preparation of FR/DPR/EIAR the Company failed to identify that there was forest land.

- As per GoCG order (8 September 2006) the government land was to be allotted to the Company at a nominal cost of one rupee. The Company acquired 755.63 acre government land from GoCG. However, the district administration in respect of two villages<sup>5</sup> out of 10 villages allotted land at ₹ 7.01 crore whereas in remaining villages, land was allotted at nominal rate. Superintending Engineer (Land Acquisition), ABVTPS initiated the payment and the same was approved by the Chief Engineer (Civil Project) of the Company. Despite request of the Company this amount was not refunded (May 2019) by the district administration leading to avoidable additional burden on consumers.

While accepting the observation the Management stated (December 2018) that process for refund of cost of land is under progress.

- The District Land Acquisition Officer (DLAO) acquired 977.66 acre of land which took abnormal time of more than one year in two cases<sup>6</sup> of land allotment, since receipt of application to award of order.

The Government stated (October 2019) that the delay in acquisition of land after passing of award was due to non acceptance of compensation by the concerned project affected persons.

Reply does not address the issue because audit has pointed out the delay before award of order for land acquisition.

- While granting (5 February 2008) Environment Clearance (EC) the MoEF&CC, GoI directed that no land in excess of 1,254.76 acre shall be acquired for any utilities/facilities relating to this project. However, in violation of EC condition the CE (Civil Project) acquired (till April 2017) total 1,728.73 acre land, against limit of 1,254.76 acre which was 38 *per cent* higher than the limit fixed for which no approval was obtained from the MoEF&CC and reasons for the same were not on record resulting in cost of project was increased by ₹ 63.32 crore. In such a situation the MoEF&CC could revoke the clearance but no such action was taken.

The Government stated (October 2019) that total acquired land for ABVTPS was originally conceived to accommodate expansion units under the said project. Accordingly, 1,201.58 acre land was acquired for present 1,000 MW ABVTPS and remaining of land was acquired for expansion unit of plant.

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<sup>5</sup> Taga and Pauna village

<sup>6</sup> 145.52 acre and 18.91 acre at Lachhanpur and Marwa respectively.

The reply is not acceptable as it seems to be an afterthought as neither in DPR nor at the time of approval from MoEF&CC the Company mentioned about the future expansion of plant. Further, the Company did not obtain approval from MoEF&CC for excess acquisition of land.

**Recommendation:**

**The Company should always assess and carry out the detailed survey of land before proceedings for acquisition of land. It may also consider to take action against responsible officials who failed to assess the nature of land.**

### **Contract Management**

**2.7** Contract Management includes inviting tenders, evaluation of tenders, deciding the terms and conditions of the contract, award of work and enforcement of terms and conditions of the contract. The Company executed two major contracts valuing ₹ 3,890.62 crore<sup>7</sup> relating to BTG and BOP contracts on Engineering, Procurement and Construction (EPC) contract basis. Deficiencies noticed in award of work, terms and conditions entered into and non compliance of terms and conditions of contracts are discussed below:

***Irregularities by Project execution management consultant***

**2.7.1** The Chairman of the Company approved (August 2008) to award the work to M/s Development Consultant Private Limited (M/s DCPL) at a total cost of ₹ 13.99 crore as Project execution Management Consultant (PMC) on limited tender basis from the approved vendor list of Power Finance Corporation (PFC).

The major scope of work of M/s DCPL was approval/review of drawings/design, documents to be submitted by the BTG and BOP contractors, quality surveillance and assurance, supervision, testing and commissioning of the plant equipments and project monitoring from concept to completion.

Following irregularities were noticed on part of the consultant:

***Approval of incorrect specifications of material led to non-installation of Weigh Bridge***

**2.7.1.1** As per the work awarded to M/s BGR Energy System Limited (M/s BGR), they are required to supply in motion weigh bridge for weighment of coal received from South Eastern Coalfield Limited (SECL) through railway infrastructure from Naila Railway station to plant yard. M/s BGR submitted design for in-motion Weigh Bridge for 52 kg /mtr rail for approval of M/s DCPL who approved (March 2012) the same without examining that rail network is designed for 60 kg /mtr rail. Accordingly M/s BGR supplied (August 2012) in-motion Weigh Bridge for 52 kg /mtr rail. Due to mismatch in specifications in-motion Weigh Bridge could not be commissioned till (May 2019). Further, SE (Fuel Management) also failed to notice the incorrect specifications approved by the M/s DCPL due to lack of supervision. He also failed to pursue the matter vigorously for procurement of required in motion Weigh Bridge for early commissioning. It is pertinent to mention that cost of

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<sup>7</sup> BTG erection – ₹ 314.91 crore, BTG supply- ₹ 1,942 crore, BOP erection – ₹ 691.86 crore, BOP supply- ₹ 941.85 crore

in-motion weigh bridge was ₹ 20 lakh only and the Company received coal worth ₹ 1,681.52 crore during the period 2016-19 but same could not be measured to ascertain coal lost in transit. The Chhattisgarh State Electricity Regulatory Commission has specified norm of 0.50 per cent for coal lost in transit.

The Government stated (October 2019) that the in-motion weigh bridge has been installed and commissioning is in progress.

The fact remains that due to delayed installation of weigh bridge coal received during three years period could not be measured.

### ***Non-recovery of penalty of ₹19.71 crore***

**2.7.1.2** The Natural Draft Cooling Tower (NDCT)<sup>8</sup> is a semi closed device for evaporative cooling of water by contact with air. The main function of cooling tower is to remove waste heat into the atmosphere from condenser.

Audit observed (January 2019) that as per technical specification M/s BGR was to install 16 Automatic Valve less Gravity (AVG) filters in the NDCT but only six AVG filters were installed up to January 2019. As required number of AVG filters were not installed the required normative temperature i.e. 33°C could not be maintained. This resulted in high temperature above the norm at the outlet of cooling tower ranged between 0.28°C to 6.89°C during the period March 2016 to December 2018 (Unit-1) and 0.17°C to 4.36°C during the period February 2017 to November 2018 (Unit-2). The Company appointed (7 April 2017) NTPC as third party for conducting Performance Guarantee (PG) test. The PG test for Cooling Tower was conducted in the month of October 2018 instead of during summer month defeating the objective of PG test and the same was approved by the consultant even after its poor performance, resultantly the cooling towers had failed to maintain outlet temperature. The ED (PRG 1) failed to enforce the penalty of ₹ 19.71 crore<sup>9</sup> as per the Letter of Award (LoA)<sup>10</sup> so far (May 2019).

The Government stated (October 2019) that PG test was conducted by M/s NTPC and test report confirms that the cooling towers are fully complying with the terms and conditions of the contract document as well as the designed characteristics of the said cooling towers.

Reply is not acceptable because PG test was conducted in October 2018 and temperature of cooling towers were within the guaranteed outlet temperature of 33°C. However, as per the contract agreement the same should be in all weather conditions which it failed to maintain. Hence, the penalty of ₹ 19.71 crore was to be recovered from contractor as per contract.

<sup>8</sup> NDCT are large concrete chimneys to introduce air through the media. The hot water is introduced into the tower through spray nozzles approximately 10 m above the basin. The main function of the spray zone is to simply distribute the water evenly across the tower. The water passes through a small spray zone as fast moving droplets before entering the fill. This significantly increases the surface area for heat and mass transfer.

<sup>9</sup> ₹ 12.07 crore (₹ 35 lakh for every 0.2°C x 6.9) for unit – 1 and ₹ 7.64 crore (₹ 35 lakh for every 0.2°C x 4.37) for Unit – 2

<sup>10</sup> ₹ 35 lakh for every 0.2°C or part thereof increase over and above the guaranteed temperature of 33°C

***Delay in approval of drawings***

**2.7.1.3** M/s DCPL took one month to 15 months for review/approval of drawings<sup>11</sup> result of which execution work was delayed.

***Deficient terms and conditions of BOP and BTG contract***

**2.7.2** Works Department Manual, GoCG restricts advance against materials brought to site by the contractor at 75 per cent of the value assessed by the Engineer-in-charge. The recovery of such advances shall be made from each succeeding running bill, to the extent of the materials that have been consumed in the relevant finished item.

Audit observed (November 2018) that the Company accepted the terms and conditions for supply of material under BOP contract as 90 per cent advance against permissible limit of 75 per cent and only 10 per cent of the contract price was linked with Commercial Operation Date (COD) and PG test. The Company released bulk of the payment of ₹ 847.67 crore<sup>12</sup> against due amount of ₹ 706.39 crore<sup>13</sup> before COD. Resultantly, the contractor showed very little interest to complete the work in time because on schedule date of completion of project (November 2012) 40.37 per cent work was completed.

Similarly, the terms and conditions for payment for BTG contract were 15 per cent interest free initial advance against Bank Guarantee, 60 per cent progressive payment against proof of dispatch for supply, 20 per cent against receipt of materials at site, 2.5 per cent on COD and 2.5 per cent Performance Guarantee (PG) test for each unit. However, the Company released 95 per cent on receipt of material at site against permissible limit of 75 per cent and only five per cent of the contract price was linked with COD and PG test, and bulk of the payment of ₹ 1,752.75 crore against due amount of ₹ 1,383.75 crore was released before COD. Resultantly, the contractor showed very little interest to complete the work in time because on schedule date of completion of project (November 2012) 36.82 per cent work was completed.

The Government stated (October 2019) that progressive payment of 60 per cent was released to M/s BHEL to facilitate smooth execution of work.

Reply is not acceptable as the Company released 95 per cent payment against the delivery of material at site to M/s BHEL. So, the bulk of the payment had been released before COD, and the contractor showed less interest in completing the project as he had already realised the profit element. This also contributed to delay in completion of project.

**Recommendation:**

**The Company should safeguard its financial interest while determining the terms and conditions of the contract relating to release of advances in future projects.**

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<sup>11</sup> Relating to lightening protection lay out for CHP building, fire water pump house footing layout, layout of ventilation fans/air conditioning plant room in TG building and ID system foundation plan

<sup>12</sup> ₹ 941.85 crore x 90 per cent

<sup>13</sup> ₹ 941.85 crore x 75 per cent



### ***Payment of interest free advances to M/s BHEL***

**2.7.3** As per Central Vigilance Commission (CVC) guidelines standard benchmark advances should be interest bearing and recovery should be time based and not linked with the progress of the work. Further, in other contracts the Company provided interest bearing advances to the contractors.

Audit observed (November 2018) that the Company availed loan of ₹ 7,365.38 crore as on 31 March 2018 from M/s PFC to finance the ABVTSP project. The rate of interest ranged between 9.90 *per cent* and 13 *per cent*. As per terms of payment, the Company released (23 April 2008) ₹ 276.75 crore<sup>14</sup> as interest free advance towards supply of material and ₹ 25.40 crore (24 March 2009) as interest free mobilisation advance for the work of erection, testing & commissioning to M/s BHEL. The Company recovered the whole advance against supply in 3,347 instalments from the invoices furnished by M/s BHEL during the period from February 2009 to June 2017 and mobilisation advances in 345 instalments by February 2018. As per prudent business practice, interest free advances to vendor should be avoided. PFC loan being costly, the Company should have provided interest bearing advance to M/s BHEL. This has resulted in extension of undue advantage to M/s BHEL and consequent loss of realisable interest of ₹ 87.66 crore<sup>15</sup> to the Company. Though, mobilisation advances were paid to ensure speedy execution of the work, the project was not completed in time. It is pertinent to mention that a similar case had also been pointed out earlier in Audit<sup>16</sup>.

The Government stated (October 2019) that CVC guidelines are neither adopted by GoCG nor by the Company. Further, the Government stated that by providing interest free advance to the bidders the Company has attracted competitive bids at comparatively low price. The Government also stated that NTPC in its Mauda project had given advance.

The reply is not acceptable as the Company should have followed CVC guidelines as a best practice in absence of GoCG/Company's guidelines. Further, the reply regarding attracted competitive bids is factually incorrect because the Company selected M/s BHEL on negotiation basis. Apart from it the Company failed to follow the terms and conditions of the NTPC, Mauda project where interest bearing advance was provided to M/s BHEL.

### ***Acceptance of percentage contract***

**2.7.4** As per CVC guidelines standard benchmark consultant's fee should be fixed on the original contract value. In other case the Company limit the consultant fees upto the contract value.

The Company awarded (December 2008) the work of engineering/consultancy and supervision of BTG civil works and Chimney on cost plus 10 *per cent* of the contract value to M/s BHEL. The value of work order of

<sup>14</sup> 15 *per cent* of the value of contract i.e. ₹ 1,845 crore

<sup>15</sup> Loss of interest ₹ 76.14 crore on supply advance i.e. ₹ 276.75 crore and ₹ 11.52 crore on mobilisation advance i.e. ₹ 25.40 crore which was calculated at the rate of 9.90 *per cent* on minimum rate of interest of loan availed from PFC.

<sup>16</sup> Para 4.2.10.2 of Audit Report (Civil and Commercial) of CAG of India for the year ended 31 March 2010, Government of Chhattisgarh.

BTG civil work and Chimney was ₹ 180.10 crore<sup>17</sup> and the Company paid ₹ 194.82 crore including price escalation of ₹ 19.18 crore against the same. This has resulted in additional cost burden of ₹ 1.92 crore as supervision charges on price escalation. Had the Company adopted lump sum (Firm/fix price) contract instead of percentage contract additional cost burdened could have been avoided.

The Government stated (October 2019) that the CVC guidelines are neither adopted by GoCG nor by the Company. The Government further stated that the Company placed work order after getting approval of the Competent Authority, which is comparable with the other similar orders and all sincere efforts were made to have reasonable price for the BTG package as well as execution of civil works under the contract.

The reply is not acceptable as the Company should have followed CVC guidelines as a best practice in absence of GoCG/Company's guidelines. Further, the Government reply did not address the issue of acceptance of percentage contract.

**Recommendation:**

**The Company should award the consultancy works with long completion period on firm price basis considering CVC guidelines as standard benchmark.**

**Project Execution**

**2.8** The project execution includes effective actions to resolve bottlenecks, ensuring quality control through different test for material used in the project, ensuring that the work was executed as per terms and conditions of the contract, deviation in achieving of milestone of various activities, if any is duly approved by the competent authority.

**Slippage of Project schedule**

**2.8.1** Board of Directors (BoDs) awarded (March 2008) BTG work to M/s BHEL on negotiation basis. Notification of Award (NoA) was issued (April 2008) for supply and erection of BTG package amounting to ₹ 2,256.91 crore<sup>18</sup> and completion of Facilities/COD was to be achieved by 30 September 2012 and 30 November 2012 for Unit-1 and Unit-2 respectively after change in zero date. However, there was no change in the date of completion of facilities for supply of material.

Similarly, the Company issued (25 August 2009) LoA to M/s BGR for BOP Package of the Project at a total cost of ₹ 1,633.71 crore<sup>19</sup> with schedule period of 30 months. Thus, the completion of facilities was to be achieved by 24 February 2012.

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<sup>17</sup> Order value of BTG Civil work was ₹ 156.19 crore + Order value of Chimney supply and erection work was ₹ 23.91 crore

<sup>18</sup> Supply ₹ 1,942 crore and for erection ₹ 314.91 crore

<sup>19</sup> Supply ₹ 941.85 crore and for erection ₹ 691.86 crore

The major milestones of the project, achievement there against and delay (if any) is given in table - 2.1.

Table - 2.1: Details of major milestone of the Project							
Sl. No.	Major Milestones	Unit-1			Unit-2		
		Target	Actual	Delay <sup>20</sup> (in months)	Target	Actual	Delay (in months)
<b>BTG Work</b>							
1	Commencement of Boiler Erection	30-01-10	15-02-10	0	30-03-10	26-04-10	1
2	Erection of boiler structure i.e. Boiler drum lifting	31-08-10	06-08-10	-1	21-10-10	06-03-11	4
3	Commencement of Condenser erection	30-11-10	07-03-11	4	31-01-11	15-10-11	4
4	Hydraulic Testing of Boiler	30-08-11	05-10-11	-2	30-10-11	06-09-12	2
5	Commencement of TG Erection	21-12-11	23-02-13	13	21-02-12	02-12-13	11
6	Commencement of TG Oil Flushing	28-12-11	14-02-13	-1	28-02-12	29-03-14	4
7	Boiler ready for testing	30-01-12	14-01-13	-2	30-03-12	08-05-14	0
8	Steam Blowing in Boiler	31-03-12	26-10-13	7	31-05-12	03-09-14	2
9	Barring Gear i.e. rotation of turbine generator	21-04-12	09-11-13	0	21-06-12	17-01-15	3
10	Rolling and synchronisation	26-05-12	21-12-13	1	28-07-12	31-03-15	1
11	COD	30-09-12	31-03-16	23	30-11-12	31-07-16	12
<b>BOP work</b>							
1	Availability of DM water	24-03-11	23-04-17	Completed after COD	24-03-11	23-04-17	Completed after COD
2	Readiness of Cooling Tower	24-10-11	23-04-17	Completed after COD	24-10-11	23-04-17	Completed after COD
3	Coal Handling Plant	24-02-12	01-05-17	Completed after COD	24-02-12	01-05-17	Completed after COD
4	Ash Handling Plant	24-02-12	01-05-17	Completed after COD	24-02-12	01-05-17	Completed after COD

(Source: Data compiled with the records of the Company)

It is clear from the table that Unit-1 and Unit-2 of the project were delayed by 42 and 44 months respectively. The projects were being monitored at different levels of management i.e. Project Manager at site, ED/CE (PRG 1), MD and Chairman at Company's Headquarters. At Headquarters level every month progress of project as a whole was reviewed. It also discussed various issues causing hindrances in the progress of projects and tried to resolve them along with responsibility centres. Besides above, the Energy Department, GoCG and MoP, GoI also monitoring the ABVTSPS project to ensure its timely completion. However, these meetings had no significant impact in containing

<sup>20</sup> Delay was calculated on the basis of difference between target date and actual date of one stage to next stage.

delay in commissioning of ABVTPS project as Unit-1 and Unit-2 were not completed within schedule time period. It is pertinent to mention here that in spite of comment on delay in execution of projects being pointed out by CAG<sup>21</sup>, no corrective measures were taken by the Company. The main reasons for time overrun are discussed below:

### ***Delay in execution of agreement***

**2.8.1.1** As per clause 10.0 of NoA (April 2008), M/s BHEL was required to prepare and finalise the contract documents for signing of the formal contract agreement and shall enter into the contract agreement with the Company, as per the proforma acceptable to CSEB, within 28 days from the date of NoA. The CE (PRG 1) executed an agreement on 10 September 2009 with abnormal delay of 16 months (after considering 28 days i.e. from 9 May 2008). The reasons for such delay were attributable to delay in finalisation of scope of work (Bill of Quantity) and terms and conditions of the contract for different works which were to be carried out under the contract and delay in finalisation of agency to carry out BTG civil works.

The Government stated (October 2019) that there was no impact of delay in execution of agreement in the project execution as M/s BHEL started supply of various items prior to execution of contract agreement.

Reply is not acceptable as in the absence of agreement there was significant delay of 16 months in issuing essentiality certificate<sup>22</sup> which caused delay in supply of imported material by M/s BHEL and contributed in delay in completion of milestone at further stage.

### ***Delay in Supply of material***

**2.8.1.2** The supply of materials which were used in assembling of Boiler, Turbine and Generator valuing ₹ 1,845 crore was to be completed upto January 2012 and March 2012 for Unit-1 and Unit-2 respectively by M/s BHEL. However, there was inordinate delay in supply of material due to:

- delay in issuing essentiality certificate: After delay of 16 months in entering into agreement with M/s BHEL, process for issuing essentiality certificate was initiated. M/s BHEL initially applied for the essentiality certificate with incomplete/ unsigned documents which were further submitted with a delay ranging from one to nine months<sup>23</sup>. The Chief Engineer (PRG 1) forwarded the same to Energy Department with delay ranging from one to five months, reasons for the same were not on record and Energy Department issued essentiality certificate with further delay ranging from two to eight months due to lack of pursuance by the Chief Engineer (PRG 1) with the Department. Thus, total delay in issuing essentiality certificates for different units<sup>24</sup> of M/s BHEL ranged between

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<sup>21</sup> Para No. 4.2.9.2 of Audit Report (Civil and Commercial) of CAG of India for the year ended 31 March 2010, Government of Chhattisgarh.

<sup>22</sup> Essentiality certificate is required to avail concessional rate of custom duty on the imports made for Power Projects.

<sup>23</sup> Delay was considered after date of contract agreement i.e. 11 September 2009 instead of date of original application submitted with incomplete documents by M/s BHEL

<sup>24</sup> EDN Bangalore, HPBP Trichy, Piping Centre Chennai, HEEP Haridwar and Hyderabad Pumps

three to 16 months.

- delay in issuing of Material Dispatch Clearance Certificate<sup>25</sup> (MDCC) of M/s BHEL, Haridwar by the Chief Engineer (PRG 1) which ranged between one to five months due to submission of incomplete documents by M/s BHEL viz. test certificates, packing slip, etc. and delay in approval of materials by M/s DCPL.
- delay in receiving back, material<sup>26</sup> transferred to other projects by M/s BHEL viz. Korba West Extension, Damodar Valley Corporation (DVC), Koderma, DVC Andal, Bhusawal, etc. The monitoring mechanism of the Company failed in coordinating with main plant contractor to ensure timely supply of critical equipment in case of ABVTPS project.

The Government stated (October 2019) that analysis of delay in supply is in progress and appropriate action would be taken as per contractual provisions. The Government further stated that due to requirement of additional information from the Company or M/s BHEL for issuing essentiality certificate, delay occurred.

Reply is not acceptable as audit has quantified the delay for issuing essentiality certificate after considering time taken for additional information and further clarification required.

#### ***Delay in awarding and completion of BTG civil works***

**2.8.1.3** As per recommendation of the negotiation committee (March 2008), CE (Civil Project) was to finalise the tender for associated BTG civil works<sup>27</sup>, however, it failed to do so for which reasons were not on record. Subsequently, same was included (September 2008) in the scope of M/s BHEL as a result, zero date was shifted from 11 April 2008 to 31 December 2008 and completion period was also extended by nine months. Further, M/s BHEL issued (24 August 2009) Letter of Intent (LoI) to M/s Bridge & Roof Co. (I) Limited, (B&R) at a total contract value of ₹ 156.19 crore with scheduled completion period of 42 months from the date of LoI. The work was to be completed by 23 February 2013 in all respect. However, the BTG civil work was completed with abnormal delay of 46 months i.e. on 31 December 2016 due to protest of land oustees by 187 days in phased manner, delay ranged between one to nine months in approval of drawings by M/s DCPL, deployment of inadequate manpower, non-providing of fronts by BOP contractor and non-payment of price variation bills by the Company.

The Government stated (October 2019) that there was procedural delay in awarding of BTG civil work such as calling limited offers, getting approval from higher authority etc.

The fact remains that there was significant delay of nine months in awarding of BTG civil works by the Company to M/s BHEL and further delay of four

<sup>25</sup> MDCC is an authorisation certificate for dispatch of materials from works to project site.

<sup>26</sup> Material used for assembling of Boiler, Turbine and Generator such as ID fan blade and motor, generator exciter, jacking oil pump etc.

<sup>27</sup> Site leveling and grading, Civil, Structural and architectural job of power block and other miscellaneous foundation and structures for Unit 1 and Unit 2

months by M/s BHEL in awarding work to M/s B&R. Further, reply does not address the issue for delay of 46 months in execution of civil works.

***Delay in awarding and completion of construction of 275 meter twin flue Chimney***

**2.8.1.4** M/s BHEL awarded (September 2009) the work of construction of 275 meter high Reinforced Cement Concrete (RCC) twin flue steel lined chimney for ₹ 24.81 crore to M/s Gannon Dunkerley & Company Limited (GDCL), Kolkata but it was cancelled due to Chimney accident (23 September 2009) at BALCO, Korba being executed by GDCL. M/s BHEL re-awarded (5 April 2010) work to M/s Prasad & Company Limited, Hyderabad after a lapse of six months to be completed by November 2012. However, the same was completed on 30 April 2014 with an abnormal delay of 18 months attributable delays were, three months in casting of chimney raft mainly due to non-providing of construction drawings for Plain Cement Concrete (PCC) by M/s BHEL, delay of six months due to in casting of chimney shell and nine months in structural erection mainly due to non availability of chimney slab grade drawing by M/s BHEL, protest of land oustees and non-providing of experienced engineer for flue cane<sup>28</sup> and structural steel work by M/s BHEL.

While accepting the audit observation the Government stated (October 2019) that appropriate action would be taken for delay as per contractual provisions at the time of closure of contract.

***Delay in completion of facilities under BOP contracts***

**2.8.1.5** As per agreement with M/s BGR various activities like availability of De-mineralised (DM) water, readiness of NDCT, Ash Handling Plant (AHP) and Coal Handling Plant (CHP) of the BOP package were to be completed upto February 2012, however the same was completed with delay ranged between 63 months and 74 months from schedule date of completion. The main reasons attributable to delay in completion of BOP works are discussed below:

- **Non deployment of adequate manpower:** As per agreement M/s BGR was required to adopt three shift working by deploying additional manpower and resources however, the contractor had deployed less number of manpower (1,800-1,900) at site against the requirement of 4,000 i.e. deployment was less than 50 *per cent* throughout the execution period. The deployed vendors were not adequately equipped to carry out the work in a time bound manner.
- **Delay in approval of drawings:** The drawings were approved with delay ranged between one to 15 months by the consultant (M/s DCPL).
- **Protest of land oustees:** The total protest of land oustees of 187 days in phase manner affected the execution of BOP work.
- **Delayed payment by M/s BGR:** The Company processed and passed the bills of M/s BGR in line with provision contained in the contract however,

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<sup>28</sup> A flue cane is a duct, pipe or opening in a chimney for conveying exhaust gases from a fire place, furnace, boiler to the outdoors.

M/s BGR did not make payment to its sub vendor which affected the work adversely.

- **Crusher house fire incident:** Unit-1 was synchronised with coal for COD on 23 June 2015 and the load was increased upto 300 MW. However, due to fire accident occurred in the crusher house of coal handling plant on 14 July 2015, the COD of Unit-1 could not be achieved by the scheduled time i.e. August 2015. It was observed that M/s Allen Engineering, as sub-vendor of BGR, was not approved by CE (PRG 1) of CSPGCL and the welding work was carried out without taking prior permission. M/s BGR did not commission fire detecting and extinguishing system and CCTV cameras for protection against such incidences. Further, despite having excess<sup>29</sup> manpower in the plant it could not watch the unauthorised activities carried out by M/s BGR. The crusher house was restored on 22 February 2016 after more than seven months.

Thus, due to slow execution of work by M/s BGR critical civil works like various floors of thermal plant, dust suppression of pump house, sewage treatment plant, ash handling plant, coal handling plant and NDCT could not be completed till commissioning of plant. The monitoring mechanism of the Company could not ensure that such activities were carried out in timely manner.

While accepting the audit observation the Government stated (October 2019) that appropriate action would be taken against M/s BGR as per contractual provisions at the time of closure of contract. Further, the Company has taken action against responsible officials by withholding the increments with cumulative effects for fire incident.

***Delay in commissioning of Unit-1 and 2 due to non-settlement of payment issue with M/s BHEL***

**2.8.1.6** The Company decided (9 February 2016) COD of Unit-1 and 2 in the month of February 2016 and March 2016 respectively. Accordingly, the Company requested to M/s BHEL for engaging commissioning engineers to complete balance work but M/s BHEL did not engage adequate commissioning engineers for the same due to non-settlement of outstanding payment of ₹ 65 crore. After assurance of the Company to release ₹ 32 crore payment, M/s BHEL deployed the engineers. Finally, the COD of Unit-1 was achieved on 31 March 2016 after the delay of one month.

Similarly, due to non-settlement of pending payment issue<sup>30</sup>, M/s BHEL did not engage adequate manpower to rectify the defect of Unit-2 in all respect prior to COD of Unit-2. As a result the Company could not achieve the COD of Unit-2 in March 2016. After vigorous persuasion by the Company, M/s BHEL deployed the adequate manpower and same was achieved on 31 July 2016 after the delay of four months.

The Government stated (October 2019) that the decision of the Company to

<sup>29</sup> Excess manpower for Class I (EE to ED) ranged between 1.34 per cent to 75.75 per cent, for Class II (AE) 42.86 per cent to 295.45 per cent and for Class III (JE) 30.33 per cent to 173.12 per cent during the period from 2011-12 to 2016-17.

<sup>30</sup> Due to disagreement between the both on payment of price variation.

withhold the payment of M/s BHEL was in the interest of the project implementation.

The fact remains that due to non-releasing of payment by the Company COD of Unit-1 and Unit-2 was delayed by one and four months respectively.

### **Impact due to delay in commissioning**

**2.8.2** The Commercial Operation Date (COD) of Unit-1 and Unit-2 was scheduled in September 2012 and November 2012, however, the COD of Unit-1 and Unit-2 were achieved in 31 March 2016 and 31 July 2016. Delay in COD attributable to loss of generation, rebate on PFC loan, return on equity, procurement of power at higher rates and interest beyond scheduled completion date as discussed below:

- The COD of Unit-1 and 2 of ABVTPS, Marwa were delayed by 42 and 44 months respectively, had Unit-1 and 2 were completed within the scheduled period, considering the average generation of Unit-1 and 2 during the years 2016-17 and 2017-18, the Company could have earned potential revenue from generation of 16,440.07 MUs amounting to ₹ 4,438.82 crore. Thus, slippage of schedule of COD of Unit-1 and 2 had resulted in generation loss to the Company. It is pertinent to mention that in spite of this issue being pointed out by CAG<sup>31</sup>, no corrective measures were taken for timely commissioning of plants.

The Government stated (October 2019) that BTG and BOP works were awarded prior to issuance of Report by CAG. Hence, it is not relevant for ABVTPS.

Reply is not relevant as in para no. 4.2.9.1 of Audit Report (Civil and Commercial) of CAG of India for the year ended 31 March 2010, Audit has pointed out generation loss due to delay in commissioning of project which has no relevance to awarding of works.

- As per policy in vogue, the PFC allows (August 2007) a rebate of 0.25 per cent in the interest rate for generation projects from the date of commissioning of the first unit of the project. The Company was, therefore, deprived of a rebate of ₹ 17.95 crore due to delay in commissioning of Unit-1 by 42 months.

The Government stated (October 2019) that the project could not be completed in scheduled time as project was green field project and there were issues involved like rehabilitation and resettlement, land acquisition, supporting infrastructure, water availability etc.

Reply is not acceptable as 307.75 acre land for construction of plant was acquired (March 2008) before awarding of works (April 2008) and delay in providing supporting infrastructure like rail infrastructure had no impact on the completion of project as main plant and BOP work was not completed on scheduled date. Further, due to strikes by land oustees project was affected only for 187 days.

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<sup>31</sup> Para No. 4.2.9.1 of Audit Report (Civil and Commercial) of CAG of India for the year ended 31 March 2010, Government of Chhattisgarh.

**Time overrun in commissioning of ABVTPS resulted in generation loss of 16,440.07 MUs.**



- Clause 22.2 of CSERC (Terms and Conditions of determination of tariff according to Multi-Year Tariff Principles) Regulation, 2010 stipulated that in case of projects commissioned on or after 1 April, 2010, an additional return of 0.50 *per cent* shall be allowed if such projects are completed within 44 months from zero date for green field projects. Non completion of the project within schedule time resulted in a loss of ₹ 3.16 crore<sup>32</sup> on account of return on equity.

The Government stated (October 2019) that compliance of CSERC MYT Regulation, 2010 was not required as Unit-1 and 2 was to be completed within 45 and 47 months from zero date in place of 44 months as required in the CSERC provision.

Reply is not acceptable as for Unit-1 the Company did not make effort to reduce the target schedule completion period by one month to achieve the CSERC MYT Regulations. Further for Unit-2, Regulation allowed further six months which was well within the scheduled completion period. However, the Company could not complete the project within scheduled time.

- The project was to be commissioned in the year 2012-13. However, the same could not be achieved which resulted in procurement of power at higher rates from private sectors by CSPDCL as the Company has entered into power purchase agreement with CSPDCL. This had resulted in additional cost of ₹ 315.92 crore<sup>33</sup> to CSPDCL for energy during the period 2013-14 to 2015-16 which was passed on to the consumers.

The Government stated (October 2019) that the CSPDCL procured the power ranged between ₹ 2.55 per unit and ₹ 3.56 per unit to meet its shortfall. It was also stated that rates of procured power were less than the generating cost of ABVTSPS.

Reply is not acceptable as the CSPDCL procured power from private parties due to non completion of Marwa project in time by the Company. Further, generation cost of ABVTSPS increased to ₹ 4.16 per unit against range of ₹ 1.96 and ₹ 1.73 per unit as envisaged in the DPR due to cost overrun of project on part of the Company.

- The Company incurred loss of ₹ 1,317.60 crore<sup>34</sup> towards avoidable payment of interest during construction (IDC) from schedule date of completion to actual date of completion (COD) due to delay in completion of work.

### Cost overrun

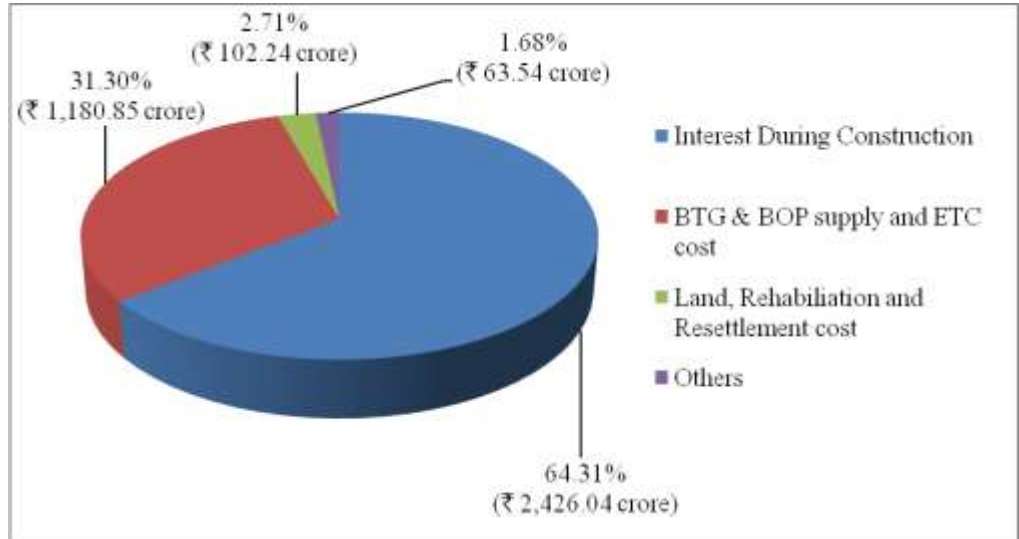
**2.8.3** Due to delay in completion of the project, the actual expenditure incurred by the Company upto 31 March 2019 was ₹ 8,892.51 crore (approved cost by CSERC) against the original estimated cost of project of ₹ 5,119.84 crore and the Company had to incur additional expenditure of ₹ 3,772.67 crore. The components contributing to increase in cost are depicted in the pie-chart as follows:

**The Company had to incur additional expenditure of ₹ 3,772.67 crore towards cost overrun due to delay in commissioning of ABVTSPS.**

<sup>32</sup> ₹ 6,317.70 crore X 10 *per cent* equity X 0.5 *per cent*

<sup>33</sup> (Difference of rate per unit between DPR and actual) x procured power

<sup>34</sup> ₹ 2,994.54 crore x 44 months/100 months



The main reasons attributable for cost overrun were as follows:

### **Increase in interest during construction (IDC) on PFC loan**

The interest during construction (IDC) increased from ₹ 568.50 crore (as per DPR) to ₹ 2,994.54 crore (i.e. 426.74 per cent). Reasons that led to increase in IDC are discussed below:

#### ***Failure to infuse equity by the Company***

**2.8.3.1** The Company decided to avail 90 per cent of the estimated project cost as loan and the remaining 10 per cent was to be infused from equity (own sources/State Government contribution in equity).

During the period 2008-09 to 2017-18, the Company was to infuse 10 per cent equity amount ranging between ₹ 418 crore (2008-09) and ₹ 900 crore (2017-18) in the project.

Audit observed (December 2018) that due to non ensuring of infusing of 10 per cent equity before availing of loan from PFC and there was shortfall in infusing equity which ranged between ₹ 12.99 crore (2013-14) and ₹ 458.19 crore (2011-12). Instead of investing 10 per cent from equity, the ED (Finance) availed loan. As a result of this the Company had to bear additional interest burden of ₹ 92.56 crore.

It was also observed that no effort was made by the Company to get equity amount from GoCG till 2010-11 to reduce the cost of project, a request was made to GoCG only after August 2011.

The Government stated (October 2019) that there was no compulsion regarding infusing 10 per cent equity upfront before availing loan from PFC as per loan sanction order of the PFC.

Reply is not acceptable because as per prudent business practice before availing loan, fund was to be arranged from own sources to minimise availing of loan and interest burden thereon. However, the Company neither carried out exercise to assess the availability of funds to infuse 10 per cent equity nor efforts were made to obtain equity from GoCG till 2010-11 to avoid the additional interest burden.

### ***Downgrading in rating of the Company***

**2.8.3.2** For the purpose of funding PFC categorised State Power Generation Companies based on the evaluation of utility's performance against specific parameters covering operational and financial performance including regulatory environment and audited accounts.

Audit observed (January 2019) that during the period from 16 February 2012 to 12 September 2012 rating of Company was downgraded from A+ to B due to compliance of previous year's statutory provision in respect of employee cost which resulted in loss to the Company in the year 2010-11 for which the PFC charged additional 0.50 *per cent* rate of interest on disbursed loan. Later on, the rating of Company was upgraded from B to A since 13 September 2012 and the same was retained till 6 October 2013. As a result, the PFC reduced additional rate of interest to 0.25 *per cent* on disbursed loan. Again rating of Company was downgraded from A+ to B during the period 1 October 2014 to 30 September 2015 due to loss to the Company during the year 2013-14 as there was underutilisation of plant capacity, for which PFC charged 0.50 *per cent* additional interest on disbursed loan. Resultantly, the Company had to bear additional interest burden of ₹ 18.01 crore and also incurred avoidable financial burden on ABVTPS to the same extent.

The Government stated (October 2019) that loss to the Company during the year 2010-11 is mainly due to statutory provisions required to be made in accounts in compliance to accounting standards and in 2013-14 it is due to true up order by CSERC and generation loss.

Reply is not acceptable as the Company incurred loss during the year 2010-11 as it made provision for retirement benefits of previous years. As regard loss during the year 2013-14 profit after tax was negative even after considering true up order of CSERC.

### ***Increase in cost of BTG and BOP works***

**2.8.3.3** The cost of BTG supply and Erection, Testing and Commissioning (ETC) work increased from ₹ 2,437.01 crore (as per awarded value) to ₹ 2,666.91 crore (i.e. 9.43 *per cent*). The main reason for increase is payment of price variation in contract period.

Similarly the cost of BOP supply and ETC work increased from ₹ 1,902.05 crore (as per awarded value) to ₹ 2,208.57 crore (i.e. 16.12 *per cent*). The main reasons for increase are payment of price variation of ₹ 116.88 crore paid as per terms and conditions contract and construction of approach road ₹ 1.42 crore. The issue of non-availability of encumbrance free land led to avoidable expenditure of ₹ 1.42 crore on construction of approach road is discussed below.

Without acquiring the required land for construction of approach road, the Company issued (May 2012) work order valuing ₹ 2.34 crore for construction of road. The contract was rescinded (February 2013) due to non-availability of hindrance free land by the time contractor had executed work valued ₹ 13 lakh. Subsequently, the work order was issued<sup>35</sup> (March 2014) against

<sup>35</sup> M/s Asha Construction, Raipur

the land already acquired by the Company at a total financial commitment of ₹ 2.01 crore. Further, the Company issued<sup>36</sup> (June 2014) another work order at a total financial commitment of ₹ 1.75 crore after acquiring the balance land. Had the Company acquired the land before awarding the contract, extra expenditure of ₹ 1.42 crore could have been avoided.

The Government stated (October 2019) that at the time of awarding of work, the entire land could not be taken over due to resistance of the villagers. Further, contractor did not commence the work on the available land. Hence, the contract was rescinded and fresh contract was awarded.

Reply is not acceptable as land acquisition problem arose due to acquisition of land without conducting any detailed survey which resulted in avoidable expenditure of ₹ 1.42 crore.

### ***Increase in cost of land acquisition and R&R***

**2.8.3.4** The land acquisition and R&R cost was considered at ₹ 71.66 crore in the DPR, however the actual expenditure incurred was ₹ 174 crore (i.e. 142.81 *per cent*) which comprising of ₹ 125 crore on land and ₹ 49 crore on R&R. The main reasons for increase in cost of land was excess acquisition of land, difference in rate of agricultural and barren land and excess expenditure incurred on settlement of R&R due to payment of compensation at higher rate.

### **Recommendation:**

**The Company should ensure timely execution of new thermal power plant through better planning, close monitoring and close follow up with contractors and consultants to avoid time and cost overrun and consequent loss of generation.**

### ***Non recovery of liquidated damages from the contractors***

**2.8.4** Though the contractors completed the works after 42 and 44 months of the scheduled date, no liquidated damages (LD) were recovered as stipulated in the contract for delay of 13 months on the part of M/s BHEL due to delay in awarding of BTG civil works and supply of materials and 16 months by M/s BGR due to non-deployment of adequate manpower. It is pertinent to mention that in spite of being pointed out by CAG<sup>37</sup> no lessons were learnt. This led to undue financial benefit of ₹ 339.31 crore<sup>38</sup> to the contractors.

While accepting the audit observation the Government stated (October 2019) that the applicability of LD would be ascertained after finalisation of delay analysis which is under progress.

### ***Project commissioned with incomplete ash handling plant***

**2.8.5** Electrostatic precipitator (ESP) is a particulate removal device that removes suspended particulate matter from combustible products using an

**The Company extended undue benefit of ₹ 339.31 crore to contractors due to non-recovery of liquidated damages.**

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<sup>36</sup> M/s Shankar Engineering Works, Korba

<sup>37</sup> Para No. 4.2.9.1 of Audit Report (Civil and Commercial) of CAG of India for the year ended 31 March 2010, Government of Chhattisgarh.

<sup>38</sup> BTG contract ₹ 1,845 crore (contract value excluding tax and duties) X 10 *per cent* = ₹ 184.50 crore and BOP contract ₹ 1,548.09 crore (contract value excluding tax and duties) X 10 *per cent* = ₹ 154.81 crore.

electrostatic force. The installation work of ESP was in the scope of M/s BHEL.

Scrutiny of progress report (March 2016) revealed that the work of AHP remained incomplete even after COD. As AHP was not ready completely, the ash generated at boiler accumulated inside the ESP casing much beyond the capacity of ESP. Since, one pass was damaged completely, it was required to be replaced with new one. M/s BHEL refused (July 2016) as per terms of contract to rectify the defect as same was due to fault of the Company because the Company commissioned the plant with incomplete AHP. This has resulted in avoidable expenditure of ₹ 4.25 crore on replacement/repair of ESP.

The Government stated (October 2019) that the commissioning of Unit-1 and 2 was done only after completion of ESP and Ash Handling System.

Reply is factually incorrect because as on COD, AHP was not fully completed which was completed on 1 May 2017.

**Recommendation:**

**The Company should start commercial operation only after ensuring completion of all facilities to avoid damage to equipments.**

**Non-compliance of Chhattisgarh State Electricity Grid Code**

*Improper trial run*

**2.8.6** The CSERC published (December 2011) Chhattisgarh State Electricity Grid Code 2011 (Grid Code 2011). It prescribed that trial run shall be carried out i.e. running of generator continuously for 72 hours. The Company<sup>39</sup> declared COD of Unit-1 and Unit-2 from 00:00 hrs of 31 March 2016 and at 00:00 hrs of 31 July 2016 respectively. Audit observed (January 2019) the following irregularities with respect to COD of the project:

- Unit-1 of ABVTSPS was run for 108 blocks of 15 minutes continuously and not for a continuous required period of 72 hours i.e. 288 blocks of 15 minutes each at its installed capacity.
- Grid Code 2011 stipulated that the short interruptions, for a cumulative duration of four hours, should be permissible and more than four hours should call for repeat of trial operation or trial run. However, the cumulative interruption in Unit-1 and Unit-2 during the period of trial run was 173.25 hours and 14.25 hours respectively. The Company neither opted for repeat trial nor derated the capacity for Unit-1 and 2.
- The units of thermal Generating Station shall also demonstrate capability to raise load upto 105 *per cent* of its Installed Capacity (IC). The Unit-1 recorded maximum of 505.02 MW (29 March 2016 00:24:46 hrs) and 504.38 MW (29 March 2016 00:31:14 hrs). Thus, the unit ran at its full capacity for a total period of 18 minutes only (i.e. 00:31:14 hrs *minus* 00:13:37 hrs). The Unit-2 ran for 502 MW for only 1 block (27 July 2016 at 04:30:00 hrs). Both the units did not raise load upto 105 *per cent* of IC.
- Grid Code 2011 provided that the generating Company shall certify that

**The Company declared COD of ABVTSPS in violation of CSERC Electricity Grid Code 2011.**

<sup>39</sup> Chief Engineer (C&CP) and ED (Gen) declared COD for Unit-1 and Unit-2 respectively.

the generating station meets the relevant requirements and provisions of the Grid Code 2011, BOP auxiliaries<sup>40</sup> have been commissioned and are capable of full load operation. The Company did not certify COD as required. Many important works such as Turbine Driven Boiler Feed Pump (TDBFP) 2B, Hydrogen Generation Plant, Fire fighting system, Effluent Treatment Plant (ETP), AHP, Chlorination system and CHP were not commissioned.

- The certificates were required to be signed by the Chairman and MD/Chief Executive Officer of the generating Company and a copy of the certificate was to be submitted to the Member Secretary of the concerned Regional Power Committee and concerned Regional Load Dispatch Centre (RLDC)/State Load Dispatch Centre (SLDC) before declaration of COD. But the certificate for COD was signed by the Chief Engineer (Commercial & Corporate Planning) and ED (Generation) for Unit-1 and Unit-2 respectively and submitted to the Chief Engineer (SLDC). Nothing was found on record to show that a copy of the certificate was submitted to the Member Secretary of the Western Regional Power Committee as required in the Grid Code 2011.
- The respective RLDC/SLDC was required to notify the clearance within seven days of receiving the generation data or else inform the generating Company of any deficiency in the trial run operation. But the RLDC/SLDC did not inform the generating Company of the deficiencies in the trial run operation as pointed above.
- Though the RLDC was empowered in the Grid Code 2011 not to schedule the unit station in the event of non-compliance of any of the provisions of Grid Code 2011, it did not object to commissioning of Unit-1 and 2.

While accepting the audit observation the Government stated (October 2019) that trial run of Unit-1 was conducted subsequent to declaration of COD.

### **Expenditure on non-utilisation of assets created**

#### ***Infructuous expenditure of ₹ 1.37 crore on construction and maintenance of Temporary Bund at Marwa***

**2.8.7** The Executive Engineer (Civil 1), ABVTPS Project proposed (January 2012) to construct a coffer bund across Hasdeo River at downstream of intake pump house of the project as trial run was scheduled in March 2012. LoA for the subject work was issued<sup>41</sup> (March 2012) and work was completed (4 January 2013) at a cost of ₹ 28.58 lakh.

The BoDs of the Company accorded approval (June 2013) for construction of a temporary earthen bund near intake pump house on Hasdeo River and maintaining the same for a period of three years at an estimated cost of ₹ 1.45 crore to save ₹ 78.52 crore against water charges. Accordingly, tender was invited<sup>42</sup> by and work was awarded (September 2013) for construction

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<sup>40</sup> Fuel Oil System, Coal Handling Plant, DM Plant, pre-treatment plant, fire-fighting system, Ash Disposal system

<sup>41</sup> EE (Civil) under office of ED (Civil Project)

<sup>42</sup> ED (Civil Project)

and maintenance of the said bund for ₹ 1.08 crore. The work was completed in 24 February 2014 at the cost of ₹ 1.08 crore.

In this connection, audit observed (November 2018) that major works such as Boiler light up, TG Box up, synchronisation and CHP were incomplete at the time of decision for construction of temporary bunds. Without completion of above mentioned work, commissioning of Units were delayed. As such, decision for construction of temporary bunds without synchronising with completion of plant works lacked justification. Further, no record was found to show that any water was drawn from the temporary bunds. As temporary bund was constructed on 24 February 2014 and COD was achieved in March 2016/July 2016, so at the time of completion of construction of temporary bund project was in under progress therefore, there was no use of it. This had resulted in infructuous expenditure of ₹ 1.37 crore.

The Government stated (October 2019) that proposal to construct and maintain temporary bund was initiated to meet the requirement of water during pre commissioning and testing activities.

Reply is not acceptable as water requirement for pre-commissioning activities was fulfilled from the *Choutaria Nala* and no water was utilised from temporary bund. Hence, there was no need to construct temporary bund.

***Non-completion of Over Head Electrification (OHE) work led to idling of Railway line valuing ₹68.76 crore***

**2.8.8** The Company awarded (March 2008) the work of Project Management Consultancy Contract to M/s RITES who awarded contracts in six packages for Rail Infrastructure to the contractors.

The work under package IV for OHE was awarded (February 2009) to M/s Traxun Towers by M/s RITES at a cost of ₹ 10.46 crore. However, encumbrance free site was handed over (November 2013) by the Company. Accordingly, the schedule date of completion was extended to July 2014. The work of OHE could not be completed till (May 2019) due to non-completion of OHE wire stringing work. The contractor did not execute the balance work and requested for short closure of the work as the work was to be completed by April 2014 but due to delay in getting site clearance from Railway, Rail Over Rail (ROR) Bridge work remained incomplete by the Company till (May 2019).

The Company had already spent an amount of ₹ 183.19 crore till December 2018. But due to non-completion of balance work of OHE the Company was forced to use the single line i.e. the return line for both loaded and empty rakes. Thus, out of total railway line of 24.96 kilometer (km) only 15.59 km of the railway line could be utilised by the Company (i.e. 62 per cent). A total of 9.37 km (38 per cent) of railway infrastructure costing ₹ 68.76 crore<sup>43</sup> remained idle (May 2019) even after three years of COD of the units.

**The Company could not utilise 9.37 km railway line costing ₹ 68.76 crore due to non-completion of overhead electrification work.**

<sup>43</sup> Cost of unused rail infrastructure = ₹ 183.19 crore (total cost)/24.96 km (total length of railway network) x 9.37 km (unused part of railway network)



Incomplete wire stringing work

The Government stated (October 2019) that OHE work was delayed due to delay in land acquisition, strike by villagers and delay in grant of block by Railway for ROR. The Government further stated that presently OHE work is under progress.

Reply is to be seen in the context that acquisition of land was done without conducting any detailed survey and the Company did not pursue the matter vigorously with Railway till COD to obtain grant of block.

**Recommendation:**

**The Company should get the associated work completed within scheduled time to synchronise the system.**

***Unfruitful expenditure of ₹ 2.99 crore on automatic signalling system***

**2.8.9** M/s Vijaywargi Infra Engineers Private Limited was awarded the work of Signalling and Telecommunication (S&T) by M/s RITES. The work was completed (February 2016) at a cost of ₹ 2.99 crore. M/s RITES successfully commissioned and handed over the S&T system to CSPGCL on 24 February 2016.

Audit observed (December 2018) that since inception the Company knew that manpower to be deployed for operation and maintenance of S&T system. However, the Company neither deployed own staff<sup>44</sup> for training<sup>45</sup> nor engaged manpower through outsourcing to operate the system. The Company requested (24/02/2016) to RITES to close down the automatic signalling system. The system was operated manually from the date of handing over to till May 2019. Despite spending of ₹ 2.99 crore on automatic signalling system, objective of faster, reliable and safer train movement remained unfulfilled. The same was further established by photograph as follows which was taken during joint physical verification (December 2018).

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<sup>44</sup> Superintending Engineer (Civil) Circle-1, requested (23/02/2016) Superintending Engineer (Services) to deploy staff.

<sup>45</sup> As offered by M/s RITES (Project Management Consultant) on 02/02/2016.





Steel apparatus case of automatic signalling system lying demolished at railway line between stretch of Bridge no.17 and null point of cutting section.

While accepting the audit observation the Government stated (October 2019) that initiative has been taken for deploying the trained manpower for operating the same.

### *Non-utilisation of procured materials*

**2.8.10** As per terms of payment the contractor was paid 90 *per cent* of the value of material supplied at site after issue of MRC. In this regard audit observed (January 2019) that material valued at ₹ 2.11 crore remained unutilised till date (May 2019) after lapse of 34 months is given in table - 2.2.

Table - 2.2: Statement showing unutilised items		
Sl. No.	Item	Value (₹ in crore)
1	0.52 lot Hoisting equipments out of one lot	1.48
2	One conveyor belt vulcaniser out of two	0.18
3	One Elevator (lift) out of two	0.45
<b>Total</b>		<b>2.11</b>

*(Source: Data compiled from the records of the Company)*

Non-installation of these materials resulted in idle investment of ₹ 2.11 crore besides operational problems in day to day work. As the above materials were supplied during the period March 2012 to March 2014 and more than four years had passed by, the guarantee/warranty period of the equipment expired. This shows that the contract enforcement by the SE (CHP) was extremely poor.

The Government stated (October 2019) that action is being initiated to ensure utilisation of procured materials. The Government further stated that LD would be levied as per contractual provisions after delay analysis.

### **Other issues**

#### *Delay in unloading of coal from wagons resulted in avoidable payment of demurrage charges of ₹ 1.15 crore*

**2.8.11** The Company arranged unloading of coal by placing (1 April 2016) a work order to M/s Neelkantham Systems Private Limited, Korba (Contractor). As per the work order, the wagons were to be unloaded within the scheduled time of 2 hours 15 minutes. In case of delay in unloading the wagons, penalty at the rate of ₹ 150 per wagon per hour or at the prevailing rate as notified by South Eastern Central Railway (SECR) from time to time shall be imposed

and recovered from the Contractor.

Audit observed that during the period from March 2016 to May 2019, the Company paid ₹ 1.46 crore on account of demurrage charges to SECR on account of delay in unloading of coal wagons, however, the Company could recover only ₹ 0.31 crore from the Contractor and remaining amount of ₹ 1.15 crore was borne by Company due to poor monitoring of SE (CTD). The main reasons for delay in unloading of coal from wagons were due to problem in coal feeding and conveying or crushing system, big lumps of coal/shale which stuck-up wagon gate and hopper grill causing jamming and restriction in coal evacuation/unloading process.

The Government stated (October 2019) that restoration after crusher house fire accident and re-commissioning of other auxiliaries of CHP had taken considerable time for stabilisation which caused payment of demurrage charges. The Government further stated that demurrage charges have been reduced considerably in the year 2018-19 even after receipt of more coal in the year.

Reply is not acceptable because the audit considered the demurrage charges only after restoration of crusher house fire accident. The fact remains that major amount ₹ 98 lakh was paid as demurrage charges prior to 2018-19.

***Non-obtaining of credit note of ₹66.08 crore from SECL***

**2.8.12** As per the Fuel Supply Agreement (FSA) available on Coal India Limited (CIL) website samples of coal shall be collected jointly by manual method during each of the shifts and at each of the delivery points for determining the quality of coal provided. As per the joint sampling of coal inspection clause, in case of any dispute with regard to grade of the coal, it was to be referred to a third party and decision of the third party would be final. Council of Scientific and Industrial Research-Central Institute of Mining and Fuel Research (CIMFR) was third party. The credit note on grade slippage was to be issued by the SECL within seven days of acceptance of results under joint signature.

Audit observed (December 2018) that as per analysis of CIMFR there was grade slippage of coal received from SECL during the month of December 2016 to December 2018. Accordingly, the Company was to receive credit note for ₹ 95.34 crore from SECL within seven days in succeeding month of respective month. However, the Company started claiming of credit note from SECL from September 2018. Thus delay in persuasion of matter by the SE (Coal Transport Division) with SECL and credit note has not been received (May 2019) amounting to ₹ 66.08 crore. Further, the reason for delay in payment of credit note by SECL was also not on records.

While accepting the audit observation the Government stated (October 2019) that after being pointed out by audit consistent persuasions were made to bring down the outstanding credit note amount resulted in reduction of credit note amount from ₹ 66.08 crore to ₹ 62.63 crore up to July 2019. Further, the Government stated that if SECL would not adjust credit note, the Company would withheld payment equal to amount of credit note from their bills.

***Delay in execution of agreement with Water Resources Department (WRD) resulted in penalty of ₹ 4.47 crore***

**2.8.13** Total water requirement for 2X500 MW ABVTPS Marwa was to be met from the Hasdeo River flowing by the side of the project. The flow water requirement was about 35 Million Cubic Meter (MCM)/year.

Audit observed (January 2019) that initially, the Company was allotted 60 MCM/year which was reduced to 35 MCM/year in December 2016. However, the Additional Chief Engineer (Operation and Maintenance) did not execute any agreement with WRD till May 2017. In absence of agreement, drawal of water was treated as unauthorised and illegal. Resultantly, the Company had to bear penal water charges to the tune of ₹ 4.47 crore being thrice<sup>46</sup> the normal rate<sup>47</sup> during the period February 2017 to May 2017.

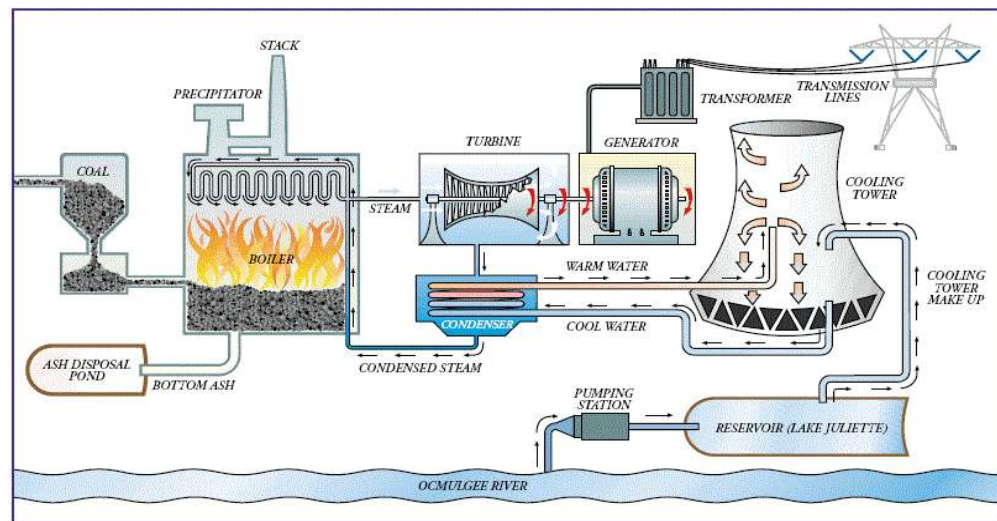
The Government stated (October 2019) that the matter is being pursued with WRD to waive off the penalty.

**Recommendation:**

**The Company should execute the agreement timely so that penalty could be avoided.**

**Operational Performance**

**2.9** The pictorial representation of generation of electricity by a thermal plant is depicted below:



In a thermal plant, water is taken initially into the boiler from a water source. The boiler is heated with the help of coal. The increase in temperature helps in transformation of water into steam. The steam generated in the boiler is sent through a steam turbine. The turbine has blades, which rotate when high velocity steam flows across them. This rotation of turbine blades is used to generate electricity. A generator is connected to the steam turbine. When the turbine rotates, electricity is generated and given as output by the generator,

<sup>46</sup> ₹ 16.50/Cum

<sup>47</sup> ₹ 5.50/Cum

which is then supplied to the consumers through high voltage power lines. Operation efficiency of the power generating station is dependent on Plant Load Factor, plant availability, capacity utilisation, outages, auxiliary consumption and oil consumption. These aspects have been discussed below:

***Non-achievement of generation target***

**2.9.1** The annual targets for generation of energy were fixed by the CSERC after considering the planned outages during the year.

Table - 2.3 depicts the details of installed capacity, target fixed and actual generation during the period April 2016 to March 2019.

<b>Table - 2.3: Installed Capacity vis-à-vis actual generation</b>							
Unit	Year	Installed Capacity	Target Fixed by CSERC		Actual Generation		Shortfall (MUs)
		(MUs)	(MUs)	PLF (per cent)	(MUs)	PLF (per cent)	
Unit-1	2016-17	4,380	3,723	85	294.10	6.70	3,428.90
	2017-18	4,380	3,723	85	2,739.90	62.60	983.10
	2018-19	4,380	3,723	85	2,945.96	67.26	777.04
Unit-2	2016-17 <sup>48</sup>	2,928	2,488	85	2,326.20	79.50	161.80
	2017-18	4,380	3,723	85	2,980.00	68.00	743.00
	2018-19	4,380	3,723	85	3,471.31	79.25	251.69
<b>Total</b>		<b>24,828</b>	<b>21,103</b>		<b>14,757.47</b>	<b>59.44</b>	<b>6,345.53</b>

*(Source: Data compiled from the Company's records)*

**The Company could not attain the generation target and there was shortfall in generation of 6,345.53 MUs power valuing ₹ 1,713.29 crore due to high rate of outages.**

Audit observed that shortfall of 6,345.53 MUs valuing ₹ 1,713.29 crore. The major reason as identified and reported by the Management<sup>49</sup> for shortfall in achieving generation target was high rate of outages as discussed below:

- Outages refer to the period for which the plant remained closed for attending planned/forced maintenance. Total number of hours lost due to planned outages increased from 275 hours in 2016-17 to 1,313.84 hours in 2018-19. Forced outages ranged between 8.70 per cent and 60.43 per cent during the period 2016-19. Main reasons for higher outages noticed in audit are as under:

***Installation of Defective Turbine***

**2.9.2** The turbine box up for Unit-1 was completed in February 2013 and Unit-1 was synchronised (20 December 2013) with fuel oil. Thereafter, Unit-1 was re-synchronised and load was raised (30 March 2014) to 500 MW with coal. On both the occasions Unit-1 tripped due to TG shaft vibration and unit did not come on stable condition as it is a tendency for the turbine shaft to deflect or bend if allow to remain in one position too long. The Unit-1 could not be operated during 14 July 2015 to 22 February 2016 due to fire accident in the crusher house and thus achieved COD with effect from 31 March 2016. The Unit-1 tripped 18 times during the period 14 March 2016 to 2 May 2016 due to the turbine problem. The site engineers of M/s BHEL made several attempts to resolve the matter at their level but failed. Therefore, M/s BHEL declared (28 August 2016) that the turbine was not fit for operation. The turbine was sent for repair to M/s BHEL, Haridwar (30 September 2016) and

<sup>48</sup> 31 July 2016 to 31 March 2017

<sup>49</sup> Executive Engineer (Operation), ABVTPS, Marwa

was put back into operation w.e.f. 12 March 2017. Unit-1 was under shutdown during the period 2 May 2016 to 12 March 2017 (314 days). Further, despite repair by M/s BHEL the problem persisted and the Unit-1 was put under shut down on six occasions till December 2018.

In this connection, audit observed (January 2019) that the Unit-1 tripped 24 times since March 2016 to till date of audit (December 2018). A number of studies were carried out by both M/s BHEL and the Company to find out the exact reason for such high vibration, however the exact reason could not be ascertained till date of audit (January 2019) which indicated that M/s BHEL supplied and installed defective turbine valuing ₹ 89.94 crore at ABVTPS Marwa. Due to inherent defect in turbine, the Company was forced to operate the Unit-1 at restricted load ranging between 150 MW to 416 MW and incurred loss of ₹ 198.13 crore on account of partial loss of 736.84 MUs and chances of such partial loss during the designed life span of the Unit-1 could not be ruled out.

The Company despite being aware of the high vibrations in the turbine since first synchronisation of Unit-1 in December 2013, it neither insisted M/s BHEL for replacement of the defective turbine though stipulated in the contract nor took up the matter through Energy Department, GoCG. In spite of provision for arbitration in the contract, the Company did not file any arbitration case against M/s BHEL.

The Government stated (October 2019) that the defects noticed in the turbine generator shaft were conveyed promptly to M/s BHEL to resolve the problem. Due to non-resolving the problem, the Company had decided to send the HP turbine to the works of M/s BHEL at Haridwar to identify the problem. The Government further stated that the vibration problem in turbine has been rectified (March 2019).

Reply is not acceptable as the Company was aware with the vibration problem in the turbine since first synchronisation (December 2013) but it could not take any action to rectify the same in three years till COD. Further, the Company had to bear generation loss of 4,654.35 MUs<sup>50</sup> valuing ₹ 1,256.67 crore<sup>51</sup> till March 2019 due to vibration problem in turbine.

### ***Outages due to non availability of spare GT***

**2.9.3** M/s BHEL, Bhopal had supplied (April 2013) seven Generator Transformers (GT) for ABVTPS, out of which six GTs (three each) were erected and commissioned in Unit-1 and Unit-2. One GT was kept (Sl. No. 6006970) as a spare to deal with any emergent situation and the same would be replaced with defective GT.

On joint verification of the Company and M/s BHEL (December 2015), the core<sup>52</sup> of spare GT (Sl.No.6006970) was found earthed. The same was sent for

<sup>50</sup> Generation loss of 3,917.51 MUs and 736.84 MUs due to shut down for 328 days and operated at restricted load respectively.

<sup>51</sup> 4,654.35 MUs X ₹ 2.70 per unit

<sup>52</sup> A core is piece of magnetic material with a high magnetic permeability use to confine and guide magnetic field in electrical or electromechanical and magnetic device in transformer.

repair to M/s BHEL. In the meantime GT (Sl. No. 6006966) of Unit-2 was tested (September 2016) for Dissolve Gas Analysis (DGA) by the Company and abnormal formation of combustible gases was found in the sample of which may cause the failure of GT at any time. As the spare GT (Sl. No. 6006970) was not received back after repair, the Company replaced defective GT (Sl. No. 6006966) with GT of Unit-1 on 17 November 2016 by taking shutdown of Unit-2 from 10 November 2016 to 17 November 2016.

M/s BHEL rectified and returned to the Company GT (Sl. No. 6006970) in August 2017 after lapse of 20 months. Further, a shutdown was proposed of Unit-1 from 13 November 2017 to 17 November 2017 for replacement of defective GT (Sl. No. 6006966)<sup>53</sup> with the spare GT (Sl. No. 6006970) and the same was replaced on 22 November 2017.

Audit observed (December 2018) that the spare GT was repaired after abnormal delay of 20 months. Had the GT (Sl. No. 6006970) been rectified within reasonable time, the defective GT (Sl. No. 6006966) of Unit-2 could have been replaced with the repaired spare GT in place of being replaced with GT of Unit-1 and subsequent shut down during the period 13 November 2017 to 23 November 2017 for 231.22 hours could have been avoided. However, the Company failed to do so which has resulted in avoidable generation loss of 115.683 MUs valuing ₹ 31.23 crore<sup>54</sup>.

The Government stated (October 2019) that the Company had made vigorous persuasions and meetings with M/s BHEL to rectify the defects of spare GT.

The reply is factually incorrect as the problem in spare GT was found in January 2016 but the Company requested (24 August 2016) to M/s BHEL to repair the spare GT after lapse of eight months. Had the Company kept spare GT in working condition, it could have avoided one shut down.

### ***Ineffective Overhauling***

**2.9.4** Annual Overhauling (AOH) of Unit-2 of ABVTSP was done during 2017-18 (15 February 2018 to 7 March 2018). Unit-2 remained shut down for 556 hours (16 incidents of tripping) in 2017-18 before carrying out AOH and after AOH it remained shut down for 1,008 hours (27 incidents of tripping) during March 2018 to March 2019. The main object of AOH is to minimise the tripping and save generation loss. But after AOH, number of tripping actually increased by 68.75 per cent.

While accepting the observation the Government stated (October 2019) that necessary instructions have been issued to make necessary rectification in the operation and maintenance of the units to avoid tripping in future.

High rate of outages resulted in increased consumption of fuel oil, auxiliary power and station heat rate against norms as discussed below:

### ***Consumption of fuel oil in excess of norms valuing ₹47.72 crore***

**2.9.5** High Furnace Oil (HFO), LDO (Light Diesel Oil) and High Speed Diesel (HSD) are used as starting or ignition fuel in thermal power plants. The CSERC in provisional tariff (April 2016) for Unit-1 and Unit-2 prescribed

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<sup>53</sup> Which was installed in Unit-1 by repairing it at site after removal from Unit- 2.

<sup>54</sup> 115.683 MUs i.e. 11,56,83,000 units X ₹ 2.70 per unit = ₹ 31,23,44,100

norms for consumption of oil at 0.50 millilitre per kilowatt-hour (ml/kWh). Against the prescribed norm, the average oil consumption ranged between 0.63 ml/kWh and 12.18 ml/kWh during 2016-17 to 2018-19. The ABVTPS consumed excess of HFO and HSD to the extent of 11,989.35 kilolitre valuing ₹ 47.72 crore (as detailed in *Annexure - 2.1*).

### ***Excess Auxiliary consumption of power***

**2.9.6** Energy consumed by power stations themselves for running their equipments in common services is called auxiliary consumption. Norms prescribed (30 April 2016) by CSERC in its Tariff Orders for auxiliary consumption for ABVTPS was 5.25 *per cent*. Against norms the actual auxiliary consumption ranged between 5.24 *per cent* and 20.03 *per cent* during the period 2016-17 to 2018-19. With reference to CSERC norms, there was excess consumption of 194.69 MUs which could have been transmitted to grid and generated revenue of ₹ 52.57 crore<sup>55</sup>.

### ***Station Heat Rate***

**2.9.7** The Station Heat Rate (SHR) is an important index for assessing the efficiency of a thermal power station. The heat rate of a power plant is the amount of chemical energy that must be supplied to produce one unit of electrical energy i.e. heat energy input in Kilocalorie (Kcal) required for generating one Kilowatt-hour (kWh) of electrical energy. It should be the endeavour of any station to operate the unit at as near its design Heat Rate as possible.

The CSERC prescribed SHR of 2,378 Kcal/kWh while approving (30 April 2016) provisional tariff order for Unit-1 and Unit-2 of ABVTPS. The SHR was much higher i.e. 2,708 and 2,593 Kcal/kWh than the norm fixed by CSERC during 2016-17 in respect of Unit-1 and Unit-2. The high SHR in Unit- 1 and 2 during 2016-17 and 2017-18 resulted in excess consumption of 1.54 lakh MT coal valuing ₹ 37.69 crore (as detailed in *Annexure - 2.2*).

### ***Avoidable payment of DSM Charges- ₹10.07 crore***

**2.9.8** Section 5 of the CERC {Deviation Settlement Mechanism (DSM) and related matters} Regulations, 2014 stipulated that the seller shall pay the charges<sup>56</sup> for deviations in injection of power for all the time-blocks<sup>57</sup> at the rate specified in the Regulation.

Audit observed (December 2018) that the Company paid an amount of ₹ 10.07 crore<sup>58</sup> on account of DSM charges as it failed to inject the scheduled energy in the grid during the period May 2016 to March 2019. Resulted in avoidable payment of ₹ 10.07 crore on account of DSM charges.

While accepting the observation the Government stated (October 2019) that

<sup>55</sup> 194.69 MUs X 10,00,000 X ₹ 2.70 per unit as fixed by CSERC

<sup>56</sup> Work out on the basis of average frequency of a time-block at the rates specified in the Regulation.

<sup>57</sup> Means a time block of 15 minutes, for which specified electrical parameters and quantities are recorded by special energy meter, with first time block starting at 00:00 hrs.

<sup>58</sup> From April 2016 to March 2019

the main reasons for non-achievement of minimum generation were high vibration in the turbine shaft, ash evacuation problem, poor quality or short supply of coal, high percentage of dissolved gases in generator transformer and tube leakages. The Government further stated that before closing of contract, all the liabilities towards M/s BHEL and M/s BGR will be analysed and appropriate action will be taken against them.

**Recommendation:**

**The Company should make efforts to improve the PLF and achieve the operational parameters fixed by the CSERC in respect of coal and oil consumption to minimise cost of generation.**

**Environmental issues**

**2.10** Coal based power plants significantly impact the local environment. Direct impacts resulting from construction and on-going operations include air pollution (Sulphur Dioxide, Nitrogen Dioxide etc.), water pollution (Arsenic, Fluoride etc.), land degradation (due to alterations of land used for storing fly ash) and noise pollution.

The Ministry of Environment, Forest & Climate Change (MoEF&CC), GoI accorded (February 2008) Environment Clearance (EC) to ABVTPS for a period of five years to start production and the same was extended (March 2016) for further five years i.e. upto February 2018. The Company is required to comply with 35 conditions out of which in 17 cases there were non-compliance of conditions of EC as detailed in *Annexure - 2.3*. However, nothing was found on records of Chhattisgarh Environment Conservation Board (CECB) to show that any action was taken against the Company for non-compliance. Some of the major non-compliances are discussed as under:

***Excess Stack Emission Standard***

**2.10.1** The Ministry of Environment, Forest and Climate Change, GoI amended (December 2015) the “Environment (Protection) Rules, 1986” and prescribed stack emission standards to be achieved within two years from the date (7 December 2015) of publication of the notification for thermal power stations. According to said notification, the level of Sulphur Dioxide should be within 200 mg/Nm<sup>3</sup> in stack emission/ambient air quality.

Audit observed (January 2019) that during January 2018 to November 2018, as per records of the Plant there were 52 numbers of instances, when level of Sulphur Dioxide was beyond the norm and ranged between 202.10 mg/Nm<sup>3</sup> and 246.15 mg/Nm<sup>3</sup> (1.05 *per cent* to 23.08 *per cent*) after two years from the date of publication of the said notification.

The Government stated (October 2019) that new norm for level of sulphur dioxide within 200 mg/Nm<sup>3</sup> was applicable from 7 December 2015. As the implementation of the project was conceived during 2007-12 period, the designed parameter of the project components were finalised keeping in view of norms applicable during the said period. The Government further stated that the Company initiated necessary action to maintain the emission level of sulphur dioxide within the norm.

Reply is not acceptable as the Company failed to maintain the emission level



of sulphur dioxide within the norm in prescribed time. Further, the Company initiated (May 2019) action for installation of Flue Gas Dissolved system to achieve the emission of flue gases as per the norms of MoEF &CC only after lapse of more than three years after notification.

### ***Excess level of noise pollution***

**2.10.2** According to the Noise Pollution (Regulation and Control) Rules, 2000, GoI, “Ambient air quality standards in respect of noise in industrial area limits shall be in day time<sup>59</sup> 75 dBA<sup>60</sup> and in night time<sup>61</sup> 70 dBA”. This condition was also intimated (May 2008) by CECB in its permission to establish.

Audit observed from the records of the Plant that in six<sup>62</sup> out of 12 locations<sup>63</sup> the monthly average noise level were beyond norm prescribed by environmental authorities due to steam turbine generator, other rotating equipment, combustion induced noises, flow induced noises and steam safety valves. It ranged between 95.74 dBA and 83.64 dBA, against the prescribed limit of 75 dBA for day time during the period August 2016 to March 2019. However, the Company did not record the noise level at night. It was also observed that in other plant<sup>64</sup> of the Company noise level was within norm. To achieve the above, noise emission from equipment be controlled at source, a green belt should be developed around the plant area to diffuse noise dispersion. However, the Company planted 1.28 lakh plants against the norms of 3.38 lakh<sup>65</sup> plants prescribed by MoEF&CC (February 2008).

The Government stated (October 2019) that as per noise level monitoring report of 14 May 2019 various parameters have been measured at 12 different identified locations of ABVTPS. Hence, the audit conclusion that the Company had not recorded noise level at night is not correct.

Reply is not acceptable because as per records of the Company for the period August 2016 to March 2019 the Company did not record the noise level at night. Further, the Company did not address the excess level of noise pollution in day time.

### ***Environment Impact Assessment Report not prepared***

**2.10.3** While granting consent (31 March 2014) the CECB directed that “EIA Report covering one year data (four seasons) shall be submitted to the CECB within 15 months from date of commissioning of plant”. Audit observed (January 2019) that the ABVTPS did not prepare any EIA Report even after

<sup>59</sup> Day time shall mean from 6.00 am to 10.00 pm

<sup>60</sup> A-weighted decibels, abbreviated as dBA, is an expression of the relative loudness of sounds in air as perceived by the human ear.

<sup>61</sup> Night time shall mean from 10.00 pm to 6.00 am

<sup>62</sup> Turbine House, Air compressor area, Mill area, Boiler House, Crusher House and Cooling Water Pump house

<sup>63</sup> Turbine House, Air Compressor Area, Mill Area, ESP Area, Water Treatment Plant, Boiler House, Crusher House, CHP area, CW Pump House, Main Gate, Hospital and Intake Pump House.

<sup>64</sup> Korba West Extension

<sup>65</sup> Total plant area 225 hectare X 1,500 plants per hectare = 3,37,500 plants.

30 months from commissioning of plant in compliance of aforesaid condition. In absence of EIA Report, the actual impact on environment due to operation of the plant could not be ascertained.

While accepting the observation the Government stated (October 2019) that Notice Inviting Tender (NIT) was issued (8 July 2019) for conducting of Environment Impact Assessment at ABVTPS.

#### ***Non-compliance of ash utilisation norms of MoEF&CC***

**2.10.4** The Ministry of Environment, Forest and Climate Change (MoEF&CC), GoI notified (25 January 2016) that the coal or lignite based thermal power plants shall comply with the provision of 100 *per cent* utilisation of fly ash generated by them before 31 December 2017.

Audit observed that during the period March 2016 to March 2019, ash utilisation was 24.07 *per cent* only as against 100 *per cent* fly ash as per the directions of MoEF&CC due to non-completion of approach road to the plant for movement of heavy vehicles and non-uploading of fly ash availability data on its website by SE (Civil-III), ABVTPS to enable users to collect/place requisition for the ash. Further, no concerted efforts such as allotment of land on nominal lease charge, concession on power consumption charges and appropriate technical, managerial and marketing assistance were made by the Company to improve the utilisation of ash, as envisaged in the DPR.

The Government stated (October 2019) that the Company filed case before Supreme Court of India against 100 *per cent* ash utilisation.

The fact remains that ash utilisation was 24.07 *per cent* only as against 100 *per cent*.

#### ***Failure to fix reserve price of cenosphere***

**2.10.5** A cenosphere is a by product produced from the combustion of coal in power stations formed from fuel ash. Normally cenosphere is produced to an extent of 0.2 *per cent* to one *per cent* in fly ash. It is commercially useful as an extender for plastic compounds, being compatible with plastisol, thermoplastics, latex, polyester, epoxies, phenol resins and urethanes. Synthetic foams are also made with cenosphere. It is compatible with cement and other building materials such as coatings and composites. It is used in a wide variety of other products, including sports equipment, insulators, automobile bodies, marine craft bodies, paints and fire and heat protection devices.

During April 2016 to March 2019, the ABVTPS had produced 40.62 lakh MT of ash which should have contributed 8,124 MT (0.2 *per cent* on conservative estimates) of cenosphere.

Audit observed (January 2019) that the Company issued (22 November 2017) work order to contractor<sup>66</sup> for collection of cenosphere, handling, processing, transportation and disposal with eco-friendly manner from Ash dyke of ABVTPS against revenue of ₹ 3.18 lakh per year. As the cenosphere, which has high demand and value in the market and could have earned more revenue

**Ash utilisation was 24.07 per cent only as against 100 per cent**

**The Company failed to earn revenue of ₹ 11.67 crore on cenosphere due to non-fixing of its reserve price.**

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<sup>66</sup> Shri Haridas Bhu Visthapit Jan Kalyan Seva Samiti, Jurvey Janjgir-Champa

for the Company, it should have fixed reserve price/MT<sup>67</sup>. Had the Company awarded contract by fixing reserve price, it could have earned revenue to the tune of ₹ 11.67 crore<sup>68</sup>. Similarly, in other Plants also the Company failed to fix reserve price and during 2016-17 to 2017-18 DSPM, TPS, Korba East earned revenue of ₹ 6.26 lakh instead of ₹ 6.23 crore<sup>69</sup> and Korba West Extension, TPS earned revenue of ₹ 7.84 lakh instead of ₹ 6.16 crore<sup>70</sup>.

The Government stated (October 2019) that the work of collection of cenosphere was awarded to the cooperative society formed by the land oustees for generation of their employment. The Government further stated that work for collection of cenosphere was awarded to such cooperative society who quoted highest rate.

Reply is not acceptable as the Company provided monthly allowances and employment to land oustees hence, providing of work of collection of cenosphere without safeguarding the financial interest of the Company lacks justification. Further, in absence of fixing of reserve price by the Company the highest rate received from cooperative societies were too meagre.

### ***Non-commissioning of Sewage Treatment Plant (STP)***

**2.10.6** As per conditions of the renewal of consent issued (31 March 2016) under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974 by CECB “Industry shall commission Sewage Treatment Plant (STP) for treatment of domestic effluent within six months positively”.

Audit observed (January 2019) that the ABVTPS had not commissioned any sewage treatment plant<sup>71</sup> for treatment of domestic effluent at its residential area till date (May 2019) in compliance of aforesaid conditions of CECB even after lapse of 30 months. Reasons for the same were not on the records of the Company.

While accepting the observation the Government stated (October 2019) that consultant was appointed to prepare DPR for installation of STP at residential area.

### **Recommendation:**

**The Company should ensure strict adherence to the environmental acts and regulations.**

### **Internal Control and Monitoring**

**2.11** Internal control is a management tool used to provide reasonable assurance that the objectives of the organisation are being achieved in an efficient, effective and orderly manner. Deficiencies in the internal control system and monitoring mechanism are discussed below:

<sup>67</sup> The Kothagudam Thermal Power Station, Telangana sold at a rate of ₹ 14,360 per MT.

<sup>68</sup> ₹ 14,360/MT x 8,124 MT

<sup>69</sup> 0.2 per cent of 21,71,023 MT X ₹ 14,360/MT

<sup>70</sup> 0.2 per cent of 21,47,070 MT X ₹ 14,360/MT

<sup>71</sup> Cost involved ₹ 3.04 crore

***Non-preparation of works manual***

**2.11.1** The Company was incorporated in May 2003. The Company executed different types of civil work at its power stations including ABVTSPS such as construction of roads, culverts, garden, residential quarters and supervision of the work of BTG/ BOP contractors. In this connection it was observed (January 2019) that the Company neither prepared its own works manual nor it adopted Public Works Department (PWD), GoCG manual. As a result of this the Company did not maintain any hindrance register consequently contracts could not be closed till date.

The Government stated (October 2019) that the Works Manual would be prepared at the earliest.

***Non-submission of Utilisation Certificate***

**2.11.2** The works under Corporate Social Responsibility (CSR) for project affected people were carried out by the Company through local administration.

In this connection, Audit observed (December 2018) that during the period of 2009-10 to 2018-19, 56 works valuing ₹ 6.62 crore were executed through the local administration, Janjgir-Champa for which no Utilisation Certificate (UC) were received so far (January 2019). As a result the Company could not assess the status of fund utilisation as well as progress of work.

The Government stated (October 2019) that efforts are being made to obtain UCs from the District Authorities and UC of ₹ 2.77 crore has been received.

The fact remains that UC of ₹ 3.85 crore is not yet received.

***Non-conducting of Energy Audit***

**2.11.3** As per provisions of Energy Conservation Act, 2001 (Act), all energy intensive industries should get their units audited by accredited energy auditors. Further, as per notification of Bureau of Energy Efficiency dated 28 April 2010, stipulated that every designated consumer shall have its first energy audit conducted, by an accredited energy auditor within 18 months of the notification issued by the Central Government.

Audit observed (January 2019) that the Company was to get the energy audit conducted for Unit-1 and Unit-2 within 18 months from date of COD i.e. September 2017 and January 2018, but no energy audit had been conducted for these two units so far (March 2019). As a result of which the Company was deprived from the benefit of the energy audit besides violation of the provisions of the Energy Conservation Act, 2001.

The Government stated (October 2019) that the consultant was appointed (July 2019) to conduct energy audit.

The fact remains that energy audit was not conducted within stipulated time of September 2017 and January 2018 for Unit-1 and Unit-2 respectively and same was initiated by the Company on being pointed out by audit.

***Deficient and ineffective internal audit system***

**2.11.4** Internal Audit (IA) is an independent management function and

involves a continuous and critical appraisal of the functioning of an entity with a view to suggest improvements thereto and add value to and strengthen the overall governance mechanism of the Company. In this connection Audit observed (December 2018) the Company had no internal audit wing of its own and it had also not prepared internal audit manual so far. The IA of ABVTPS was conducted (April 2017) upto 2016-17 by the Chartered Accountants appointed by the ED (Finance). The internal audit did not cover the core area of the project like preparation of DPR, terms and conditions of major contracts, funds arrangement for project, compliance of statutory requirements, execution of projects and operational efficiency. Further, internal audit reports were not placed to the BoDs for perusal.

The Government stated (October 2019) that the internal audit report would be submitted to the BoDs, in future.

### ***Plant remained uninsured post COD***

**2.11.5** The main objective of insurance is to provide protection and mitigate risk. It was observed (January 2019) that the COD of Unit-1 and Unit-2 was carried out on 31 March 2016 and 31 July 2016 respectively and no insurance of the plant was covered. It was primary responsibility of the Company to take insurance of the plant but the Company did not take any insurance coverage of the complete plant. It was pertinent to mention here that the Company had already suffered a major setback in 14 July 2015 as fire accident occurred at crusher house which resulted in slippage of schedule of completion of facilities/COD by seven months for both the Units and it had to incur generation loss of 5,352 MUs. It should have learnt lesson from the past experience however, no action had been taken by the Company in this regard. It is pertinent to mention here that Damodar Valley Corporation and West Bengal Power Development Corporation Limited insured the generating plants.

The Government stated (October 2019) that the ABVTPS along with other plants of the Company would be insured shortly.

### ***Non- monitoring of project through SAP-ERP system***

**2.11.6** Office of the Chief Engineer, Energy Info Tech Centre<sup>72</sup> (EITC) assists the Company to carry out its financial, operational and other activities through SAP-ERP system. However, the following shortcomings were observed (January 2019) in connection with the monitoring through SAP-ERP system over the construction activities carried out in ABVTPS, Marwa:

- The SAP is a transaction based software and based on which reports are generated in the system. However, work flow module was not implemented in the SAP. Hence, the approval levels were not in place for Vendor Billing Process.
- There was no provision in the SAP-ERP system to ensure that payment was made only after verifying all the terms and conditions of the contracts instead the bills were passed manually and it depended upon the bill passing authority to adhere to the terms and conditions of the contract.

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<sup>72</sup> Chief Engineer is head of wing

- There was no provision in the SAP-ERP system to ensure that penalty was deducted automatically if there is delay in completion of works/ supply beyond the scheduled time. Though the commissioning of the project was delayed by 44 months the Company did not deduct any penalty.
- There was no check in the SAP-ERP system to monitor performance based penalty if any shortfall occurred in the execution/ performance of the work. The cooling tower failed to give guaranteed performance of outlet temperature of 33°C however, the Company did not impose any penalty.
- There was no provision in the SAP system to review validity of BG time to time. It was observed that bank guarantee (01310100003179) had expired on 30 September 2017 but it was renewed only on 6 November 2017 after lapse of 36 days.
- There was no provision in the SAP system to check security deposit (SD) was obtained within the stipulated time mentioned in the contract agreement.
- There was no provision in the SAP-ERP system to restrict the vendor to convert the earnest money into security deposit.
- There was nothing to ensure that no running account bill was passed without realising security deposit in advance.

The above deficiencies in the SAP-ERP system were mainly due to failure of the Company to design and implement customised system as per its requirement. It implemented manual system without proper work flow module as a result the transactions entered manually in the SAP-ERP system only was displayed in the system.

The Government stated (October 2019) that to meet the shortcomings pointed out by audit, appropriate work flow module would be developed in near future.

**Recommendation:**

**The Company should strengthen its internal control and monitoring mechanisms relating to pre-execution activities, execution of project, compliance of terms and conditions through SAP-ERP system.**

**Conclusion**

- The Company did not conduct detailed survey or verify the revenue records of land to assess the nature of land to ensure correctness of DPR. Due to it the Company acquired total 1,728.73 acre land out of which only 283.77 acre (16.41 *per cent*) land was barren and remaining 1,444.96 acre (83.59 *per cent*) was agricultural land. As a result 15 Rehabilitation and Resettlement (R&R) issues, protest of land oustees, strike, *kaamroko*, *talabandi* took place which hampered the project work.
- As per the terms and condition of BTG and BOP contract 95/90 *per cent* advance payment ₹ 2,600.42 crore towards supply was released without linking with erection and the contractors showed very little interest in completion of erection work resulting in delay in completion of condenser erection, TG erection, steam blowing activity, CHP, AHP etc. as on

schedule date of completion only 36.82 *per cent*/40.37 *per cent* erection work was completed.

- Unit-1 and Unit-2 of ABVTPS was to be completed by 30 September 2012 and 30 November 2012, however, the same was completed on 31 March 2016 and 31 July 2016 with delay of 42 and 44 months respectively due to delay in execution of agreement, supply of materials, awarding and completion of BTG civil work and completion of BOP work.
- Delay in commissioning of Plant led to potential generation loss of 16,440.07 MUs value of ₹ 4,438.82 crore, deprival of a rebate on interest of ₹ 17.95 crore on PFC loan and cost overrun of ₹ 3,772.67 crore due to increase in Interest during Construction (IDC) on loan, cost of BTG and BOP works, cost of land acquisition and Rehabilitation and Resettlement expenditure.
- The Company did not recover the liquidated damages of ₹ 339.31 crore from the defaulting contractors due to non-closure of contracts.
- Even after commissioning of the both the units of the Power Plant the Company failed to achieve the objective of generation of at least 850 MW (at 85 *per cent* Plant Load Factor) per hour power it could generate only 575 MW per hour. Consequently the Company could not attain the generation target and there was shortfall in generation of 6,345.53 MUs power valuing ₹ 1,713.29 crore. Main reasons for poor operational performance was high rate of outages due to installation of defective turbine, non availability of GT spares and ineffective overhauling, as well as excess consumption of fuel, auxiliary consumption and coal against the CSERC norms which led to extra expenditure of ₹ 85.41 crore.
- Non adherence to the provision of environmental Acts, regulations and norms resulted in non-achievement of specified stack emission levels, noise level and disposal of ash which adversely affected the environment.
- Despite having sufficient manpower, lack of effective internal control and monitoring mechanism led to non-preparation of works manual, non-conducting of energy audit, deficient internal audit system, non-insurance of plant and deficient SAP-ERP system.