CHAPTER - II

PERFORMANCE AUDIT
POWER SECTOR PSU

Setting up of Singareni Thermal Power Plant at Jaipur

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2.1 Introduction

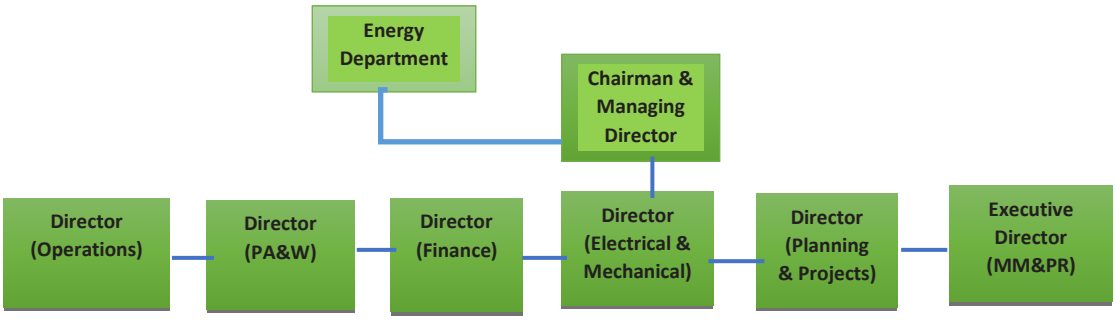
The Singareni Collieries Company Limited (Company), is a coal mining company predominantly owned[32] by the State Government[33] and the Government of India (GoI). The Company operates 50 coal mines[34] (14 open cast and 36 underground) with proved geological reserves of 8,790 million tons. Owing to its depleting profitability, the Company proposed (June 2007) diversification into power generation by setting up a thermal power plant at its own pit head[35].

The Singareni Thermal Power Plant (STPP) was proposed to be set up with 600 Mega Watt[36] (MW) at Jaipur in Adilabad district[37]. In view of increasing gap of demand and supply of power, the State Government enhanced (August 2009) the proposed capacity to 1,200 MW[38] (2 units of 600 MW each). The Unit-I and Unit-II of STPP achieved Commercial Operation Date (COD) in September and December of 2016 respectively.

Singareni Thermal Power Plant

2.2 Organisational Set Up

The Organisational structure of the Company is detailed below:



The activities of STPP were supervised by an Executive Director appointed on contract basis. He was assisted by three General Managers. The STPP did not

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32 51.096 *per cent* by State Government, 48.902 *per cent* by Government of India and 0.002 *per cent* by private parties.

33 Government of Andhra Pradesh and Government of Telangana with effect from 02nd June 2014.

34 Located in six districts of Telangana viz., Komaram Bheem Asifabad, Mancherial, Peddapalli, Jayashankar Bhupalpalli, Bhadradri Kothagudem and Khammam.

35 Adjacent to coal mines/coal production area.

36 2 units of 250 MW each *plus* 20 *per cent.*

37 Jaipur Village cum Mandal is part of Manchirial district after reorganisation of districts in Telangana with effect from 11th October 2016.

38 1,200 Mega Watt = 12,00,000 Kilo Watts = 1.20 Million Units of electricity per hour.

have established organisational set up and trained manpower to run the plant. Hence, the operation and maintenance (O&M) of the plant was contracted (March 2016) to M/s STEAG Energy Services (India) Private Limited (O&M Contractor) for three years' period.

2.3 Audit Scope and Methodology

Entry conference was held with the Management of STPP on 9th March 2018 and the audit objectives, criteria, scope and methodology of audit were discussed. Scrutiny[39] (March to June 2018) covered the activities involved in setting up of STPP and performance of both Units up to March 2018. Exit Conference was held on 19 November 2018 with the Management and State Government to discuss the audit findings, conclusions and recommendations thereon. The replies of Management to the audit findings were concurred by the Government and were considered in audit while finalizing the Report.

2.4 Audit objectives

The audit was conducted with a view to ascertain whether:

- the project was planned considering all relevant factors;
- the execution of the project and fund management was done economically, effectively and efficiently;
- the operation of plant and consumption of fuel were as per parameters;
- the environmental/ pollution norms were complied with and
- monitoring system ensured that outcomes of the project were achieved.

2.5 Audit Criteria

The audit criteria were derived from the following;

- Norms and guidelines issued by GoI[40], State Government, Central Electricity Authority (CEA), Central Electricity Regulatory Commission (CERC), Telangana State Electricity Regulatory Commission (TSERC), Central Vigilance Commission (CVC), Central Pollution Control Board (CPCB)
- Detailed Project Report (DPR), Other Project Reports
- Terms and conditions of Model Fuel Supply Agreements (Model FSA**),** Memorandum of Understanding (MOU), Purchase/ Work Orders/ Agreements
- Standard procedures for tendering and award of contracts with reference to the principles of economy, efficiency and effectiveness.

2.6 Acknowledgement

Audit acknowledges the co-operation and assistance extended by the officers and management of the Company at various stages of conducting of the audit.

[39] Of records in the Energy Department and in the Company including STPP.
[40] Ministry of Power, Ministry of Coal & Ministry of Environment & Forests.

2.7 Audit Findings

The audit findings are discussed in the succeeding paragraphs.

2.7.1 Planning

The planning process involved identification of:

- project deliverables and stage wise milestones for implementation,
- required resources,
- risks particularly those with potential impact on delays as well as measures to mitigate them.

The Company identified the key project deliverables and milestones[41] in the DPR (March 2010) of STPP. There were three components comprising of:

- The main plant i.e., the Boiler, Turbine and Generator (BTG)
- The Balance of Plant[42] (BOP) being machinery other than the BTG and;
- The ancillary works like railway siding, roads etc., for transportation of raw materials etc.

2.7.1.1 Benefits of Mega Power Projects Policy and ICB not availed

According to the Mega Power Projects policy evolved (November 1995) by the Ministry of Power, GoI, a Thermal Power Plant (TPP) having capacity of 1,000 MW and above would get Mega Power Project (MPP) status with eligibility to draw duty exemptions and tax holidays. In line with the amendments made (December 2009), MPP must sell minimum of 85 *per cent* of its generation capacity to the State Distribution Companies (DISCOM). Moreover, all goods supplied through International Competitive Bidding (ICB) process were exempted from payment of duties as per the Central Excise Notification No. 6/2006-CE dated 1st March 2006.

The Company executed (September 2010) a Power Purchase Agreement (PPA) with the State DISCOMs to sell 1,050 MW (87.50 *per cent* of 1,200 MW) after deducting 150 MW proposed for its internal consumption. Thus, the Company was entitled to get MPP status for its STPP to claim the benefits envisaged in the MPP Policy. By incorrectly deducting, however, (March 2011) auxiliary power consumption[43] of 78 MW (6.50 *per cent*) from 1,050 MW, the Company derived the net saleable power at 972 MW representing 81 *per cent* of generation capacity and concluded that it was not eligible for MPP status and hence not claimed the benefits available under MPP Policy.

The amount of benefits foregone by the Company worked out to ₹ 254.55 crore towards excise duty and ₹ 39.00 crore towards customs duty on the value of imported materials under BTG contract that was awarded on nomination basis instead of ICB route. Thus, by not claiming the MPP status and not adopting the ICB route for procurement, the Company lost the opportunity to avail duty benefits of ₹ 293.55 crore.

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41 COD within 40 months from Zero Date (award of BTG).

42 Including coal handling plant machinery, ash handling plant, water cooling system etc.

43 Auxiliary consumption represents the power consumed by the equipment, common facilities and transformer losses within the generating station.

In reply (December 2018), Government stated that the net saleable power of STPP was only 81 *per cent* of its generation capacity and construction of the plant was not undertaken through ICB mode. Hence, STPP was not eligible for MPP status. It also stated that though the Company did not avail MPP status, it availed the concessional customs duty by issuing Essentiality Certificate.

The reply was not in consonance with the facts as the MPP Policy had provided for tying up of 85 *per cent* of the (gross) generating capacity and not the net generating capacity. Also, the actual power sold depended on the scheduling done by the State Load Dispatch Centre under Availability Based Tariff mechanism. Further, due to award of BTG contract on nomination basis, Company had paid customs duty at concessional rate instead of availing full duty exemptions.

2.7.1.2 Assessment of external risks

An important factor considered in the setting up of STTP by the Company was that the coal available at the pit head of Company's own mines would be used. The second factor was that the power generated in the STTP could be used for its own internal consumption in mines thus reducing its cost of operations. These presumptions in the planning stage were, however, made without factoring the changes in the GoI policy as detailed below.

A) Allocation of coal

i) Faulty assessment of coal cost

New Coal Distribution Policy (NCDP) announced (October 2007) by Ministry of Coal (MoC), GoI, envisaged allocation of coal by MoC through long term linkage[44]. Disregarding NCDP and without obtaining consent from MoC, the Company assumed (March 2010) supply of coal to STPP from its own mines of Srirampur (SRP) area[45]. Accordingly, the DPR envisaged (March 2010) average coal cost at ₹ 1,933.00 per Metric Tonne (MT) with ₹ 2.37 as cost per unit of generation.

It was observed that the Company applied to MoC for long-term coal linkage from its own mines only in December 2013 after a delay of more than 3 years since the State Government approved (September 2010) the setting up of STPP and after 6 years since the project was originally conceived/ NCDP came into force. In its application the Company stated that the requirement of STPP would be met without affecting the Fuel Supply Agreement (FSA) quantities of its existing customers. The MoC, however, rejected (January 2014) the Company's application as it was already decided (May 2013) to keep the long-term coal linkages in abeyance due to huge gap in demand and supply of coal. Under the NCDP the MoC allotted (August 2015) coal linkage of 4.523 Million Metric Tonnes Per Annum (MMTPA) from the Naini coal mines (Odisha). The reason for allocation of Naini coal mines instead of the Company's own mines was not available from the records produced to audit. Such allotment would entail additional cost to the Company to the extent of ₹ 1,943.30 per MT[46]

[44] Linking sources of coal with the consumers of coal on long term basis.
[45] Situated within a distance of 11 KMs.
[46] ₹ 2,142.00 for the distance slab of 1,241 to 1,260 KMs - ₹ 198.70 for the distance slab of 0 to 100 KMs as per Railway Freight Circular No.02 of 2018 dated 09-01-2018.

towards transportation of coal by rail which was not envisaged in the DPR.

As the Naini coal mines was expected to commence coal production only from December 2020, the MoC granted (February 2016) bridge linkage[47] to STPP from the Company's own mines for a period of three years (extended in May 2018 up to 2023). Under the MoU executed for bridge linkage, STPP had to pay premium charges @ 20 *per cent* of the basic cost of coal supplied from the Company own mines. Hence, the average coal cost increased to ₹ 3,142.00 per MT (March 2018) and the cost of generation rose to ₹ 3.42 per unit.

Thus, assuming, supply of coal to STPP from its own mines of Srirampur (SRP) area by disregarding NCDP and without obtaining consent from MoC (by March 2010), besides delay in making application for coal linkage, the Company lost the opportunity to utilize coal from its own mines on long-term basis as envisaged in the DPR. This resulted in increase in the coal cost per unit.

Government stated (December 2018) that as per the existing bridge linkage policy, the Company supplied coal to STPP at the premium rates as per the MoU on par with the other customers.

The fact, however, remained that the Company not only failed to consider the existing NCDP guidelines but also delayed making of application for long-term coal linkage due to which STPP procured coal on bridge linkage basis by paying premium charges.

ii) Swapping of coal blocks not done

The Ministry of Coal constituted (June 2014) a new Inter Ministerial Task Force (Task Force) to rationalise existing sources of coal of all users in Power, Cement & Steel/ Sponge Iron sectors. This was required to optimise transportation cost and materialisation under the given technical constraints. The consultant[48] engaged (July 2014) by the MoC, recommended (February 2015) implementation of the exercise in two parts. Part-I comprised quick wins in respect of 94 out of 114 TPPs by swapping some relatively easy to implement arrangements. Part-II comprised the balance TPPs.

The Company however, did not apply (as of June 2018) to MoC for swapping the coal linkage from Naini coal mines to Company's own mines. As a result, STPP made avoidable payment of ₹ 289.91 crore upto March 2018 towards premium charges on procurement of 83.24 lakh MTs of coal from the Company own mines on bridge linkage basis.

The Government replied (December 2018) that the STPP was under construction when task force was considering the issue. At present the rationalisation of coal blocks was not done by the MoC as there is no extant policy. The Government also stated that the Company would take up the issue

[47] Bridge Linkage is a policy framed (February 2016) by the MoC to facilitate supply of coal to end users on short term basis until the commencement of production from the allotted coal mines.

[48] The Task Force appointed M/s KPMG Advisory Services Private Limited as its consultant to assist it in mathematical modelling, operations research, optimisation exercises, etc.

with the MoC for swapping of coal blocks once production of coal starts from Naini coal block that was linked to STPP.

It is pertinent to mention that the Task Force agreed to take up the cases of other TPPs under Part-II of the rationalisation exercise and the same was being carried out in respect of TPPs not covered earlier. Also, the Company, while belatedly applying for long-term coal linkage for STPP, had committed to the MoC that it would be able to meet the coal requirement of STPP without affecting the FSA quantities of its existing customers. Therefore, the Company need not have waited for production of coal to start from the Naini coal mines to apply for swapping of coal blocks.

B) Plan for internal consumption of power abandoned

The State Government permitted (September 2010) the Company to avail 150 MW (12.50 *per cent* out of 1,200 MW) power generated by STPP for its internal consumption. Accordingly, STPP entered (September 2010) into PPA with DISCOMs[49] to sell the balance power of 1,050 MW (87.50 *per cent*). But, after the formation of Telangana State, STPP entered (January 2016) into a new PPA with DISCOMs to sell the entire power generated by it. Thus, in the new PPA there was no provision for utilization of 150 MW for internal consumption.

Since COD of Unit-I (September 2016 to March 2018), STPP generated 13,106.62 MU power and exported 12,302.38 MU (93.86 *per cent* of energy generated) into the Grid. Thus, it was observed that the Company was drawing power from DISCOMs for its mining activities. The generation cost of STPP was ₹ 3.42 per unit (March 2018) whereas the Company was drawing power from DISCOMs at ₹ 5.65 per unit. Thus, Company was incurring avoidable expenditure of ₹ 2.23 per unit of energy drawn from DISCOMs. Considering the power requirement of 150 MW, the Company incurred avoidable expenditure of ₹ 24.08 crore per month and ₹ 288.96 crore during 2017-18.

The Government replied (December 2018) that acting upon its directions the Company entered into PPA with DISCOMs for the sale of total 1,200 MW power. It further stated that as per the Electricity Rules, 2005, STPP was not meeting the eligibility criteria[50] to qualify as Captive Generation Plant (CGP).

The reply was not acceptable because STPP was set up to diversify Company's activities. The State Government initially permitted it to use 150 MW for its internal consumption in mining activities and accordingly PPA was executed with DISCOMs. Therefore, STPP was not planned as a CGP. Thus, the initial plan for consumption of 150 MW in its mining activities was abandoned causing avoidable financial burden to the Company.

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[49] M/s Northern Power Distribution Company of Telangana Limited and M/s Southern Power Distribution Company of Telangana Limited.

[50] As per Clause 3 (1) (a) (ii) not less than 51 *per cent* of aggregate electricity generated by the plant as determined on an annual basis was to be consumed for captive use.

Recommendation: *The Company should pursue with MoC for swapping of coal supply from Naini coal block to its own mines and also take steps to meet its power requirement from the power generated by STTP.*

2.7.2 Project Execution and Fund Management

The project execution stage involved bringing together of material and financial resources required for setting up of STPP, preparing and implementing the action plan to achieve the stage wise milestones and optimum utilisation of project deliverables so as to ensure that the STPP operated effectively. The STPP was funded in the form of debt and equity in the ratio of 70:30. The equity portion was sourced internally by the Company and the debt portion was funded by obtaining loans from PFC and REC[51]. The Company availed loan of ₹ 4,101.00 crore (out of ₹ 5,300.00 crore) up to March 2018. The observations are detailed below:

2.7.2.1 Delayed commissioning of STPP

As per the CERC Regulations, 2014 adopted by the TSERC, the TPPs completed within 44 months were eligible to earn Additional Return on Equity (AROE) @ 0.50 *per cent* as incentive. The date was to be reckoned from the date of approval by the Cabinet Committee on Economic Affairs (CCEA) or the date of approval of investment by the Board of Directors (BOD).

The CCEA approved the setting up of STPP in July 2009. The Company's Board of Directors cleared (July 2010) the investment proposal of ₹ 5,685.00 crore for STPP. Accordingly, the project should have been completed by March 2014 to claim AROE. The COD was, however, achieved in December 2016. As the STPP failed to achieve COD within scheduled time, it lost the benefit of AROE to the extent of ₹ 13.15 crore[52] (up to March 2018).

Further, the TSERC disallowed ₹ 380.71 crore towards Interest During Construction (IDC) for the delays not reflected in the activity wise delays submitted by the Company.

It was observed that the delays were mainly on account of time taken for award of contracts. There was a delay of 11 months[53] in the award of BTG contract and 15 months[54] in the award of BOP contracts. The delay in award of BOP work was on account of time taken (16 months)[55] by the Project Management Consultant (PMC)[56] to assess the capabilities of foreign firms and to vet the tender documents. Audit also observed that the COD of Unit-I

[51] M/s Power Finance Corporation Limited and M/s Rural Electrification Corporation Limited.
[52] ₹ 0.14 crore and ₹ 13.01 crore as at the end of March 2017 and 2018 respectively.
[53] From August 2010 to October 2011 after excluding 4 months expected time for contract finalization on nomination basis.
[54] From November 2011 to September 2013 after excluding 6 months period as per CEA norm.
[55] From December 2011 to September 2013 after excluding 6 months from November 2011.
[56] M/s National Thermal Power Corporation Limited (NTPC) was appointed as the Project Management Consultant for assistance at both pre award (December 2009) and post award (March 2011) stages of contracts for execution of BTG, BOP and Ancillary works.

and Unit-II were delayed by 19 months[57] and 17 months[58] respectively. The Company, thus, took 76 months[59] from the date of investment approval accorded by its BOD.

The Government replied (December 2018) that BTG was awarded to M/s BHEL[60]on nomination basis keeping in view the relative practice followed by other power generators like APGENCO and NTPC[61]. Also, the time taken for placing order through ICB was about 16 months as compared to just four months required for nomination basis. It further stated that award of BOP contract was delayed on account of delays in the process of enquiry finalization due to huge competition and delayed completion (March 2013) of physical assessment of bidders by the PMC to ascertain their capability to execute the BOP works.

Regarding delays in the execution of project the Government stated that execution of the BTG, BOP and Ancillary Works was affected due to delay in acquisition of private land for water pipeline, obstruction of work by land losers, non-availability of sand and delay in supply of BOP equipment due to Hud-Hud Cyclone. It further stated that the Company has constituted a committee for studying the reasons for delays in execution by the BTG and BOP contractors.

The fact however, remained that the Company took 16 months[62] to award the BTG contract even on nomination basis. Further, the Company failed to prevail upon the PMC to complete the award of BOP contract as per the planned/ agreed schedule. Moreover, observing that many of the reasons stated for the delays were not reflected in the activity-wise delay submitted by the Company in its tariff proposal, the TSERC had in its tariff order[63] observed it to be prudent to condone only 5 months out of the total delay of 17 months.

2.7.2.2 Laying of Railway Siding

The DPR of STPP provided for transportation of coal to STPP by conveyor belts/ rail system from the Company's own mines of Srirampur (SRP) area. Accordingly, a sum of ₹ 90.00 crore was provided for railway line and plant marshalling yard. The Company appointed (September 2012) M/s Anurag Project Management Consultants Private Limited (M/s Anurag) as consultant for preparation of Railway Siding (RS) DPR. It also appointed (March 2014) M/s RITES Limited (RITES)[64] as the RS Project Management Consultant (RSPMC).

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57 From February 2015 to September 2016 after excluding 39 months from November 2011.
58 From July 2015 to November 2016 after excluding 43 months from November 2011.
59 From August 2010 to November 2016.
60 M/s Bharat Heavy Electricals Limited.
61 M/s Andhra Pradesh Power Generation Corporation Limited and M/s National Thermal Power Corporation Limited.
62 From July 2010 to November 2011.
63 TSERC Tariff Order dated 19-06-2017 on determination of capital cost and generation tariff of STPP for the financial years 2016-17 to 2018-19.
64 M/s RITES Limited was earlier known as Rail India Technical and Economic Services.

A) Loss of financial assistance due to reduced scope

M/s Anurag submitted (October 2012) a draft RS DPR for a proposed track length of 33 KMs at an estimated cost of ₹ 383.76 crore. The Company, however, reduced (January 2013) the scope of the RS project to ₹ 280.00 crore on account of reduction in the cost on earth works, bridges, etc. In addition, overhead lines and general electrical works were shifted from RS project to other heads of STPP. Thus, the Company obtained (December 2013) approval from the CCDAC[65] for one-time, non- repayable financial assistance of ₹ 196.00 crore[66]. The Railways also approved (January 2014) the RS DPR as submitted by the Company.

It was observed that the Company revised the RS cost to ₹ 380.00 crore in the second Revised Capital Estimates (RCE) of April 2017. This was necessitated because items deleted/ reduced earlier from the scope of work, were now included. Thus, due to non-inclusion of cost of entire scope of activities in the approved RS DPR, the assistance received by the Company from the CCDAC was less by ₹ 70.00 crore[67]. This resulted in increase in project cost and consequent burden on consumers to that extent.

The Government replied (December 2018) that the draft RS DPR was restricted to ₹ 280.00 crore by limiting the yard facilities considering optimum operational convenience. The entire scope of railway line was included at the DPR stage but the execution cost increased due to actual site conditions. Accordingly, the revised cost was projected in the RCE proposals.

The fact remained that though the RS DPR was prepared considering the actual site conditions, the scope of railway line was restricted to ₹ 280.00 crore which deprived the Company of the CCDA assistance by ₹ 70.00 crore. Further, from the records produced it was clear that the Company reworked out the cost of RS at ₹ 380.00 crore by *inter alia* considering earlier trimmed activities.

B) Delay in award and execution of contracts

The services to be rendered by RITES in its role as RSPMC covered devising packages of work, processing of tenders (by January 2015[68]), supervision of the execution of works, liaisoning for various approvals, etc. The work was to be completed within 27 months ending on 23 June 2016.

As per the RSPMC contract, LD was leviable @ 0.50 *per cent* per week subject to a maximum of 5 *per cent* of contract value. The LD was leviable on total contract value (₹ 32.22 crore *plus* applicable service tax)[69] if the progress within

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[65] Coal Conservation and Development Advisory Committee of the MoC, GoI provides one-time, non-repayable assistance of 70 *per cent* of the project cost as per DPRs submitted for approval to Railways for the infrastructure development works meant for coal evacuation from mining areas. The subsidy was sourced from the fund created out of the Stowing Excise Duty of ₹ 10.00 per Tonne paid by the coal companies on extraction of coal.

[66] ₹ 60.00 crores released by MoC upto March 2018 as per CCDAC recommendations.

[67] 70 *per cent* of (₹ 380.00 crore - ₹ 280.00 crore).

[68] From the date of issue of Letter of Acceptance by the SCCL.

[69] 8.48 *per cent* of RS Project Cost of ₹ 380.00 crore (as per 2nd RCE) *plus* service tax.

the contract period was less than 75 *per cent*. As on the date of expiry of original RSPMC contract (June 2016), the percentage of completion of works was less than 75 *per cent.* Therefore, the maximum LD was leviable and the same worked out to ₹ 1.61 crore. The Company, however, extended the RSPMC contract upto 31 December 2018 without levying any LD.

The Government replied (December 2018) that the period was fixed with RITES considering ideal conditions/ availability of land. Tendering, award and commencement of work of major contracts for RS had been completed during the initial agreement period of 27 months. The delay in processing of tenders was considered unavoidable as major firms participated in tendering and the delay in execution of RS works was due to land acquisition issues.

RITES was a specialised agency engaged in this field and as per the RSPMC contract, the role of RITES was to ensure award and execution of contracts within 27 months. Further, RITES did not cite the delay in acquisition of land as a reason for the delays in execution of RS works. Therefore, the reasons for delays in award and execution of RS works were within the scope of RITES. But the Company extended the RSPMC contract without levying any LD.

C) Avoidable expenditure on road transportation

Due to delay in commissioning of the RS, the Company proposed (July 2014) to transport 3.00 MMTPA of coal by road from its mines [i.e., SRP and Ramakrishnapur (RK) areas]. The MoC allowed (February 2016) supply of coal to STPP from any of the Company's own mines under bridge linkage arrangement. It was observed that the Company incurred (upto June 2018) an amount of ₹ 49.03 crore for strengthening, widening and laying of roads connecting SRP and RK mines with STPP. Further, during the period 2015-18, the Company spent ₹ 92.14 crore (at an average cost of ₹ 105.47 per Tonne) on transportation of 87.36 Lakh Tonnes of coal. The cost of transportation of above quantity of coal by rail however, worked out to ₹ 1.80 crore only (at an average cost of ₹ 2.06[70] per Tonne). Thus, the Company incurred avoidable expenditure of ₹ 90.34 crore due to delay in the laying of RS.

The Government replied (December 2018) that the RS was a major work and acquisition of private land through revenue department consumed time. The existing road infrastructure was narrow and insufficient for transportation of coal. Hence, roads were strengthened and developed to establish alternate mode of transportation till the RS become operational. Further, these roads served as an additional convenience for men and materials to access STPP.

The fact remained that failure to complete the RS works within time compelled the Company to incur avoidable expenditure on transportation of coal by road.

[70] {[(₹ 164.50 basic fare for 100 KMs) + (₹ 164.50 * 15 *per cent* for Busy Season Surcharge)] X 5 *per cent* for Development Surcharge} X 3.708 *per cent* for Service Tax with effect from August 2016.

2.7.2.3 Avoidable expenditure on widening and laying of roads

The bridge linkage approval accorded by MoC allowed the Company to supply coal from any of its mines to STPP at its discretion. Accordingly, the Company proposed (July 2014) to widen and strengthen the existing coal road of 2.10 KMs in the RK mine area[71](RK-6 to RK-7) and to lay an additional road of 0.47 KMs[72] connecting RK-6 to RK-7 to the National Highway (RK-7 to NH 63) to enable it to supply coal to STPP. A work order was awarded (January 2015) to M/s AMR India Limited at a total cost of ₹ 4.36 crore, to be completed within 9 months from the date of handing over the marked out land.

Audit observed that the marked out land was handed over on 9 February 2015. But only 23 *per cent* of the road work between RK-7 to NH 63 involving expenditure of ₹ 84.00 lakh was completed up to June 2018 due to financial difficulties of the contractor. The Company however, neither levied LD nor terminated the contract as per the contractual terms. Further, during the years 2016-18, a meager quantity of 1,692.78 MTs of coal was supplied to STPP from the said mine area through RK-6 to RK-7 route. Thus, the above road widening and strengthening works were undertaken without carrying out the required assessment proved to be less productive.

The Government replied (December 2018) that widening and strengthening of the road connecting SRP-CHP with NH 63 was planned for transportation of coal to STPP. During 2016-18, a quantity of 21.58 Lakh MTs of coal was transported on the road connecting SRP-CHP with NH 63. Utilization of total stretch of the road has to be considered as a whole and not in part. The Government further stated that as the road RK-7 to NH 63 was partly completed, STPP allowed the contractor to complete the work by December 2018 duly applying the LD.

The reply was not acceptable as the RK-6 to RK-7 route that was specifically laid for transporting coal to STPP from the RK mine area was not put to major use and the laying of new route RK-7 to NH 63 was not yet completed. Further, transportation of 21.58 Lakh MTs of coal did not involve the use of above routes.

2.7.2.4 Loss due to short and delayed billing

As per Clause 3.2 of the PPA, the DISCOMs would reimburse the entire cost of fuel consumed by STPP for generation of infirm power[73]. Further, as per Clause 1.11, the energy bills were to be raised 5 days after the Meter Reading Date in each calendar month. While determining the final tariff of STPP in June 2017, the TSERC directed that the difference between the provisional tariff and the final tariff be claimed in the next month's bill.

It was observed that STPP consumed 7,263.695 Kilo Litres (KL) of High Speed Diesel and Low Sulfur Diesel being secondary fuel[74] valued ₹ 28.19 crore for

[71] From RK-6 incline junction to RK-7 incline weigh bridge junction.
[72] From RK-7 incline weigh bridge junction to National Highway No.63.
[73] Power generated after synchronisation of BTG and BOP equipment but before COD .
[74] Meant to increase calorific value of primary fuel i.e., coal.

generation (June, July and September 2016) of 169.159 MU of infirm power between the date of synchronization and the COD of Unit-I and Unit-II. The STPP however, claimed reimbursement only for 2,850.000 KL valued at ₹ 11.62 crore.

Thus, STPP did not claim reimbursement of cost of the balance quantity of 4,413.695 KL valued at ₹ 16.57 crore. It was further observed that STPP raised the power bills (including bills for the differential tariff) of ₹ 417.74 crore with a delay of 17 to 67 days. This resulted in loss of interest income[75] of ₹ 4.05 crore. Thus, STPP suffered loss of ₹ 20.62 crore due to short and delayed billing.

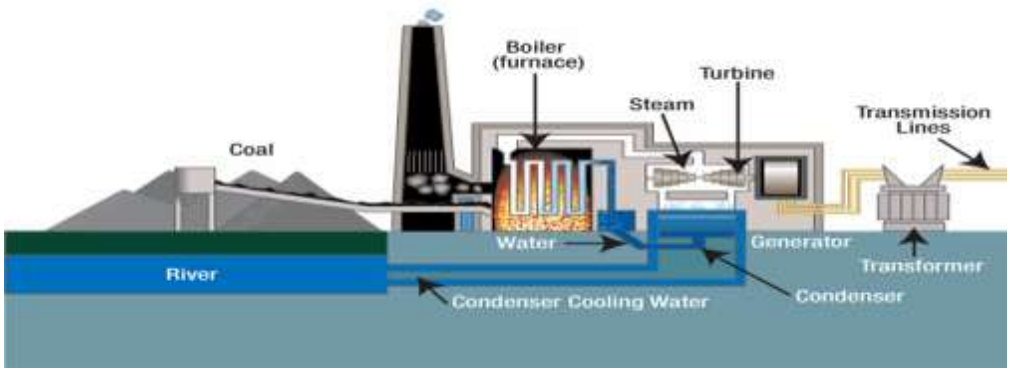
The Government replied (December 2018) that STPP being new to power generation industry claimed only the cost of oil used for generation of infirm power and the cost of oil used during various test prior to synchronization was capitalised. It also stated that the TSERC had in its Tariff Order dated 19th June 2017 directed STPP to raise differential bills with the July month's bill which could only be raised in August.

The fact remained that the cost of oil not claimed by the Company was related to the infirm power generated by Unit-I (during June & July 2016) and Unit-II (during September 2016). Further, the TSERC had in its above Tariff Order directed STPP to raise the differential bills "in the next months' bill", meaning that the differential bills were to be raised along with the June month's bill which could be raised in July. Moreover, there were delays in raising the regular energy bills of Unit-I before the COD of Unit-II and the infirm power bills of Unit-II.

Recommendation: *The Company should review the contract management for non-adherence of contractual conditions and delays in work execution for proper corrective action.*

2.7.3 Operational Efficiency

The diagram given below depicts the process of energy generation in a TPP.



The norms of operation applicable to all TPPs were prescribed at national level by the CEA. These norms prescribed the operational efficiency to be achieved by the TPPs and *inter alia* included norms for PLF, Auxiliary Power

[75] @ 15 *per cent* as per Clause No.6.3.2 of the PPA with DISCOMs.

Consumption (APC), specific coal consumption and station heat rate[76] (SHR). Based on these norms TSERC allowed tariff to the TPPs operating in the state.

The achievement[77] of key operational norms by the STPP was as given below:

Parameter	Unit	Norm[78]	Actual	Result	Government's response
PLF	*per cent* of generation capacity	> 85	91	Achieved	
SHR	Kcal/ kg.	2303	2325	Achieved	
Specific Coal Consumption	Grams/ kWh	0.560	0.611	STPP maintained the SHR nearer to the TSERC norms. But, due to receipt of poor quality of coal it consumed 4.97 Lakh MTs of coal valued ₹ 156.10 crore in excess of the norms.	The Government confirmed the observation and stated (December 2018) that STPP was putting all out efforts to receive quality coal as per the norms.
Specific Oil Consumption	ml/ kWh	0.50	0.27	Achieved	
APC	*per cent* of gross power generated	5.75	5.96	The STPP consumed 51.15 MU of energy worth ₹ 17.82 crore in excess of the norms. But, it did not analyse the reasons for excess APC to levy penalty, if any, on BTG and BOP contractors.	The Government confirmed the observation and stated (December 2018) that all efforts are being made to stabilize the unit to bring down the APC.

Good Practices

The STPP achieved (March 2018) a PLF of 91 *per cent* and was ranked (January 2018) fourth among 25 TPPs in the country.

2.7.3.1 Joint Sampling not conducted

The prices of different grades[79] of coal were notified by the coal companies based on their gross calorific value (GCV). The MoU entered into between the Company and STPP *inter alia* provided for supply of coal of G10 grade[80] and for joint sampling of coal at loading points. The credit or debit bill as the case may be was to be raised after the confirmation of the grade of coal in the joint analysis of the sample. Further, STPP could utilise[81] the services of third party inspection agencies for collection, preparation of samples at loading points and analysis at the laboratories of their choice. The Coal India Limited notified (August 2014) a panel of 25 such agencies approved by the CEA.

[76] Station Heat Rate refers to the amount of heat energy (Kilo Calories per Kilogram – kcal/ Kg.) required for generating one unit of electrical energy.
[77] For the year 2017-18 being one/ first full year of operation.
[78] As per the generation tariff for STPP approved by TSERC in June 2017.
[79] G1 (GCV > 7,000) to G17 (GCV 2,201 – 2,500) as per GoI Notification dated 30.12.2011.
[80] GCV of 4,301 to 4,600.
[81] As per the decision (June 2014) of Ministry of State for Power, Coal and Renewable Energy.

It was observed that the actual grade of coal determined at STPP's end was on lower side[82] as compared to the grade for which the invoices were raised by the Company. But, the STPP did not initiate any action for joint sampling as of June 2018.

In reply Government confirmed (December 2018) that Joint Sampling protocol was provided in the MoU and that it was being implemented at Bhupalpalli & Srirampur mines and Medigadda Open Cast Project from August 2018 and October 2018 respectively.

The reply, however, does not clarify the specific reasons for not conducting joint sampling of coal at loading points.

2.7.3.2 Slippage in grade of coal

The difference in the grade of coal declared at loading points of Company's mines and as found at STPP's end during 2016-18 was as given below:

Year	Weighted average GCV at Loading Points (kCal/ Kg)	Weighted average GCV at STPP's end (kCal/ Kg)	Difference in GCV (kCal/ Kg)
2016-17	4112	4037	75
2017-18	4240	3751	489

It was observed that STPP commenced analysing the GCV of coal from September 2017 onwards. The GCV analysis reports revealed that as against the agreed grade of G10, the grade of coal supplied ranged from G11 to G15[83] in respect of 17.40 Lakh MTs, being 53 *per cent* of total 32.76 Lakh MTs of coal, received by STPP between November 2017 and March 2018. Even though the slippages in the grade was being notified from October 2017 onwards, STPP could not get any refund as the analysis was done unilaterally and not on joint inspection basis. This caused financial loss of ₹ 92.90 crore to STPP being the differential value of the coal received and paid for.

In reply the Government stated (December 2018) that the variation in coal grades as worked out was statistically correct. Variations in grades of coal are, however, imminent in large supplies due to sudden variations in geo-mining conditions during exploitation of coal. It further stated that the Joint Sampling protocol was being implemented at Bhupalpalli & Srirampur mines and Medigadda Open Cast Project from August 2018 and October 2018 respectively.

The fact is that STPP could not get refund due to slippages in coal grade due to its failure to enforce the joint sampling protocol until August 2018 which resulted in avoidable expenditure of ₹ 92.90 crore.

2.7.3.3 High incidence of boiler tube leakages

The Company, in its submission (December 2014) for first Revised Cost Estimates (RCE), attributed the reasons for escalation in project cost, *inter alia,* to the safety measures (i.e., increase in thickness of pressure parts and

[82] G11 (GCV from 4,001 to 4,300) to G15(GCV from 2,801 to 3,100).

[83] Bhoopalapally Open Cast Mines (G11 to G15), Godavarikhani11 Mines (G10 to G14), Khairguda & Srirampur Open Cast Mines (G11 to G15), Medigadda Open Cast Project Mines (G11 to G14) and Ramakrishapur Open Cast Mines (G11 to G15).

temperature ranges over and above the IBR[84] specifications) taken by it to reduce boiler tube failures. In view of these safety measures, the boiler was expected to perform without any failures.

During the year 2017-18, STPP however, lost a total of 1,053 hours due to multiple tube leakages in the boilers of Unit I & II causing generation loss of 642.06 MU valued at ₹ 219.58 crore. The main reasons identified for such failures in the monthly O&M reports were;

- ineffectiveness of the Mill Rejects System,
- non-functioning of Electrostatic Precipitator,
- oil leakages from servo motor of Forced Draft Fan 1A & 1B,
- high temperature in both the boiler areas all around the furnace and
- non-availability of Long Retractable Soot Blower in Units I & II.

Many of these issues remained unresolved as of date. Failure of the Company to take timely action for their resolution with the BTG and BOP Contractors caused generation loss valued at ₹ 219.58 crore and also hindered the Sustainable Development Goal (SDG)[85] of providing reliable power.

In reply the Government stated (December 2018) that boiler tube leakages increased during initial phase of operation and stabilization due to stopping and restarting of the plant several times as per the OEM requirements. Moreover, the receipt of coal with lesser average GCV than the designed value resulted in erosion of boiler tubes due to ash accumulation. It also stated that action to reduce boiler tube leakages would be taken up during annual overhaul of the Units.

2.7.3.4 Presence of excess unburnt coal in bottom ash

As given in the operating and maintenance (O&M) manual of boiler of the Original Equipment Manufacturer cum BTG contractor – M/s BHEL, the unburnt coal in both fly and bottom ash should be 1 *per cent*. Further, as per the boiler performance guarantee test (PGT) results proposals[86] of OEM, the unburnt carbon content in bottom ash was expected to be at 1.80 *per cent*. It was however, observed that the actual presence of unburnt coal in bottom ash of STPP on average ranged between 2.14 *per cent* and 2.65 *per cent*. Owing to excess presence of unburnt coal in bottom ash during 2017-18, STPP lost 0.50 Lakh MTs of coal that could generate 81.51 MU of energy worth ₹ 27.87 crore. Besides, the boiler tubes also got eroded.

Further, the O&M Contractor reported that unburnt coal in bottom ash was within limits by adopting higher threshold limit of 2.5 to 3 *per cent* without

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[84] India Boiler Regulations.

[85] Sustainable Development Goals (SDGs) refer to the set of 17 aspirational global goals with 169 targets that were adopted by 194 member countries of the United Nations General Assembly at the UN Sustainable Development Summit held in September 2015. The SDGs cover a broad range of sustainable development issues which *interalia* included ensuring access to affordable, reliable, sustainable and modern energy for all (SDG No.7). In India, NITI Aayog has mapped the SDGs to various Departments of the GoI for implementation and monitoring. The Government of Telangana State (GoTS) also envisaged achievement of SDGs as part of its *Bangaru Telangana* (Golden Telangana) initiative.

[86] January 2017 for Unit-I and September 2017 for Unit-II.

justifying the suggested higher limits. Also, during PGT (January 2017), the unburnt coal in bottom ash was found at 3.65 *per cent*. This established the fact that fuel combustion in the boiler furnace was not taking place at appropriate levels as guaranteed by the OEM.

The Government replied (December 2018) that flame in boiler depends on Temperature, Turbulence and Time (3 Ts). Changes in the fineness of coal fired into the boiler, grades of coal used and the quantity of coal fired would affect combustion and hence excess formation of unburnt coal.

The reply was not acceptable since STPP had installed boilers with Tilting Tangential Type Firing System which enabled the flexibility to form the fire ball in the boiler furnace at the desirable levels to achieve optimum combustion of coal based on the quality and quantity of coal injected/ fired. Hence, the 3 Ts were manageable and should have been maintained to avoid excess unburnt coal.

Recommendation: *The Company should take steps to (i) ensure the grade of coal, (ii) meet the operational parameters as per TSERC norms and (iii) arrest boiler tube leakages.*

2.7.4 Environmental compliance

The Central Pollution Control Board (CPCB) categorised TPPs as a major polluting industry. The emission levels of STPP were abnormally high compared to the environmental norms revised (December 2015) by the Ministry of Environment & Forests (MoEF), GoI. The STPP also failed to comply with the specific conditions stipulated by MoEF while according environmental clearance as detailed in succeeding Paragraphs:

2.7.4.1 Monitoring of Pollution levels

The STPP was required to install Continuous Online Monitoring Equipment (COME) for monitoring the pollution levels. The equipment would measure levels of Sulphur Oxide (SO_2), Oxides of Nitrogen (NO_x) and Particulate Matter (PM). The results so monitored were also required to be displayed at a convenient location near the main gate of the Company in the public domain. The Telangana State Pollution Control Board (TSPCB) instructed (May 2016) the STPP to connect the COME to the websites of CPCB and TSPCB.

Accordingly, the Company placed (September 2013) order for procurement of COME i.e., Ambient Air Quality Monitoring System (AAQMS) at a cost of ₹ 44.00 lakh under the BOP contract. The BOP contractor supplied the AAQMS by July 2016 but the same was installed only in July 2018, i.e., two years after the COD of STPP. Further, STPP initiated action for connecting the COME to the websites of CPCB and TSPCB only in April 2018.

In the absence of AAQMS, an order was placed (May 2012) on Environment Protection Training and Research Institute (EPTRI), to ascertain the emission levels at Company's coal mines and STPP. The Company also awarded (December 2017) the work for environmental monitoring at STPP to the EPTRI at a cost of ₹ 43.07 lakh per annum. Audit observed that the EPTRI conducted the tests as per the National Ambient Air Quality (NAAQ) standards of November 2009 though specific norms for TPPs were

prescribed[87] (December 2015) by MoEF. Thus, STPP failed to monitor its emission levels in line with the specific norms applicable for TPPs.

The Government replied (December 2018) that off-line monitoring of Ambient Air Quality was done by EPTRI and the AAQMS is in operation since its commissioning in July 2018. The Government, however, was silent about the reasons for delay in commissioning of the AAQMS and non-conducting of tests by EPTRI as per the specific norms applicable for TPPs.

Recommendation: *STTP must be proactive in preventing delays in commissioning anti-pollution measures considering the adverse impact on public health and environment and may initiate steps to comply with the revised norms prescribed by MoEF for TPPs.*

2.7.4.2 Revised environmental norms not complied

Ministry of Environment & Forests revised (December 2015) the norms for SO_2, NOx, PM and Mercury. All the existing TPPs were required to comply with the new norms within two years (by December 2017). The Company noted (December 2017) that except for Mercury, the average levels of PM and NOx were on higher side and the average levels of SO_2 was abnormally high in both Units. Hence, CPCB directed (December 2017) STPP to retrofit Electrostatic Precipitator (ESP) to comply with PM limit. The CPCB also directed STPP to install Fuel Gas Desulphurisation (FGD) Plant costing about ₹ 800.00 crore.

It was observed that in the case of TPPs of TSGENCO which were operating since 1971 onwards did not have the FGDs installed up to March 2018 as they were meeting the emission norms. Hence, non-adherence to the emission norms by STPP which is a relatively new plant was not justified. This had resulted in the requirement for installation of the FGD soon after two years of COD of STPP. Reasons for high emission levels of SO_2 and NOx were also not analyzed and recorded for appropriate actions.

The Government while accepting the audit observation stated (December 2018) that ESPs had already been installed in STPP and all necessary steps were being taken to maintain emission levels within norms.

2.7.4.3 Adherence to the conditions for environmental clearance

According to the special conditions imposed by MoEF while granting (December 2010) environmental clearance, the STPP was *inter alia* required to;

- construct Sewage Treatment Plant (STP) and utilise the treated water for raising greenbelt,
- earmark one time capital expenditure of ₹ 22.00 crore for Corporate Social Responsibility (CSR) activities,
- incur an expenditure of ₹ 4.40 crore annually on CSR activities and
- ensure monitoring and annual social audit of schemes identified for CSR activities.

[87] Under Air (Prevention and Control of Pollution) Act, 1981 as amended from time to time.

It was observed that (i) the construction of STP was completed and commissioned in August 2018, (ii) during 2010-11 to 2017-18, STPP incurred only ₹ 12.85 crore (58 *per cent*) of the targeted amount of ₹ 22.00 crore for CSR activities and (iii) STPP did not earmark and initiate any activity under the annual component of CSR activities. Annual social audit was also not conducted by STPP as of June 2018.

The Government replied (December 2018) that construction of the STP was delayed due to changing its location considering the proposed establishment of Unit-III of 800 MW within STPP. It also stated that the balance CSR budget would be spent on receiving the relevant proceedings from the District Collector and annual social audit was conducted through EPTRI. The fact, however, remained the same that STP was commissioned after 18 months from the COD of STPP. Further, STPP failed to adhere to the conditions relating to CSR expenditure.

2.7.5 Monitoring of Project Outcomes

While setting up STPP, it was envisaged that the Company would (i) supply coal generated from its own mines to STPP, (ii) utilise 150 MW to 225 MW generated as self-consumption for mining activities and (iii) provide direct employment to 700 local people who lost land for setting up of STPP. Further, as per the SDGs implemented[88] by the State Government, the STPP was required to provide affordable and reliable energy to consumers.

It was, however, observed that the expected outcomes of use of coal from own mines and internal consumption of 150 MW power were not realized. The STPP also neither provided (June 2018) employment to people who lost their lands for setting up of STPP nor provided any training to the local people for eventual employment in STPP. Further, STPP did not contribute to the SDG of providing energy at low cost.

As the BOD was in-charge of the affairs of the Company including STPP it was its primary responsibility to ensure that the expected outcomes of STPP were realised. For this purpose, operational review meetings were to be held periodically to assess the progress made in achievement of the outcomes. The BOD of the Company however, did not ensure that a monitoring mechanism was in place to ensure achievement of envisaged outcomes of STPP.

[88] As part of "*Bangaru Telangana*" (Golden Telangana) initiative.