

CHAPTER XIII: MINISTRY OF STEEL

MECON Limited

13.1 Loss due to termination of contract and encashment of BG by the client

Delay in commencement of work by MECON Limited and inability to ensure submission of Bank Guarantee (BG) by its foreign associate, to execute External Coal Handling Plant Project awarded by NTPC, resulted in termination of contract and encashment of BG by NTPC and loss of ₹42.26 crore to MECON.

NTPC Limited invited bids for External Coal Handling Plant (ECHP) for North Karanpura Super Thermal Power Project (NKSTPP) in January 2015. Since MECON Limited (MECON or company) was not meeting the eligibility criteria for the above work, it arranged a pre-tender tie up with M/s Northern Heavy Industries Group Co Limited, China (NHI) and M/s JMC Projects (India) Limited (JMC) to submit the bid for above work. The company entered into Memorandum of Understanding (MoU) with its foreign associate NHI for Pipe Conveyor work and with the Indian Associate, JMC for Civil works in June 2015.

NTPC awarded the work of ECHP for NKSTPP to MECON in February 2017 at a cost of ₹394 crore¹ to be completed by June 2019. Contract was signed between NTPC and MECON on 7 March 2017. MECON awarded the work order for design, manufacture, supply and commissioning of Pipe Conveyors for ₹100 crore (October 2017) to NHI and Civil works of the project to JMC (September 2017). MECON was responsible for Detailed Engineering, Soil investigation, Site survey etc.

- As per clause 34.1 & 34.2 of Instruction to Bidders, MECON was required to furnish a Bank Guarantee (BG) for 10 *per cent* of the contract value and its associates were to furnish BG (2 *per cent* for NHI and 0.63 *per cent* for JMC) for faithful performance within 28 days of the placement of order failing which, NTPC had the right to annul the tender.
- As per the GoI OM (April 2015), prior approval of competent authority was required for entering into MoU with any foreign agency.

Audit observed that MECON took five months upto 11 July 2017, to seek approval of Board of Directors for placement of order to NHI, China. Meanwhile in a meeting held 18 May 2017, a Government Director raised the issue of requirement of prior approval of competent authority for entering into MoUs with any foreign agency. MECON sought exemption (17 July 2017) from Ministry of Steel for pre-tender tie up with NHI, which was granted by the Ministry vide letter dated 20 September 2017 (approx two months from the date of receipt of the proposal). Audit noted that there was no progress upto May 2017 and only some engineering work was done by MECON whereas, NTPC kept issuing letters and reminders for submission of BG.

¹ Considering 1USD equivalent to ₹66.98

Audit also noted that, MECON submitted BG of ₹39.12 crore in October 2017 (seven months delay) despite being requested several times by NTPC to adhere to timelines. JMC submitted BG of ₹2.48 crore in January 2018 (nine months delay). NHI requested MECON to submit BG of ₹7.88 crore on their behalf (with back to back BG to be submitted by NHI to MECON) because in absence of any direct contract between NTPC and NHI, banks in China were not ready to furnish BG to NTPC. This, however, was not accepted by MECON. MECON thereby exposed itself to risk, as NHI had neither submitted its part of BG nor carried any of the contractual obligations.

In view of persistent failure of MECON and its associates to discharge their contractual obligations and non-submission of BG, NTPC terminated the contract in February 2018 and encashed the BG of MECON for ₹39.12 crore and BG of JMC for ₹2.48 crore as per provisions of the contract. MECON approached the High Court of Jharkhand where both the parties being PSUs agreed (July 2018) to get the dispute resolved through Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD). The company pleaded before AMRCD that NTPC had unfairly terminated the contract and therefore should refund ₹62.26 crore² incurred by it on the project. AMRCD opined (October 2019) that termination of contract and forfeiture of BGs by NTPC was justified, but NTPC should pay ₹20 crore towards cost incurred by MECON against works carried out by them and loss suffered due to invocation of BG. All claims and counter claims of parties stood settled and accordingly, NTPC paid ₹20 crore to MECON on 30 November 2019.

MECON replied (April 2019) that arrangements to commence the work and measures to ensure timely delivery of the project were taken immediately and excavation work commenced in February 2018. It further stated that the process to obtain approval from Ministry was initiated only after knowing the requirement of GoI's approval for entering into MoU with foreign partners.

Ministry reiterated (March 2020) the views of the Management

Reply of Management/ Ministry was not acceptable in view of the fact that

- i) Survey work by MECON was scheduled to be completed by May 2017 whereas MECON placed the order for survey only in October 2017 and the survey report was submitted in December 2017 with a delay of seven months. MECON started soil excavation only after issue of contractual notice by the client in February 2018 (after 11 months of the award of work) and could excavate only 10,000 cum (8.45 *per cent*) when the contract was terminated by NTPC. Pipe Conveyors were not supplied by NHI as per agreed schedule, and
- ii) Guideline for prior GoI's approval was issued in April 2015 i.e. well before entering into MoU. MECON should have obtained such prior approval, whereas it sought the approval of Ministry of Steel for pre-tender tie up with NHI, in July 2017, which delayed the placing of work orders thereby delaying the whole project and finally leading to the termination of the project.

² *Comprising of ₹41.73 crore for guarantees encashed, ₹20 crore towards cost of design & engineering, rasgeotechnical investigation work, civil works etc and ₹0.53 crore incurred on site mobilization*

Due to delay in award and commencement of work and inability of Management to ensure timely submission of BG by its associate, the company suffered a loss of ₹42.26 crore.

Rashtriya Ispat Nigam Limited

13.2 Energy Management

13.2.1 Introduction

Rashtriya Ispat Nigam Limited, Visakhapatnam (RINL) incorporated (February 1982) under the administrative control of Ministry of Steel (MoS), established an Integrated Steel Plant with an installed capacity of 3.0 Million Tonnes Per Annum (MTPA) of liquid steel to produce and sell iron and steel products. It commenced full-fledged operations in phases by August 1992. As of 31 March 2019, capacity expansion of the plant from 3.0 MTPA to 6.3 MTPA and subsequently to 7.3 MTPA through upgradation/ modernisation was substantially completed except development of Madharam Mines³ and revamping of Sinter Machine 2⁴.

To meet the power requirements (prior to 31 March 2014), RINL set up a Thermal Power Plant (TPP) with five Turbo Generators (TGs) and Auxiliary Power Generating Units with an overall installed capacity of 388.60⁵ Mega Watt (MW). To meet additional power requirement towards capacity expansion, the capacity of captive power generation was also enhanced in phased manner to 542.48⁶ MW as of 31 March 2019.

13.2.2 Organisation set up

RINL is governed by Board of Directors headed by the Chairman-cum-Managing Director (CMD) who is assisted by five Functional Directors looking after Operations, Commercial, Projects, Finance and Personnel. General Managers are in-charge of TPP and Distribution Network and report to Executive Director (Works) who in turn reports to Director (Operations).

13.2.3 Scope of Audit

Audit scope included generation, purchase and distribution of energy covering the period of five years ending March 2019.

13.2.4 Audit Objectives

Audit was conducted to examine whether:

- overall power generation performance was as per norms and targets;

³ Expected to be completed by December 2019

⁴ Expected to be completed during 2020-21

⁵ (a) 315 MW of TPP by synchronising 3 TGs of 60 MW each between March 1989 and December 1990 and 2 TGs of 67.5 MW each in May 1996 and November 2013; (b) 15 MW (2 X 7.5 MW) of Back Pressure Turbine Station (BPTS) - 1 & 2 in December 1990; (c) 24 MW (2 X 12 MW) of Gas Expansion Turbine Stations (GETS) - 1 & 2 in February and August 1993 respectively; (d) 14 MW of Coke Oven Battery (COB) - 4 Plant in April 2012; and (e) 20.6 MW of Sinter Heat Recovery Power Plant (SHRPP) in March 2014

⁶ 153.88 MW by commissioning (i) 14.88 MW of Top Recovery Turbine (TRT) in June 2014; (ii) 120 MW of Gas based Captive Power Plant (CPP) - 2 in March 2016; (iii) 14 MW of COB-5 Plant in May 2018; and (iv) 5 MW Solar Power Plant in December 2016

- consumption of required materials/ inputs was economical;
- captive generating units were operated effectively, ensuring their optimum use and maximising power generation there from; and
- energy conservation and distribution mechanism were effective.

13.2.5 Audit criteria

Audit criteria were derived from Sustainability Plans, Memoranda of Understanding entered into by RINL with Administrative Ministry i.e., Ministry of Steel, Notifications of Central Electricity Regulatory Commission (CERC), operational efficiency of other steel plants, Minutes of meetings of Board of Directors, etc.

13.2.6 Audit methodology

Audit methodology included scrutiny of records relating to periodical reports on generation and distribution of power and steam, outages of generating units, interaction and discussion with Management, issue of audit requisitions, soliciting records/ data/ information and issue of audit observations and the draft audit report to RINL (in December 2019).

13.2.7 Audit findings

13.2.7.1 Captive Generation Capacity of RINL

Electricity power requirement of 228 MW at 3.0 MTPA was revised to 546 MW at 7.3 MTPA on expansion/ upgradation. Captive power generating capacity through TPP (315 MW), Solar Power Plant (5 MW) and Gas based CPP-2 (120 MW) stood at 440 MW. To convert waste heat generated in production process into electrical energy, RINL also commissioned Auxiliary Power Generation units with a capacity of 102.48 MW⁷, thereby increasing the total captive power generating capacity of RINL to 542.48 MW as of 31 March 2019. Besides captive generation, RINL also had an agreement (August 2014) with Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL) to purchase power with Contracted Maximum Demand (CMD) of 1,85,000 KVA which was further enhanced (April 2018) to 2,35,000 KVA.

i) Operational efficiency

The details of the installed capacity, targets for power generation, actual power generation, power purchased and cost of generation and purchase during the five years from 2014-15 to 2018-19 are given below:

⁷ (a) 15 MW BPTS-1&2; (b) 24 MW GETS-1&2; (c) 14 MW each of COB-4&5 Plants; (d) 20.6 MW SHRPP also called as New Energy and Industrial Technology Development Organisation (NEDO) Project; and (e) 14.88 MW TRT

Table-13.2.1: Cost of power generated vis-à-vis power purchased

Year	Installed Captive capacity ⁸ (MW per hour)	MOU ⁹ target (MW per hour)	Target as per sustainability ¹⁰ plan (MW per hour)	Actual Captive generation (MW per hour)	Shortfall with ref. to installed capacity (MW per hour)	Purchase from APEPDCL (MW)
1	2	3	4	5	6 = (2-5)	7
2014-15	342.10	252.50	261.39	206.92	135.18	50.45
2015-16	356.98	269.70	273.60	217.08	139.90	64.91
2016-17	356.98	256.90	249.67	207.75	149.23	78.17
2017-18	476.98	338.54	338.54	294.20	182.78	58.32
2018-19	476.98	366.99	366.99	332.69	144.29	49.49
Year	Consumption (MW)	Total captive power generation during the year (MWH)		Total power purchased during the year (MWH)	Overall annual average variable cost of generation (₹ per MWH)	Energy charges & electricity duty for purchase (₹ per MWH)
1	8	9		10	11	12
2014-15	277.19	18,12,820		4,41,954	4,592	5,511
2015-16	304.38	19,06,991		5,70,162	4,623	5,789
2016-17	326.24	18,20,011		6,84,729	5,358	5,900
2017-18	374.60	25,76,875		5,10,860	5,290	6,111
2018-19	407.65	29,14,248		4,33,500	5,286	6,111
		1,10,30,945		26,41,205		

It can be seen from the above table that in all the years, actual captive generation was lower as compared to the installed capacity as well as MOU targets and RINL's Sustainability Plan. Shortage in captive generation was met significantly by purchase from APEPDCL and such purchase of power showed an increasing trend up to 2016-17 and reducing trend in subsequent years mainly due to stabilisation of 120 MW Gas based CPP-2 from September 2017.

Shortage in captive generation was attributable to various factors such as shortage of boiler coal, low performance of boilers of TPP, outages of boilers/ auxiliary power generation units, higher consumption of process steam, delayed generation of power from TRT and forced outage of new TG-5. These issues have been discussed in detail in the succeeding paras.

Management replied (January 2020) that (a) only 50 MW power could be generated in TG-5 as against the installed capacity of 67.50 MW with the balance steam after meeting the steam requirement of Turbo Blower-4 & process steam; and (b) power generation from Auxiliary Power units was linked to the performance/ heat recovery from various units such as Coke Oven & Coal Chemical Plant (CO&CCP), Blast Furnaces (BFs), Sinter Machine etc., which contributed to low Plant Load Factor (PLF).

⁸ Excluding BPTS-1&2 (15 MW), COB-4&5 (28 MW) for 2014-15 to 2018-19 as arriving shortfall in power generation without considering the actual gross coke produced may not be appropriate; Solar Power Plant (5 MW) for 2014-15 to 2018-19; CPP-2 (120 MW) for 2014-15 to 2016-17 as it was stated to be stabilized from September 2017; and TRT for 2014-15 as it was commissioned in June 2014. Installed Capacity of TG-5 is taken as 50 MW only instead of 67.50 MW based on Management reply

⁹ Target of power generation as per the Memorandum of Understanding entered with MoS

¹⁰ Target of power generation as per the Sustainability Plan, which is prepared annually by RINL

The reply is not acceptable. Even after considering the installed capacity of TG-5 as 50 MW and excluding BPTS-1&2, COB-4&5 for the entire period of 2014-19 and CPP-2 for the period 2014-16, there was still shortfall in generation of power ranging between 135.18 MW (2014-15) and 182.78 MW (2017-18) with reference to their installed capacities. Commissioning of SHRPP without carrying out capital repairs to the 25 years old Sinter Machine was the main reason for not getting sufficient heat required for generation of auxiliary power from SHRPP.

ii) Low Plant Load Factor (PLF) of Thermal Power Plant

One of the parameters to measure efficiency of TPPs is Plant Load Factor (PLF)¹¹. As per CERC's notification (2014-19), PLF norm for operation of TPP is 85 per cent. Against the norm of 85 per cent, actual PLF achieved by the 315 MW Main TPP of RINL during 2014-15 to 2018-19 was low and ranged between 67.16 (2016-17) and 74.66 per cent (2018-19) as detailed below:

Table-13.2.2: PLF achieved by Thermal Power Plant

Sl.	Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
a	Total captive power generated (MWh)	17,82,716	18,76,396	17,50,120	18,34,687	19,45,763
b	Total captive power capacity (MW per hour) ¹²	297.50	297.50	297.50	297.50	297.50
c	Total calendar hours during the year	8760	8784	8760	8760	8760
d	Average hourly generation (MW per hour) (a/c)	203.51	213.62	199.79	209.44	222.12
e	Combined PLF percentage ((d/b) x100)	68.41	71.80	67.16	70.40	74.66

A statement showing the loss of generation due to low PLF is at **Annexure-XXVII**. It could be seen from **Annexure-XXVII** that as against the stipulated norm of 85 per cent of PLF, total shortfall in generation by Main TPP during the years 2014-15 to 2018-19 was 18,92,312 MWh valuing ₹130.44 crore. The reasons for lesser production of power from captive plants have been discussed in detail in the subsequent paragraphs.

Management replied (January 2020) that even when all machines were available for generating power from TPP and Auxiliaries Units, generation was restricted sometimes in those units in order to comply with minimum compulsory import of 7,400 MVAH per month in lieu of CMD (minimum 88,800 MVAH per year). Under such a scenario, PLF of the plant could not be compared with other power generating units, which generally did not have such type of limitations. Hence, PLF for TPP was not comparable with CERC norm. It was also stated that Plant Load¹³ met by RINL was in excess of 76 per cent during the last five years.

¹¹ PLF is the ratio between the actual energy generated by Plant and maximum possible generation for actual operating hours at installed capacity

¹² Installed Capacity of TG-5 is taken as 50 MW only instead of 67.50 MW based on Management reply

¹³ Plant Load met by RINL was arrived by dividing average captive generation in MWs with average Plant Load in MWs (i.e., average captive generation + average power purchased)

The reply is not acceptable in view of the following:

- PLF norms were operational for all TPP units and were to be considered as benchmark to ensure efficient operations. Further, while replying to a previous draft Report, the Ministry had stated (March 2017) that Central Electricity Authority kept a norm for PLF as 80 *per cent* in respect of power plants of steel industry. Even considering the PLF as 80 *per cent*, and also considering the minimum import of power from APEPDCL, the overall shortfall in power generation by TPP as well as the avoidable purchase of power from APEPDCL during 2014-19 was 12,40,430 MWh valuing ₹85.48 crore.
- To assess the operational efficiency of TPPs of steel industry like RINL, PLF should have been considered and not the plant load met by captive generation, as stated by Management.

Thus, captive power generation needs to be increased by improving PLF to at least 80 *per cent*, which would result in reduction in expenditure on purchase of power.

iii) Low power generation by TPP due to shortage of boiler coal

As per the targets laid down in the RINL's Sustainability Plan and considering the targeted power generation, annual boiler coal requirement during 2014-15 to 2018-19 was estimated between 22.17 lakh tons (2016-17) and 26.47 lakh tons (2015-16). In order to get coal required for TPP, RINL entered (June 2008) into a Fuel Supply Agreement (FSA) with Mahanadi Coalfields Limited (MCL) which was valid up to June 2013 with Annual Committed Quantity (ACQ) of 16.80 lakh tons. The FSA was renewed (November 2013) for another five years for the same quantity.

As MCL was not supplying ACQ of boiler coal, RINL purchased a total quantity of 7.22 lakh tons of boiler coal from Singareni Collieries Company Limited (SCCL) during 2014-19, including 1.27 lakh tons purchased under e-auction during 2017-18, and imported 7.94 lakh tons of boiler coal during 2015-19. Besides, FSA for supply of 3 lakh tonnes per annum for four years from April 2018 was finalised with SCCL. The details of boiler coal purchased during 2014-15 to 2018-19 from various sources are given below:

Table-13.2.3: Boiler coal purchased during 2014-15 to 2018-19

(Quantity in lakh tonne)

Year	Requirement of boiler coal projected as per Sustainability Plan	Boiler coal linkage from MCL	Boiler coal purchased from MCL	Boiler coal purchased from SCCL	Boiler coal imported	Total boiler coal receipts
2014-15	24.00	16.80	14.35	0.41	0	14.76
2015-16	26.47	16.80	14.20	0.95	0.47	15.62
2016-17	22.17	16.80	14.00	2.94	0.51	17.45
2017-18	25.00	16.80	14.52	1.27	2.56	18.35
2018-19	25.00	16.80	12.08	1.65	4.40	18.13

From the above table, it may be seen that in all the years, there was shortfall in receipt of coal when compared to the coal requirement projected as per Sustainability Plan, though the shortfall was in reducing trend. Due to shortage of boiler coal during 2014-19, TPPs were

operated at partial loads during 11 months¹⁴ resulting in shortfall in generation of power of 2,78,952 MWh. Though boiler coal from lone long-term supplier (viz. MCL) was erratic, RINL did not make adequate efforts to make up the shortfall in supplies by procuring boiler coal from other sources. Consequently, RINL had to purchase 5,70,737 MWh from APEPDCL in the above months out of which purchase of 2,64,828¹⁵ MWh was avoidable with resultant expenditure of ₹16.78¹⁶ crore.

Management replied (January 2020) that in order to maintain sufficient coal requirement for power generation, Raw Material Department along with Material Management Department was regularly taking up the matter with various associated agencies like suppliers of coal, and Railways. Material Management Department had also pursued with MCL about the poor supplies and requirement about meeting the FSA quantity.

The reply is not acceptable. When MCL failed to supply required quantity of boiler coal, RINL neither explored the procurement of boiler coal under e-auction from CIL units and SCCL, nor finalised a long-term MoU with other coal suppliers for additional boiler coal during the period of 11 months pointed out by audit.

iv) Imprudent blending of costly medium coking coal with boiler coal

Indigenous boiler coal was the prime material for power generation by TPP. Boilers of TPP at RINL were designed to use indigenous boiler coal with Gross Calorific Value (CV) of 3,680-4,500 Kilo Calories (Kcal) per kg. Due to short receipt of boiler coal, RINL used Medium Coking Coal (MCC) with CV of 5,400 Kcal/ kg¹⁷ and Imported Boiler Coal (IBC) with CV of 6,300 Kcal/ kg for blending with indigenous boiler coal. This was done as MCC/ IBC with higher CV could not be fired directly in TPP boilers. Instead, indigenous boiler coal was blended with the above higher CV coals to ensure that gross CV was within the design range.

Audit observed that SCCL was selling boiler coal through e-auction from December 2007 and the subsidiaries of Coal India Limited (CIL) were selling boiler coal under e-auction from August 2009. Though the procurement of boiler coal through e-auction was cost effective as compared to procurement cost of MCC, RINL failed to avail this alternative to meet the short supply of boiler coal from MCL. The average procurement cost of MCC was between ₹7,241 - ₹7,362 per ton as against ₹1,597 - ₹2,463 per ton under e-auction rate of boiler coal during 2014-15 to 2016-17. RINL consumed 3,87,938¹⁸ tons of MCC for blending with indigenous boiler coal during 2014-15 to 2016-17. MCC was not blended with boiler coal during the years 2017-18 and 2018-19. Considering actual CV of MCC vis-à-vis that of boiler coal, blending of costlier MCC of 3,87,938 tons valuing ₹283.58 crore which

¹⁴ *June to September 2014; and January, May, June, July, September, November & December 2017*

¹⁵ *Considering shortfall in power generation and energy purchased, whichever is lower*

¹⁶ *Considering excess of tariff for energy charges plus electricity duty over annual average operating variable cost as per TPP cost sheet*

¹⁷ *Purchased from Central Coalfields Limited*

¹⁸ *1,62,884 tons, 1,45,224 tons and 79,830 tons for the years 2014-15, 2015-16 and 2016-17 respectively*

was equivalent to indigenous boiler coal of 6,95,792¹⁹ tons valuing ₹138.37 crore to generate same quantum of power resulted in avoidable expenditure of ₹145.21 crore²⁰.

Management replied (January 2020) that:

- Usage of MCC was not due to shortage of boiler coal but was due to receipt of high ash content of indigenous boiler coal, which did not meet the design limit of gross CV of the RINL's Boilers.
- IBC could be used as an alternative to boiler coal in case of short supplies but had to be handled carefully as it was highly susceptible to self-ignition.
- Apart from logistics problems, high volatility in international market with reference to IBC prices was also taken into account for not contemplating the long-term agreement approach for IBC linkage.

The reply is not acceptable in view of the following:

- As against the requirement of boiler coal which ranged between 22.17 lakh tons and 26.47 lakh tons for the years 2014-15 to 2018-19, the actual procurement of boiler coal ranged between 14.76 lakh tons and 18.35 lakh tons. Hence, usage of MCC in the coal blend was due to shortage of boiler coal.
- The Water Sprinkler System in Boiler Coal Bed was commissioned on 16 August 2014 to avoid self-ignition in coal yards. Further, it is also a replied fact that the logistic problem was addressed by RINL at tippers, by water quenching of materials while in wagons itself, before tipping, and hence, IBC could be carefully handled.
- The average percentage of ash content in IBC ranged between 9.24 and 11.55 during 2014-15 to 2016-17 when compared to that of MCC, which ranged between 24.51 and 32.93 during the same period. Further, the Gross CV of IBC was also higher than that of MCC and was also cost effective. Hence, inspite of high volatility in international market with reference to coal prices, blending of IBC with indigenous boiler coal instead of MCC was economical. Considering these aspects, disregarding MCC fully and blending indigenous boiler coal with IBC could have been explored.

13.2.7.2 Steam production

i) Low performance of TPP Boilers

TPP had five Boilers to produce High Pressure (HP) steam with capacity of 330 Tons Per Hour (TPH) each with firing of multi-fuels like Coal, Coke Oven Gas (CO Gas), Blast Furnace Gas (BF Gas) and Furnace Oil which were also used for start-up and for flame stability as and when required. Boiler coal was pulverised in Bowl Mills and fired in the

¹⁹ Considering annual average CV of MCC with that of indigenous boiler coal, 1 ton of MCC is equivalent to 1.60 tons, 1.73 tons and 2.30 tons of indigenous boiler coal for the years 2014-15 to 2016-17 respectively to generate same heat/ steam/ power;

²⁰ Considering difference between RINL's annual average procurement price of MCC and prevailing annual average price of indigenous boiler coal under spot e-auction for the years 2014-15 to 2015-16, computed as per Annual Report of Ministry of Coal for 2016-17.

Furnace. Steam produced through Boilers was used in four Turbo Blowers for BF and then largely for power generation. To meet increased steam requirements of Plant after expansion, additional Boiler-6 of 330 TPH was commissioned in June 2013 increasing the total capacity to 1,980 TPH of steam.

Of the six Boilers, one Boiler was kept as stand-by, and the balance five Boilers, in full load of operation, were capable of producing steam of 1,650 TPH. To conserve energy, the Boilers were required to be operated to produce steam to the maximum extent, to generate required power and meet the process needs. The details of hourly rate of steam production with reference to utilised hours by TPP Boilers during 2014-15 to 2018-19 are given below:

Table-13.2.4: Hourly rate of steam generated by each Boiler

Year	MOU Target for Steam (T)	Total TPP Steam (T)	Hourly Rate of Steam Production (T)					
			Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Boiler 6
2014-15	130,71,480	102,89,785	253.2	252.8	263.3	253.7	273.1	275.1
2015-16	135,78,000	107,71,645	239.8	233.1	223.4	231.4	250.4	303.6
2016-17	135,78,000	104,99,682	225.2	223.5	218.3	243.2	257.5	319.2
2017-18	128,33,400	106,78,349	242.4	213.1	225.5	229.8	240.1	313.1
2018-19	130,61,868	112,14,754	231.5	221.7	237.9	241.6	268.7	324.0

It can be seen from the above that the overall steam production was less when compared to the MoU targets set with the Ministry of Steel. The hourly steam production was decreasing in respect of Boilers 1 to 5 during the period 2014-15 to 2016-17 and slightly increased / decreased during 2017-18 and 2018-19. Further, steam production by Boilers 1 to 5 reached a maximum of 273.1 TPH in the period of five years against a rated capacity of 330 TPH. However, the hourly rate of Boiler 6, being newly commissioned in June 2013, was improving during the period 2014-15 to 2018-19.

Further, the efficiency of TPP boilers to produce HP steam was between 74.12 *per cent* (2017-18) and 79.09 *per cent* (2014-15) as under:

Table-13.2.5: Boiler efficiency during 2014-15 to 2018-19

Year	Total steam produced by TPP with utilised hours (T)	Overall average hourly steam production per Boiler for utilised hours (T)	Boilers efficiency (3/ 330 x 100) (<i>per cent</i>)
1	2	3	4
2014-15	102,89,785	261.0	79.09
2015-16	107,71,645	247.7	75.06
2016-17	104,99,682	248.7	75.36
2017-18	106,78,349	244.6	74.12
2018-19	112,14,754	256.8	77.82

Management replied (January 2020) that the reduction in steam was due to receipt of coal with high ash content and high moisture content in rainy season and also due to aging of equipment. It was also stated that broad initiatives for the improvement of performance of TPP Boilers 1&2 were taken during 2018-19 and 2019-20 and replacement of ducts would be taken up in other Boilers during their Electrostatic Precipitator (ESP) Revamping Project.

The reply is not acceptable as concerted and fruitful efforts to sort out the issue of receipt of inferior boiler coal with high ash content from MCL, by taking up at the highest level and resolve the same proved inadequate. It is evident from the reply that the Company belatedly

took up the initiatives in 2018-19 for the improvement of 30-year-old Boilers 1&2. Delayed action was the main reason for low performance of the boilers, as evident from the better performance of Boiler 6, which was relatively newer.

13.2.7.3 Performance of Thermal Power Plant and Auxiliary Power Generation Units

i) Performance of TPP (Boilers and Turbo Generators (TGs))

Capital repairs of Boilers were planned once in every year for 30-35 days and capital repairs of Turbine Generators (TGs) were planned for 40 days every year on need basis. Further, due to operational problems, Boilers and TGs would also be under unplanned/ forced outages and repairs were to be carried out on urgent basis.

(a) Impact on steam production and power generation

The details of average hourly generation of power from the turbine generators (TGs) during 2014-15 to 2018-19 may be seen at *Annexure-XXVIII*, the abstract of which is given below:

Table-13.2.6: Average hourly generation of power during 2014-15 to 2018-19

Year	TG-1 - 60 MW	TG-2 - 60 MW	TG-3 - 60 MW	TG-4 - 67.5 MW	TG-5 - 67.5 MW
2014-15	45.8	49.2	48.6	48.9	59.1
2015-16	45.4	44.1	38.2	44.5	51.1
2016-17	48.9	36.5	41.6	43.9	51.3
2017-18	47.6	36.9	45.9	44.4	53.6
2018-19	48.5	50.8	48.5	55.7	58.6

Further audit analysis revealed that:

- The average hourly production of steam by TPP Boilers during 2014-15 to 2018-19 ranged between 213 TPH (Boiler 2 in 2017-18) and 324 TPH (Boiler 6 in 2018-19), against the installed capacity of 330 TPH. Forced shutdown hours of TPP boilers for the years 2014-15 to 2018-19 ranged between 73 hours (2016-17) and 780 hours (2014-15). Due to forced outages of Boilers during these years, the Company was unable to generate 3,17,910 tons of steam.
- The average hourly generation by TGs 1, 2 and 3 ranged between 36.5 MW (TG-2 in 2016-17) and 50.8 MW (TG-2 in 2018-19) as against 60 MW capacity each and that of TGs 4 and 5 was between 43.9 MW (TG-4 in 2016-17) and 59.1 MW (TG-5 in 2014-15) against 67.5 MW capacity each. Forced shutdown hours of TGs of TPP for the years 2014-15 to 2018-19 ranged between 89 hours (2015-16) and 1,077 hours (2014-15). Due to forced outages of TGs during these years, the Company was unable to generate 4,65,485 MWh of power.
- This apart, there was forced outage of TG-5 for 160 days during April to September 2014 due to the negligence of the Technical Consultant in identifying the defect during the supervision of the fixation of thrust collar of rotor shaft at the time of commissioning of TG-5 in November 2013.

(b) Time taken for outages/ shutdown

The details of the time taken for planned outages/ shutdown of Boilers and TGs for the years 2014-15 to 2018-19 is at *Annexure-XXIX*, the abstract of which is given below:

Table-13.2.7: Excess time taken for planned outages/ shutdown of Boilers and TGs
(In number of days)

Year	2014-15	2015-16	2016-17	2017-18	2018-19	Total
Boiler-1	29	22	18	21	246	336
Boiler-2	18	34	27	29	-	108
Boiler-3	51	25	8	7	-	91
Boiler-4	43	38	26	-	37	144
Boiler-5	11	31	-	25	-	67
Boiler-6	-	30	7	4	-	41
Total						787
TG-1	-	-	-	-	139	139
TG-2	-	-	-	-	25	25
TG-3	-	-	43	-	-	43
TG-4	-	-	-	-	-	-
TG-5	-	-	-	-	-	-
Total						207

While reviewing the time taken on capital repairs during April 2014 to March 2019, from *Annexure-XXIX*, Audit observed that -

- Out of the 24 planned capital repairs for TPP Boilers, total excess time of 787 days was taken against the stipulated 35 days for each capital repair in 23 cases, with excess time on each occasion ranging between 4 (Boiler 6 in 2017-18) and 246 days (Boiler 1 in 2018-19); and
- Out of the three planned capital repairs carried out in TGs, in all the cases, RINL has taken total excess time of 207 days when compared to the planned days.

Management replied (January 2020) that the capital repairs to TG-1, 2 & 3 were taken up on an emergency basis due to sudden breakdown of the machine and non-availability of spare rotor and inner casing at site as they were undergoing repairs at BHEL. It also assured that efforts were being made to minimise such delays in future.

The reply is not acceptable as the delays in completion of capital repairs of TG-1&2 in 2018-19 and TG-3 in 2016-17 were mainly due to non-availability of a spare rotor, other than a rotor procured as a two-year operational spare way back in 1988 and declared as beyond repair in May 2019. Management's reply was silent on the excess time taken on capital repairs to Boilers and failure of the Technical Consultant to identify the defects during the commissioning of TG-5.

Thus, excess time taken beyond planned shutdown for annual capital repairs was causing reduced hours of utilisation of Boilers/ TGs with resultant reduction in steam and thereby causing lower power generation with consequential purchase from APEPDCL. Since Boilers were taken down for planned capital repairs once in every year, excess down time than that stipulated was avoidable.

ii) Performance of Auxiliary Power Generation units

The following table indicates the details of calendar hours, utilised hours and hours lost by Auxiliary Power Generation units during 2014-15 to 2018-19.

Table-13.2.8: Utilised hours and hours lost by Auxiliary Power Generation Units

Year	Calendar hours	BPTS-1 (7.5 MW)		BPTS-2 (7.5 MW)		GETS-1 (12 MW)		
		A (per cent)	B	A (per cent)	B	A (per cent)	B	
2014-15	8,760	8,121 (93)	47	7,421 (85)	752	0 (0)	0	
2015-16	8,784	8,657 (99)	64	8,501 (97)	181	0 (0)	0	
2016-17	8,760	8,473 (97)	184	8,348 (95)	361	341 (4)	0	
2017-18	8,760	7,168 (82)	1,592	8,556 (98)	204	6,749 (77)	2,011	
2018-19	8,760	8,691 (99)	69	8,164 (93)	596	597 (7)	8,213	
Year	GETS-2 (12 MW)		COB-4 (14 MW)		NEDO Project (20.6 MW)		TRT (14.88 MW)	
	A (per cent)	B	A (per cent)	B	A (per cent)	B	A (per cent)	B
2014-15	6,057 (69)	1,550	7,717 (88)	359	1,424 (16)	3,414	--	--
2015-16	2,341 (27)	40	8,152 (93)	551	602 (7)	0	2,106 (24)	130
2016-17	0 (0)	0	8,624 (98)	59	1,591 (18)	0	6,445 (74)	882
2017-18	1,070 (12)	7,690	8,532 (97)	228	942 (11)	7,257	6,313 (72)	2,447
2018-19	5,076 (58)	3,684	8,350 (95)	410	75 (01)	8,685	5,671 (65)	3,089

A – Utilized Hours (*per cent* to Calendar Hours); B – Hours Lost towards Planned/ Unplanned/ Forced Shutdown

Note: COB-5 was commissioned in May 2018, hence, not considered in the analysis. Similarly, TRT was commissioned in June 2014, hence, not considered for 2014-15.

The utilisation of Auxiliary Power Generation units like GETS-1, NEDO Project and TRT was poor resulting in shortfall in generation of power with consequential purchase of power from APEPDCL. The Auxiliary Power Generation Units performance as scrutinised by Audit indicates that:

- **GETS-I (12 MW)** – The top gas generated from Blast Furnace (BF)-1 is routed through Gas Expansion Turbine for generation of power. The power generated from this Plant is used for excitation and for drives. The performance of GETS-I was poor due to the faulty design of Gas Cleaning Plant of BF-1 and breakdown of silencer supplied by Acoustics India Limited (GETS-1).
- **NEDO Project (20.60 MW)** – During the course of sinter production in Sinter Machine, hot air is generated which is routed through a Boiler Turbine Generator for generation of power. The Project was initiated in May 2009 with an estimated cost of ₹95.76 crore with scheduled completion within 34 months (February 2012). The Project was commissioned in March 2014 and ₹174.09 crore had been incurred till March 2019. RINL was unable to utilise the NEDO Project due to generation of insufficient steam by the 25 year' old Sinter Machine to run the NEDO Boiler for generation of power, making the decision to take up the Project without carrying out capital repairs to the Sinter Machine and ensuring required heat input as imprudent.

- **Top Recovery Turbine (14.88 MW)** - The top gas generated from Blast Furnace-3 is routed through a Turbo Generator for generation of electricity. The electricity generated is used by various associated devices and excitation system. The Plant was commissioned and trial run conducted in June 2014, however, the generation could start only by September 2015 with a delay of 15 months. The Plant could not be run efficiently as it was stated to receive insufficient top gas pressure (1.6 kilogram/square centimetre²¹ (Kg/ cm²)) from BF-3.

Management replied (January 2020) that utilisation of Auxiliary Power Generation units were low for various problems on the side of production units to which they were connected such as:

- GETS-1 associated with BF-1 was idle during the years 2014-15 to 2016-17 due to vibration and noises at Gas Cleaning Plant (GCP) near septum valve area and utilisation was low in 2018-19 due to GCP side silencer breakdown and high vibration;
- Utilisation of GETS-2, associated with BF-2 was low during the years 2015-16 to 2017-18 due to BF-2 Category-2 repairs;
- NEDO Project commissioned in 2014 was dependent upon heat input coming from hot sinter and NEDO Boiler was not able to produce steam due to insufficient heat input. A study to enhance power generation from NEDO Project was in progress and plan for its revival was on the anvil; and
- Due to some teething problems in BF-3 immediately after commissioning of TRT, BF-3 top gas pressure was not reaching up to 1.6 Kg/ cm², the minimum pressure required for power generation from TRT. Because of this, power generation from TRT was delayed by almost 15 months and TRT was restarted on 25 August 2015 after getting clearance from BF-3.

The reply is not acceptable in view of the following:

- In case of GETS-I, though the BF top pressure was more than 1.5 Kg/ cm² for 245 days (equivalent to eight months) of the 18 months during October 2015 to March 2017, the same could not be utilised for power generation due to faulty design of Gas Cleaning Plant of BF-1. Similarly, inspite of higher BF top pressure for 172 days (equivalent to six months) during 11 months from May 2018 to March 2019 also, RINL failed to utilise the higher top pressure for power generation due to failure of silencer supplied by Acoustic India for BF-1;
- Though the utilisation of GETS-2 was low during the years 2015-16 to 2017-18 due to capital repairs, its utilisation during the years 2014-15 (69 *per cent*) and 2018-19 (58 *per cent*) was also low;
- Despite the known fact that Sinter Machines 1 & 2 were 25 years' old and capital repairs were very much essential for implementation of NEDO Project, the project

²¹ *Measure for indicating the pressure of steam*

was commissioned with a capital cost of ₹174.09 crore without carrying out the necessary capital repairs to the 25 years' old Sinter Machines and this was the main reason for not getting sufficient heat required for generation of power; and

- TRT generated power of 7,496 MWh during the period September 2015 to January 2016, even though the top gas pressure in BF-3 was lower than 1.6 Kg/ cm² during this period. Thus, the contention of Management that TRT could not be made functional due to insufficient top gas pressure of 1.6 Kg/ cm² is not acceptable.

13.2.7.4 Energy conservation

i) Auxiliary Power Consumption

Auxiliary Power Consumption (APC) is the internal consumption of power by the respective power generating units. The percentage of APC by TPP steam boilers and power generators during 2014-15 to 2018-19 is given below:

Table-13.2.9: Percentage of Auxiliary Power Consumption by Steam Boilers and Power Generators of Main TPP

Year	Total steam produced by TPP Boilers (Tons)	Total energy consumed for generation of steam (MWh)	Total power generated through TGs of TPP (MW)	Total steam consumed for power generation through TPP (Tons)	Total energy consumed for the steam used in TPP (MW)	Percentage of APC for power generated through TPP
1	2	3	4	5	6 = (5/2x3)	7 = (6/4x100)
2014-15	102,89,785	3,52,225	17,82,716	69,74,830	2,38,752	13.39
2015-16	107,71,645	3,85,732	18,76,396	72,63,903	2,60,120	13.86
2016-17	104,99,682	3,85,373	17,50,120	66,84,690	2,45,350	14.02
2017-18	106,78,349	4,00,250	18,34,687	69,16,868	2,59,261	14.13
2018-19	112,14,754	4,07,667	19,45,763	73,14,651	2,65,895	13.67

As per CERC notifications, norm for APC by power generating stations was nine *per cent*. During 2014-15 to 2018-19, APC for generation of power by the TPP alone ranged between 13.39 *per cent* (2014-15) and 14.13 *per cent* (2017-18), which was way beyond the stipulated norm of nine *per cent*. Excess APC, beyond the norm of nine *per cent*, resulted in avoidable expenditure of ₹230.56 crore.

Management replied (January 2020) that in addition to catering to the need of power requirement of different units of steel plant, TPP & Boiler House also met the process steam, DM water, soft water, chilled water requirement of different units of VSP and most of these utilities were not the part of a Conventional Power Plant. Hence, this resulted in higher APC due to its complex nature.

The reply is not acceptable. Keeping in view the complex nature of TPP and Boiler House of RINL, the APC had been computed by considering the energy (power) consumed for the steam generated and used for the production of power by TPP only. Audit did not consider the APC for the production of steam required for other process needs. Hence, APC pointed out by Audit was very much comparable with CERC norm of nine *per cent*.

ii) Impact of excess consumption of steam on cost of power generation

Fuels and consumables were the major elements of cost for power generation. During 2014-15 to 2018-19, total cost of power generation by TPP was between ₹5,791 per MWh (2015-16) and ₹7,036 per MWh (2018-19). Steam was the major component for power generation. During 2014-15 to 2018-19, steam cost alone (towards HP steam consumption by TGs of the TPP) ranged between 87.13 *per cent* (2014-15) and 91.53 *per cent* (2016-17) of the total cost of power generation.

Benchmark consumption of HP steam to generate one MWh power in TPP was fixed by Management at 3.50 tons. Audit observed that steam consumption rate during 2014-15 to 2018-19 varied between 3.91 tons/ MWh (2014-15) and 3.76 tons/ MWh (2018-19) against the benchmark steam consumption rate of 3.50 tons/ MWh. Considering benchmark rate of 3.50 tons/ MWh, excess consumption of steam during 2014-15 to 2018-19 accounted for 29,91,055 tons of steam which when converted to monetary terms valued ₹382.48 crore, taking into account only the variable operating cost incurred for production of HP steam by TPP Boilers.

Management replied (January 2020) that TGs of TPP did not only generate power but also supply process steam which was extracted in the form of 13 ata²² and 4 ata from Turbine after certain stages of expansion and sent to plant network for process requirements.

The reply is not relevant as Audit had pointed out the excess steam consumption by TGs (101 ata steam) excluding the 13 ata and 4 ata steam extracted from the TGs and sent to the network for process requirements.

iii) Transmission and Distribution Loss

Power is distributed through a large and complex network involving transmission lines, sub-stations, transformers, cables and other equipment until it reaches the end users. The difference between the power generated at power plants and received at sub-stations at the end user points is considered as Transmission and Distribution (T&D) loss. Due care needs to be taken to reduce T&D loss.

Audit analysed the distribution loss data from 2001-02 onwards and noticed that the T&D loss was 0.60 *per cent* in 2001-02 and 2002-03 and was on increasing trend thereafter. During 2014-15 to 2018-19, the T&D loss ranged between 2.26 *per cent* and 2.30 *per cent* with a total loss of 3,39,824 MWh.

Management replied (January 2020) that longer transmission circuits in the form of transmission lines and cable network were added with capacity increase, which was one of the reasons for increase in T&D loss. Continuous efforts were being made by RINL to contain the T&D losses by following the same concept of electrical network as done earlier i.e., to provide the high voltage substation in close vicinity of the equipment minimising the T&D loss. The Supervisory Control and Data Acquisition (SCADA) system was in place for energy monitoring and with the improvement in the system, the accuracy of energy consumption could be monitored and the same would help in reducing the T&D losses.

²² *ata (Atmosphere absolute) is a term used to measure pressure of the steam.*

The reply is not acceptable in view of the following:

- As compared to large network of power distribution companies, network distribution of RINL is limited and hence distribution losses should have been below one *per cent*, as was maintained for six years during 2001-07;
- Despite integration of both SCADAs to enable to account for energy consumption and take measures to reduce T&D losses, the losses continued to be on higher side during the years 2014-15 to 2018-19.

Thus, Management needs to make concerted efforts to reduce the T&D losses.

13.2.7.5 Energy Audit

Energy audit analyses energy consumption pattern by each user and suggests improvements for the conservation of energy. It is a management tool to achieve cost control by using energy effectively. Energy audit for the first time was entrusted by RINL to National Productivity Council (NPC) in November 2014 after GoI issued notification in May 2014 directing every designated energy consumer to conduct Energy Audit by an Accredited Energy Auditor. Accordingly, RINL got conducted energy audit during the period December 2014 to September 2015.

As per Bureau of Energy Efficiency (Manner and intervals of time for conduct of Energy Audit) Regulations, 2010, energy audit would be conducted every three years from the date of the submission of the previous Energy Audit Report. However, RINL had not conducted the energy audit subsequently within the due date, i.e., by September 2018, as stipulated by the Regulations. The next spell of audit was entrusted only on 2 November 2019.

Management replied (January 2020) that it initiated the process of engaging Accredited Energy Audit agency on 17 January 2018 and finalised M/s. Development EnviroEnergy Services on 2 November 2019 to carryout mandatory Energy Audit. Energy Audit work was commenced by the Accredited Auditor.

It was evident from the reply of Management that the Company failed to take up the mandatory Energy Audit within the stipulated schedule (i.e. by September 2018). Further, as the subsequent Audit had not yet been completed, the extent of compliance reported by Management in response to the previous Energy Audit observations and suggestions/recommendations could not be examined.

13.2.8 Conclusion

- PLF achieved by the Main TPP was less than the norm prescribed by CERC. Even assuming the operation of TPP at PLF of 80 *per cent*, savings to the extent of ₹85.48 crore would have accrued to the Company towards the cost of power imported from APEPDCL.
- RINL curtailed TPP generation due to shortage of boiler coal and blended high cost Medium Coking Coal with boiler coal without envisaging for alternate source of procurement of boiler coal leading to increased cost of power generation. Savings to

the extent of ₹145.21 crore were lost by the Company due to improper blending of MCC with indigenous boiler coal.

- The Company could not generate steam as per the rated capacities of the Boilers and Turbine Generators, which had an impact on the generation of power and for meeting the process needs.
- The Company lost the opportunity to generate steam to the extent of 3.17 lakh tons due to forced outage of Boilers and also failed to generate power to the extent of 4.65 lakh MWh due to forced outage of TGs. Further, it took excess time than required for maintenance of Plant.
- The utilisation of Auxiliary Power Generation units like GETS-1, NEDO Project and TRT was poor due to faulty design/ insufficient heat recovery from Sinter Machine/ insufficient top gas pressure resulting in shortfall in generation of power with consequential purchase of power from APEPDCL.
- Auxiliary Power Consumption, beyond the norms prescribed by CERC, resulted in avoidable expenditure of ₹230.56 crore.
- The excess consumption of steam during 2014-15 to 2018-19, beyond the stipulated norms, accounted for 29.91 lakh tons of steam which when converted to monetary terms valued ₹382.48 crore.

13.2.9 Recommendations

- 1) RINL should strive to achieve operation of TPP with allied Plants such as Boilers and Turbine Generators as per the standards/ norms fixed by CERC.
- 2) RINL should ensure regular supply of boiler coal by entering into Fuel Supply Agreements with Coal Companies or through e-auctions.
- 3) RINL should initiate measures for optimal utilisation of Auxiliary Power Generation Plants such as GETS-1, NEDO Project and TRT so that the reliance on import of power from APEPDCL could be minimised.
- 4) RINL should minimise the time required for maintenance of Plant to avert production losses.

The para was issued to the Ministry in January 2020; their response was awaited (June 2020).

Steel Authority of India Limited

13.3 Performance of Captive Mines of SAIL

13.3.1 Introduction

Steel Authority of India Limited (SAIL or the Company), a leading steel manufacturing company in India operates five integrated steel plants²³ and three special steel plants²⁴ and

²³ *Bhilai Steel Plant (BSP) in Chhattisgarh, Bokaro Steel Plant (BSL) in Jharkhand, Rourkela Steel Plant (RSP) in Odisha, Durgapur Steel Plant (DSP) and IISCO Steel Plant (ISP) in Burnpur, West Bengal*

produced 17.51 million tonne (mt) of Hot Metal (HM) during 2018-19. Iron ore, flux materials (limestone and dolomite) and coking coal are primary raw materials in steel making and constitute 50 per cent of the total cost of production. Availability of raw material at affordable price on sustained basis is essential for success in the steel industry. The requirement of iron ore is met from the captive mines of SAIL which produced 28.35 mt in 2018-19. However, Company was not self-sufficient in flux and metallurgical or coking coal. SAIL took up Modernization and Expansion Plan (MEP) in 2008 to enhance HM production capacity from 14.6 mt *per annum* (mtpa) to 23.46 mtpa which would proportionately also increase the requirement of raw material.

SAIL has 28 captive mines for iron ore, flux and coal in Jharkhand, Odisha, Chhattisgarh, West Bengal, Karnataka and Madhya Pradesh. Based on proximity of mines with steel plants, mines are annually linked with steel plants for supply of mined material.

13.3.2 Organisational set up

Director (Raw Material & Logistic) heads the mining activities of SAIL. The responsibility for development, renewal and management of company's iron ore and flux captive mines is with Raw Material Division (RMD)²⁵ Kolkata, Bhilai Steel Plant (BSP)²⁶ and Visvesvaraya Iron and Steel Plant (VISP), Bhadravati. Coal mines are under the control of Collieries division²⁷ Kolkata. Corporate Raw Material Group (CRMG) at New Delhi liaises with Ministry of Environment, Forest & Climate Change (MoEFCC), Ministry of Coal (MoC), Ministry of Mines (MoM) and the State Government authorities for acquisition of mines and grant of statutory clearances. SAIL had 28 captive mines²⁸ and 47 mining leases as on 31 March 2019 (*Annexure-XXX*).

13.3.3 Audit objectives, criteria, scope and methodology

The audit objectives were to assess whether:

- SAIL took adequate and effective measures to renew and develop its captive mines,
- mines were effectively managed to achieve planned production;
- production capacities were augmented to meet the enhanced raw material requirement of the steel plants after completion of MEP; and
- adequate measures were taken to comply with safety and environmental laws.

The Audit criteria used were Mines and Minerals (Development and Regulation) Act, 1957 (MMDR 1957), Odisha Minerals Rule, 2007 (OMR 2007), Forest Conservation Act, 1980 (FCA 1980), Mineral Concession Rules, 1960 (MCR 1960), Environment Protection Act,

²⁴ Alloy Steels Plant in Durgapur, W. Bengal, Salem Steel Plant in Tamilnadu, Visvesvaraya Iron and Steel Plant (VISP), Bhadravati in Karnataka

²⁵ Iron ore mines at Kiriburu (KIOM), Meghahatuburu (MIOM), Bolani (BOM), Gua (GOM), Manohapur (MOM), Barsua (BIM), Kalta (KIM), Taldih (TIM); Kuteshwar (KTR) and Bhawanathpur (BNP) limestone mines, Purnapani Limestone & Dolomite Quary (PLDQ), and Tulsidamar dolomite mines (TDMR)

²⁶ Iron ore mines at Rajhara, Dalli Mechanical-Jharandalli & Kokan east, Dalli Manual, Mahamaya & Dulki, Rowghat, KalwarNagur, Nandini limestone mines and Hirri and Baraduar Dolomite mines

²⁷ Chasnalla, Jitpur, Ramnagore and Tasra coal mines

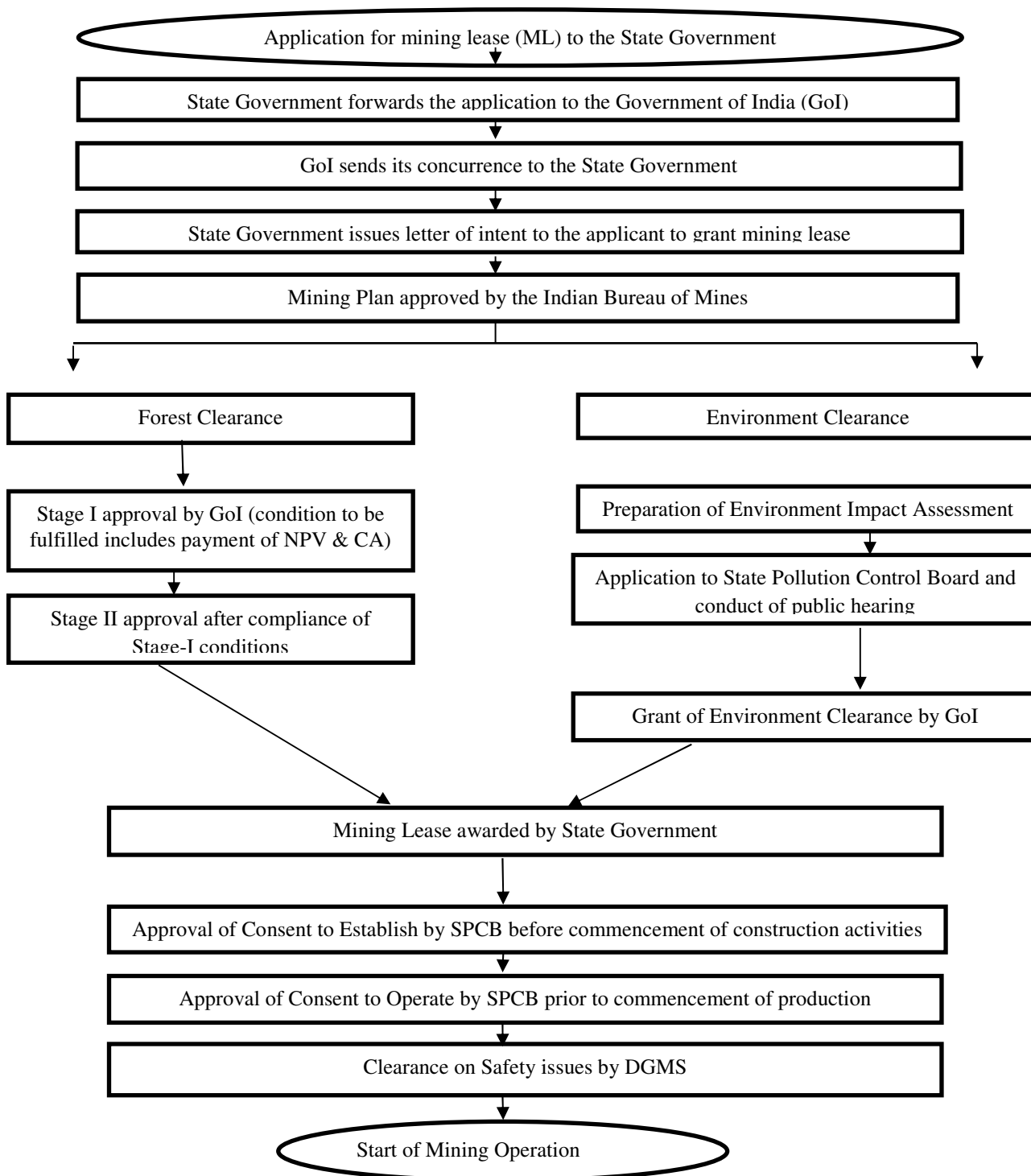
²⁸ RMD-13, BSP-9, VISP-2 and Collieries-4

1986 (EPA 1986), Annual Production Plan (APP), Production records of mines, Mining Plan (MP) approved by Indian Bureau of Mines (IBM), Norms for utilisation of equipment. Audit examined records of all captive mines, RMD HQ and CRMG of the Company for 2014-19.

13.3.4 Audit findings

13.3.4.1 Mining leases

For mining operation in an area, a lessee should have a valid mining lease. The activities involved in getting the mining lease and operations are given below:



During the course of audit, two instances were noticed where SAIL did not apply technical due diligence and conduct Techno-Commercial Viability Study (TCVS) to assess viability of project before acquisition of unviable coal mines. These were subsequently surrendered and led to entire amount spent becoming infructuous. Audit also observed two instances where SAIL failed to develop its mining leases by fulfilling conditions for obtaining the requisite clearances in time. This led to payment of dead rent, stamp duty etc. on such mines. Delays were also noticed in surrendering of closed mines that also led to avoidable expenditure on maintenance of these mines. Instances of delays in augmentation of production capacity of mines, low utilisation of Heavy machinery, less deployment of statutory manpower and environment and safety issues were also noticed. These are discussed in detail in subsequent paras.

13.3.4.2 Acquisition of unviable mines

i) Infructuous expenditure of ₹123.66 crore on Parbatpur Coal Block

SAIL applied (September 2015) to MoC for allocation of Parbatpur Coal Block, with an area of 880 ha, keeping in view the requirement of coal after MEP, future capacity expansion and to overcome dependence on imported coal. The coal block was allotted (March 2016) through Government Dispensation Route.

Audit noted that the coal block was allocated with the condition to enter into a 'Co-development Agreement' (CDA) with ONGC for simultaneous extraction of Coal Bed Methane (CBM) and coal because of overlapping of area with adjacent CBM block allotted to ONGC. SAIL could not enter into CDA with ONGC as Director General of Mines Safety (DGMS) did not give permission (January 2017) for simultaneous extraction of CBM and coal. The area available to SAIL was reduced from 880 ha to 463.72 ha and reduction of geological reserve of coal from 273.86 mt to 147.3 mt. Due to reduction of area and reserve, SAIL conducted a TCVS through MECON which suggested (January 2018) that the project was not viable. SAIL Board decided (March 2018) to return the block to MoC (8 March 2018) and requested to refund the expenditure incurred including the Performance Bank Guarantee (PBG) and also to allot potential coal block in lieu of Parbatpur block. In the meantime, MoC issued show cause notice (June 2018) for slippage of milestone by SAIL. MoC further directed (September 2018) SAIL to re-examine the viability of the mines if complete lease area of 880 ha is given to SAIL. The viability of the project was assessed again by MECON which suggested (March 2019) that it was commercially unviable. SAIL again requested (April 2019) MoC to surrender the mines.

Audit observed that SAIL was aware of the adverse geo-mining condition and high gas content while submitting application for the coal block. SAIL was also aware that the scale of operation would be restricted to lower levels due to the fact that the coal block overlapped with CBM blocks. Despite these adversities, SAIL went ahead with allocation of the block. Audit noted that MoC terminated (December 2019) the allotment and noted that SAIL had made very little progress in development of mine before taking the decision to surrender it. It also directed the Bank to encash BG of ₹62.57 crore which was an additional loss to the Company.

Management replied (February 2020) that uncertainties due to overlapping with Petroleum Mining Lease of ONGC and non-grant of exclusive Coal Mining Lease was not anticipated at the time of allotment.

The reply is not acceptable as the coal block was allotted on the request of SAIL and it was aware of the adverse geo mining condition and high gas content as it was mentioned in the application for allocation of the block.

Thus, ₹123.66 crore²⁹ spent on Parbatpur Coal block upto March 2019 became infructuous.

ii) Infructuous expenditure of ₹29.28 crore on Sitanala Coal Block

Sitanala coal block comprising of 321 ha was allocated to SAIL (April 2007) to develop a high productivity mine to commence operation from April 2011. The production did not commence due to delay in preparation of Detailed Project Report (DPR) and non-creation of infrastructure. In the meantime, Supreme Court cancelled (August 2014) the allocation of coal block. SAIL submitted application for re-allotment of block (February 2015) and was re-allotted in March 2015. Audit noted that, out of 321 ha, only 214 ha was recommended (2017) by Government of Jharkhand (GoJ) because 66 ha came under Damodar river-bed and 41 ha overlapped with CBM lease granted to ONGC-CIL.

Audit observed that, TCVS conducted by MECON showed (January 2018) that the project was unviable. SAIL decided (March 2018) to surrender the coal block and requested MoC (March 2018) to refund the BG amount. MoC terminated (October 2018) the allotment and directed to appropriate the BG and other payments made by SAIL. MoC while terminating the allotment stated that, SAIL being a prior allottee was fully aware about the coal block being geographically disturbed due to presence of gassy seams and therefore, SAIL should have undertaken the TCVS prior to entering into the process of re-allotment. Ministry further noted that very little progress was made by SAIL in development of mine before its decision to surrender the mine and there was unjustified delay on the part of SAIL. Accordingly, Ministry appropriated all payments and BG submitted by SAIL.

Audit noted that entering into re-allotment process of unviable coal block despite being aware of the adverse geo-mining condition and not conducting TCVS before re-allotment resulted in infructuous expenditure of ₹29.28 crore³⁰.

Management replied (February 2020) that, in view of uncertainties due to non-grant of Mining Lease for 321 ha area by State Government, SAIL was drawn into a precarious situation which was not anticipated at the time of allotment.

The reply is not acceptable as SAIL, was aware that the coal block was geographically disturbed with gassy seams and should have undertaken TCVS before applying for reallotment of coal block.

²⁹ ₹93.89 crore towards upfront amount, assets created by prior allottee, ₹7.25 crore on dewatering of the mines and ₹22.52 crore on power, security, consultancy etc.

³⁰ Comprising of amount spent on Geological report (₹10.18 crore), Other Project Expenses (₹7.78 crore, Upfront amount (₹0.89 crore), Performance BG (₹10.43 crore)

13.3.4.3 Non development of Mining leases

i) **Non-production from Baraduar dolomite mines:** Baraduar Dolomite Mine (BDM) allotted to SAIL in 1970 was closed in 1983 due to labour unrest and lease was cancelled (January 1993). The lease was subsequently restored (1996) to SAIL and is valid upto December 2020. SAIL was granted EC in September 2015. FC is given in two stages (Stage I and II). SAIL, however, did not pay CA and NPV and CA amount was revised to ₹59.19 crore based on April 2019 rates.

Audit observed that SAIL did not pay CA and NPV on the grounds of non-receipt of revised LOI from Government of Chhattisgarh (GoCG), which was not valid, as payment of CA and NPV was pre-requisite for FC Stage-II and had no link with Letter of Intent (LOI). The delay resulted in additional liability of ₹10.27 crore which was avoidable. SAIL also spent ₹1.36 crore on dead rent and stamp duty on the mines. In the absence of FC, mining from Baraduar mines was not started and BSP had to get its requirement of dolomite from sources other than its captive mines as discussed in para 13.3.4.10.

Management replied (February 2020) that non-payment of CA by SAIL was due to uncertainty with regard to extension of lease and absence of clear intent of GoCG for further extending mining rights of Dolomite to SAIL.

The reply is not acceptable as BSP management itself requested (November 2017) GoCH to issue demand for CA and NPV. The decision of BSP to withhold the payment of CA and NPV for want of revised LOI was not justified as there was no link between receipt of LoI and payment of CA and NPV. Further, the fact remains that, mining at BDM was not started due to unavailability of FC.

13.3.4.4 Begunia coking coal mines

The estimated capital cost to develop Begunia coking coal project with reserve of 4.24 mt was ₹97.37 crore (2009) which increased to ₹172.21 crore in January 2018. With growing requirement of coal and consistent reduction in supply of coking coal from domestic sources, it was critical for the company to develop available coal mines.

Audit observed that production from Begunia coal seam did not commence though the geological and conceptual reports were prepared in 2006 and 2008 respectively. There were delays in preparation of mining plan, obtaining EC and engagement of Mines Developer and Operator (MDO) which resulted in non-commencement of mining operation even after 15 years. Management constituted a committee only in February 2019 to review the tender document, mining plan, mine closure plan, engagement of MDO etc. The Committee's report (May 2019) *inter alia* included recommendation for fresh techno economic study and engagement of reputed agency for preparation of DPR. MECON was awarded (December 2019) the work for preparation of DPR.

The above delays resulted in cost overrun of ₹74.84 crore. The company had also spent ₹8.95 crore on the feasibility studies as of March 2019, besides the avoidable excess cost incurred on imported coking coal.

Management replied (February 2020) that once DPR is finalised further action for development of Begunia Project will be expedited.

Management's reply did not address the reasons for delay in development of the Project.

13.3.4.5 Surrender of Mines

i) Avoidable expenditure due to delay in surrender of Purnapani mines

Mining lease at Purnapani (PLDQ) was allotted to SAIL in 1960. Mining operation at PLDQ was stopped from March 2004 due to high silica content (six *per cent*) in the limestone. Audit noted that 3.61 lakh tonne of limestone worth ₹11.98 crore was lying in the mine since 2004. SAIL attempted twice to set up cement plant to utilise the reserve of PLDQ. It formed a JV with JK Cement Limited in October 2008 to use slag from RSP and limestone from PLDQ but scrapped (August 2010) the project due to prevailing cost of slag and inability to hand over quarry. Another attempt was made in May 2019 but setting up the cement plant was found economically unviable as available reserve was less than the minimum requirement of 30 mt. The company decided to surrender the lease in May 2019.

Management replied (February 2020) that on approval of Final Mines Closure Plan, the Purnapani lease would be surrendered.

The fact however remains that, long delay in surrender of lease resulted in avoidable expenditure of ₹7.94 crore on maintenance, security and electricity and ₹5.22 crore on salary and wages during 2014-19.

13.3.4.6 Delay in surrender of Bhawnathpur limestone mines

Bhawnathpur Limestone Mine (BNP) with a capacity of 2.9 mtpa was not suitable for use in the steel plants due to high silica content in limestone (six to eight *per cent*). Production from BNP mines were reduced to five *per cent* from 2004 due to poor quality and high cost of production and was stopped from April 2013. As per MoEF notification (October 2004), it was mandatory for all mining projects with more than five ha lease area that had not obtained EC, to do so at the time of renewal of lease. BNP applied for EC in January 2013. MoEF, however observed (April 2013) serious violation as mining was continued without EC and therefore EC was not granted. SAIL decided (May 2017) to surrender the mine and advised to reduce CISF personnel from 85 to 65 to save ₹1 crore per annum. The final closure plan was approved by GoJ in May 2019.

Audit noted that though production from BNP was stopped in April 2013, SAIL took four years to decide to close the mines which resulted in payment of ₹1.14 crore as dead rent during 2014-19. Further, it was only in November 2014 that Management requested JSEB to provide domestic power supply at BNP township and to disconnect industrial power supply. BNP procured 119.75 lakh unit electricity for ₹8.43 crore during 2014-19 at industrial rate for consumption in township and recovered only ₹0.62 crore from the occupants. Further, ₹5 crore on security was spent annually at the closed mines.

Management replied (February 2020) that SAIL tried to get Environment Clearance (EC) and Forest Clearance (FC) and Environment Impact Assessment (EIA)/ Environment

Management Plan (EMP) studies for the limestone leases were conducted. Efforts were also made for conversion of Industrial power supply of BNP Mines to Domestic Supply.

The reply is not acceptable as production from BNP mines was suspended from April 2013, therefore, efforts taken by Management for getting FC, EC and EIA/ EMP studies thereafter were not required. Further, BNP did not pursue the matter with JSEB after November 2014 to avail domestic connection.

13.3.4.7 Mining operation

Mining operation involves excavation of Run off Mines (ROM) from mines, segregation of ROM into required size of Iron Ore Lumps (IOL) and Iron Ore Fines (IOF) through Crushing and Screening Plant (CSP), transportation of ores to railway siding and dispatch to steel plants. SAIL carries out mining operation either departmentally or through contractors by mechanised, semi-mechanised or manual means.

13.3.4.8 Production performance

Company fixed mine-wise Annual Production Plan (APP) for iron ore, flux and coal considering annual steel production plan and prevailing operating conditions. The details of Annual Rated Capacity (ARC) of mines, APP, Annual Production (AP) and Annual Consumption (AC) of raw materials for the period 2014-19 are given below:

Table 13.3.1: APP and AP of iron ore, flux and coal from captive mines

Year	Iron ore				Flux material				Coal			
	ARC	APP	AP	AC	ARC	APP	AP	AC	ARC	APP	AP	AC
2014-15	29.72	28.57	23.18	24.26	3.81	2.53	2.10	6.43	1.14	0.92	0.62	15.00
2015-16	29.72	29.50	24.83	24.75	5.23	2.68	2.27	7.00	1.14	0.92	0.71	14.97
2016-17	39.05	28.25	26.16	25.45	5.23	2.65	2.08	7.04	1.14	1.01	0.74	14.87
2017-18	39.05	30.25	26.69	25.92	5.23	2.86	2.04	7.14	1.14	0.73	0.79	14.45
2018-19	37.80	32.98	28.35	28.64	5.24	2.65	1.87	8.04	1.14	1.01	0.74	15.25
Total	175.34	149.55	129.21	129.02	24.74	13.37	10.36	35.65	5.70	4.59	3.60	74.54

From the table above, it can be seen that APP was fixed less than ARC and production of raw material was also less than APP during last five years. Audit also noted that, though production of iron ore was sufficient to meet the requirement of steel plants, BSP and RSP were linked to distantly located mines which entailed extra expenditure of ₹295.39 crore on freight differential. Further, shortfall in production of flux was met though procurement from market at extra expenditure of ₹136.33 crore as discussed below:

iii) Extra expenditure of ₹235.12 crore on differential freight by BSP

As per the APP of BSP, its requirement of iron ore was 39.80 mt during 2014-19 whereas, production from linked mines of Rajhara and Dalli were only 35.36 mt during the period. Audit observed that, the reasons for less production were increasing stripping ratio³¹, delay in finalisation of contracts at Dalli mine, underutilisation of equipment due to over-aging in both the mines etc. BSP had to procure 2.84 mt iron ore from distantly located mines which resulted in extra expenditure of ₹235.12 crore on account of differential freight.

Audit also observed that the above shortfall in production of iron ore could have been made good to the extent of 1.73 mt from Dalli manual mines and Jharandalli mines. Audit noted that MoEFCC issued circular (March 2017) that all mines should obtain EC by September 2017 and in absence of EC mining activity would be ceased. The Collector, Balod issued (December 2016) a show cause notice to BSP for non-availability of EC in Dalli mine. As BSP had not applied for EC, mining operation was stopped from February 2017 and planned production of 0.63 mt during 2017-19 was not achieved.

Audit further noted that, CSP at Jharandalli mines could not process the total iron ore feed from mines and therefore BSP placed an order (May 2016) to install CSP and dispatch iron ore from August 2016 for two years (1.20 mt). The contractor failed to execute the work as per schedule. Consequently, there was shortfall of 1.10 mt during 2017-19. Management did not take any action to issue fresh order for crushing and screening of ore.

Management replied (February 2020) that transportation of IOF from RMD to BSP was a technical necessity to take care of techno-economical parameters of steel making and the transportation cost was gainfully compensated by blending with poor quality of fines of BSP Group of Mines. It also stated that closure of Dalli mine was not due to non-availability of EC but based on exhaustion of mineable ore.

The reply of Management is not acceptable as in the mining plan 0.628 million tonne of ore was proposed for excavation during 2017-18 and 2018-19. Moreover, the fact remains that, due to less production than APP, iron ore had to be transported from distantly located mines by incurring higher freight on transportation. Freight on transportation of raw material from RMD during last five years ending 2018-19 ranged between 74 per cent and 101 per cent of the landed cost of in-house production of iron ore at BSP. Further, there were no records to support the claim that transfer of IOF was a technical necessity to take care of techno-economical parameters of steel making.

13.3.4.9 Extra expenditure of ₹60.27 crore on differential freight at Barsua mines

As per Section 2 of the FCA 1980, prior approval of MoEFCC was required for use of forest land for non-forest purpose.

Barsua Iron Ore Mine (BIM) in Odisha has two mining leases. Mining was carried out from ML-130 allotted in January 1960. ML-162 (77.94 ha) allotted to the company in April 1960 comprised of forest land and mining was not carried out but was used (since 1961) for

³¹ *Stripping ratio refers to the ratio of the volume of overburden (or waste material) required to be handled in order to extract some tonnage of ore*

beneficiation and transportation of iron ore excavated from ML-130 through conveyor belts, in violation of the above provisions. BIM applied (February 2014) for diversion of 77.940 ha of forest land for development of mining infrastructure to which Stage-I FC was granted in February 2015 and Stage-II FC in October 2017.

Audit observed that due to absence of FC of ML-162, mining operation at ML-130 was stopped from May 2014 to May 2018 resulting in less production of 5.704 mt iron ore. During this period, RSP procured 3.40 mt of iron ore from other distantly located mines of SAIL by paying avoidable differential freight of ₹60.27 crore. Production at BIM was restored from 20 May 2018 after getting FC.

Management replied that technically, no violation of FCA 1980 has been done prior to expiry of the first renewal period up to 28 April 2000.

The reply was not acceptable as development of infrastructure on forest land without approval was a violation of the FCA. Further, the GoO in its show cause notice (June 2013) also stated that, operation of ML-162 without prior approval was violation of FCA.

13.3.4.10 Extra expenditure due to underutilisation of capacity at Hirri dolomite mines

The annual requirement of dolomite of BSP is 1.30 mt which would increase to 1.60 mt after MEP. The production capacity of Hirri mines is one mtpa where excavation is done departmentally and other mining activities like crushing, transportation and loading is executed through contractor. Considering poor availability of machineries and future enhanced requirement of dolomite, SAIL prepared capacity expansion plan from one mtpa to two mtpa for ₹13 crore. EC for this purpose was granted in February 2009 but management did not execute the expansion plan.

Audit observed that production of dolomite during 2014-19 was only 3.09 mt against the production target of 4.40 mt whereas, the annual requirement of Dolomite at BSP was more than the existing capacity of one mt. Due to non-implementation of expansion plan of Hirri mines, BSP had to procure 1.33 mt of dolomite during 2014-19 at higher cost of ₹136.33 crore as compared to cost of captive production.

Management replied that shortfall in production was due to poor performance of contractor and also stated that purchase of required quantity of Low Silica Dolomite by BSP was a technical necessity to improve the techno-economic parameters of Blast Furnace.

Management's reply was silent on non-implementation of expansion of the mines. The estimated cost for expansion was ₹13 crore whereas BSP procured Dolomite worth ₹136.33 crore during 2014-19. Further, Management of third parties is intrinsic to good project management.

13.3.4.11 Compliance of statutory provisions

i) Avoidable expenditure of ₹14.38 crore on penal NPV and CA by Barsua mines

Stopping of mining at Barsua mines from May 2014 to May 2018 in absence of FC has been discussed in para 13.3.4.9 above. Audit noted that Section 2 (ii) of the FCA 1980 stipulated that prior approval of MoEFCC is required for use of forest land for non-forest purpose. In

case of non-compliance, the state government would charge penal NPV and CA from the user agency.

GoO noted (June 2013) that no mineral extraction was carried out by the company and the installations made in the lease area were for processing and transporting iron ore excavated from ML-130, which was a clear deviation from the terms and conditions of the lease deed and violation of provision of Section-2 of FCA 1980. Show-cause notice was issued (June 2013) by GoO for above violations. BIM applied (February 2014) for diversion of 77.940 ha of forest land for development of mining infrastructure to which Stage-I FC was granted in February 2015 and Stage-II FC in October 2017.

Audit observed that non-compliance of FCA 1980 on use of forest land for non-forest purpose without approval in ML-162 of Barsua mines led to avoidable expenditure of ₹14.38 crore as penal NPV and CA (NPV ₹12.27 crore and CA ₹2.11 crore).

Management replied (February 2020) that the installations within the forest land were made before enactment of FC Act, 1980 and that had operations been stopped, loss would have been multifold.

The reply was not acceptable as mining activities were required to be undertaken in compliance with stipulated Act and Rules.

ii) Payment of royalty on iron ore at the highest rate by Bolani mines

Rule 10(5) of OMR, 2007 stipulates that the lessee, after proper dressing, stacking, grading and analysis of minerals would apply to the concerned authority for removal of such minerals. As per rule 10(7) of the OMR, 2007, if the lessee declared to pay highest rate of royalty as prescribed, stacking and sampling would be dispensed.

Audit observed that BOM management did not comply with the provisions of OMR, 2007 and sought exemption (18 August 2012) from stacking of ore on the grounds of its dynamic nature. GoO exempted (23 August 2012) BOM with the condition that lessee would pay highest rate of royalty for the iron ore dispatched from the mine. BOM has been paying highest rate of royalty w.e.f. August 2009³². Management cited reasons that sufficient space was not available at BOM to prepare stacks considering the volume of material loaded daily.

Audit observed that BOM management did not make any effort to comply with the provisions of OMR 2007 since last 10 years and opted to get exemption from stacking by paying royalty at highest rate. Audit further observed that, in Panposh quarry of BOM, mining was done through contractor who separates ROM into fines, lumps and oversize lumps through mobile screen inside the lease area and transports them directly to respective stockpile of railway. Despite the fact that fines are separated from ROM inside the lease area of Panposh quarry, separate stack of fines were not made within the lease area to avail the benefit of lower rate of royalty on IOF.

³² *GoO notified (Sept 2010) to charge royalty on output from mines at IBM rate of IOL or on the processed form i.e. IOF and calibrated lump ore (CLO) whichever is higher w.e.f. August 2009*

Management replied (February 2020) that sufficient space was not available to prepare stacks of 4,000 tonne. Since separate loading siding is not available, separate dispatches of fines from Panposh was also not feasible.

Reply of Management was not acceptable as, whereas the total lease area of BOM was 1,321.45 ha, Management had assessed requirement of 11.40 ha only for space for stacking. Further, management had not engaged any consultant or conducted feasibility study to comply with the provisions of OMR 2007 on stacking and grading of ores.

Thus, Bolani mines continue to pay royalty on iron ores at highest rate which resulted in additional expenditure of ₹451.79 crore³³ on account of payment of differential royalty during 2014-19 which would increase with passage of time.

iii) Payment of additional royalty in Manoharpur iron ore mine (MOM)

As per Jharkhand Mineral Transit Challan Regulations, 2005 and Jharkhand Minerals (Prevention of Illegal Mining, Transportation and storage) Rules, 2017, all miners are required to obtain transit/ transport challan for dispatch of iron ore from lease area. For this, the mines had to maintain proper dressing, stacking and grading of excavated iron ore and apply to District/ Assistant Mining officer (DMO/ AMO) enclosing analysis report along with proof of royalty paid. The DMO/ AMO verified the quality of ores and verification report within seven days to approve the transit challan. However, no analysis report was required if the mines paid highest rate of royalty as declared by IBM (for ore of Fe³⁴ 65 per cent or more).

Audit noted that MOM dispatched iron ore lump/ fines of 62-65 per cent grade and had been paying royalty (April 2016 to December 2017) based on ore quality dispatched. However, Fe content in iron ore was declared as 65 per cent or above (during January 2018 and February 2019) on the plea of unavailability of mining inspector and royalty was paid at highest grade (65 per cent or above). This resulted in payment of additional royalty of ₹7.88 crore.

Management replied (February 2020) that in absence of sampling by DMO, Chaibasa office and to avoid disruption in supply to Steel Plants, payment at highest rate of royalty was made during the period. Since February 2019, all the royalty payment has been made on the actual quality analysed at Government Lab.

The reply is not acceptable as the quality was declared at highest grade of ore (65 per cent) than actual quality which did not require any sampling from the mining inspector.

iv) Payment of royalty on rejected limestone chips

Nandini limestone mines were granted (1959) lease for 526.34 ha with validity upto December 2028. Audit noted that limestone chips mined from Nandini were with high silica content and were not suitable for making iron. The accumulated stock of rejected chips was 10.05 mt (March 2019). Audit further noted that out of above stock, 1.04 mt rejected chips were generated during 2006 to 2019 and ₹6.58 crore was paid as royalty on this stock.

³³ Rate of royalty for the highest grade of Lump and Fines has been considered

³⁴ Iron content

Rule 64B (2) of MCR, 1960 provides that, if ROM mineral is removed from leased area to a processing plant located outside the lease area, royalty shall be chargeable only on unprocessed ROM. Audit noted that CSP was located outside the mining lease area. Since mineral was required to be taken outside the mining lease area for crushing, royalty was paid on ROM including the rejected chips.

Audit observed that SAIL did not take steps to extend the area of mining lease so that CSP would come within the mining lease area to avoid payment of royalty on rejected chips. Management belatedly applied (March 2015) for mining lease for additional 22.69 ha to bring CSP and stacking area within mining lease area which was pending (February 2020) with state authorities.

Management replied (February 2020) that Expression of Interest was being floated to introduce new technology where in-pit screening would be done to separate the chips of size 0-10 mm from RoM and then transport only Lump to Plant to avoid unnecessary transportation of chips and payment of royalty on this account.

The fact however remains that, delay in taking steps by Management resulted in avoidable expenditure of ₹6.58 crore as royalty for the rejected chips.

v) Mining without obtaining EC and Consent to Operate

Section 21(5) of the MMDR Act, 1957 provides that extraction of any mineral without EC amount to illegal/ unlawful mining. Supreme Court in its judgment (2 August 2017) in the Common Cause vs Union of India directed that if any mining operation is conducted in violation of FC Act, EP Act or any other such legal requirements, the mining operation was illegal or unlawful. Production in the year 1993-94 was to be treated as basis for determining the capacity of EC. Ore extracted in excess of quantity from 2000-01 onward permissible under the mining plan or EC would be termed as illegal mining and will attract compensation equal to 100 *per cent* cost of mineral recovered.

Audit noted that mines under RMD produced 43.61 mt of iron ore and 0.40 mt of limestone from 2000-01 onwards beyond quantity permitted under EC/ CTO. Considering this as illegal mining, GoO demanded (September/ October 2017) ₹204.58 crore as compensation/ penalty for excess mining in BIM, KIM and BOM. Further, GoJ issued eight demand notices between September 2017 and January 2018 for ₹1,425.60 crore for illegal mining in KIOM, MIOM, GOM, MOM and BNP. SAIL paid (December 2017) ₹66.89 crore to GoO and ₹200 crore to GoJ as compensation. However, SAIL has appealed against the entire demand in High Courts of Odisha and Jharkhand and has been granted stay from payment of remaining amount.

Audit observed that management was aware of excess mining in its captive mines under RMD and need for reconciliation of figures with State Governments to arrive at the financial impact. Due to mining beyond required statutory clearance, SAIL not only paid ₹266.89 crore but also continues to undertake the risk of paying huge amounts as compensation on account of illegal mining.

Management replied that iron ore mining in excess of limits prescribed under EC at the iron ore Mines of RMD as per the procedure suggested by CEC and recognised by the Supreme Court (i.e. actual production during 1993-94 is permissible production during each year till the mining lease did not have the EC) was only 7.77 mt.

It is evident from the reply of management that there was excess mining and that it needs to reconcile the figures with state governments, to arrive at mutually agreed quantity of excess production. Further, reply was silent on penalty imposed on mining of limestone.

13.3.4.12 Contractual issues

i) Award of work to ineligible bidder in Tulsidamar mines

SAIL issued (June 2016) tender for two years composite mining work in Tulsidamar mines for raising and dispatch of 2.5 lakh tonne dolomite and disposal of 78,000 cum waste per year. Five bids were received, and the work orders were awarded in the ratio of 60:40 to M/s Ashok Kumar (January 2017) and M/s R. S. Grewal and Company (November 2016) for ₹28.78 crore and ₹19.19 crore respectively.

As per section 2(1b) of the integrity pact signed by bidders and SAIL, the bidder would not enter with other bidder into any undisclosed agreement or understanding, whether formal or informal to restrict competitiveness or to introduce cartelisation in the bidding process. Further, Section 3 of integrity pact stipulates that if the bidder violated the above section, SAIL could disqualify the bidder or take action as per guidelines on ban of business dealings.

Audit observed that two firms (M/s R.S. Grewal and Company and M/s Prograssive Constn Corpn) had two common partners (Mr. ShivpujanYadav and Mr. Abhay Prasad), in violation of provisions of integrity pact, which was noted (July 2016) by the Tender committee (TC). The legal section of the Company advised (August 2016) to consider eligibility in accordance with the terms of NIT. Audit observed that the TC ignored the provisions of the integrity pact and advice of legal section and awarded (November 2016) the contract to M/s R.S. Grewal and Company. Management did not apply due diligence to prevent collusion and awarded the contract to a bidder who should have been disqualified.

Management replied (February 2020) that inter-connectivity clause has now been made part of Eligibility Criteria so that such situation does not arise in future.

ii) Unfruitful expenditure of ₹8.86 crore on Tailing pond project at Bolani

The work for reclamation of water from tailing pond was awarded (September 2011) to Kirloskar Brothers Limited (KBL) for ₹9.78 crore to be completed by February 2013. Supply of equipment was completed by September 2016, but there has been no progress in the work till date. KBL requested (February 2017) for commercial closure of contract which was agreed by Management in November 2018.

Audit observed that after supply of equipment, civil and erection work could not start due to resistance from villagers residing near the working site. Management noticed (September 2013) encroachment at site but were unable to provide hindrance free site to

contractor even after lapse of five years. As a result, tailing dam work was not completed and ₹8.86 crore spent on the project remained unfruitful.

Management replied (February 2020) that, they were making efforts for gainful utilisation of materials supplied by the party and for commercial closure of the contract. Balance job would be taken up after the land dispute was resolved.

Reply of Management needs be viewed in the light of the fact that the guarantees for the material supplied had lapsed and the BG submitted by the party also was returned in February 2019. Management should have assessed the accessibility of land before awarding contract.

13.3.4.13 Augmentation of production capacity

SAIL decided to augment the capacity of the existing mines under RMD to meet the enhanced requirement of iron ore after MEP. The Composite Project Feasibility Report (CPFR) for KIOM, MIOM and BOM was prepared during 2008-09. Expansion plan for GOM was approved in March 2010. Audit observed that the MEP projects were lagging behind the completion schedule and not completed as on 31 March 2019 as given below:

Table 13.3.2: Status of MEP projects undertaken at mines

Name of Mines	Present Capacity (mtpa)	Proposed enhanced capacity (mtpa)	No of Packages	Contract cost (₹ in crore)	No of package completed	Cost of completed work (₹ in crore)	Cost remaining to be executed (₹ in crore)
BOM	4.10	10.00	26	377.55	4	291.00	86.55
KIOM	4.25	5.50	13	95.41	12	74.14	21.27
MIOM	4.30	6.50	5	105.77	3	75.00	30.77
GOM	2.40	10.00	5	1926.95	nil	26.06	1900.89
Total	15.05	32.00	49	2505.68	19	466.20	2039.48

The observations on augmentation of production capacity are discussed below:

i) Bolani ore mine

- SAIL approved (June 2008) enhancement of loading capacity of BOM from 4.10 to 10 mtpa for ₹123 crore and awarded (August 2008) to Techpro Systems Limited (TSL) for ₹104.15 crore to be completed by February 2010. Audit noted that Bucket Wheel Reclaimer which was part of the project, collapsed in November 2013. A committee of Management found that the root cause of the incidence was improper design of the Reclaimer structure and calculation of counterweight and addition of counter weight bloom. Risk Purchase Notice (RPN) was issued in August 2014 and the balance work was split into 24 sub-packages out of which 19 were completed, two were under progress and tendering of three packages was under process. So far SAIL had incurred ₹118 crore on this project and the same is yet to be completed.

Audit observed that TSL became insolvent in August 2017. Management submitted (May 2018) claim for ₹18.99 crore before Interim Resolution Professional (IRP³⁵) which was rejected on the ground of being time barred.

Management replied (February 2020) that matter was taken up with Corporate Law for further course of action.

Management reply was silent on the reasons for non-submission of claims before IRP within the stipulated time.

- A project to enhance the production capacity of BOM from 4.10 to 10 mtpa was approved (November 2011) for ₹254.55 crore. The major work of installation/ up-gradation of conveyors and crushing/ screening building was awarded to Techno Fab Manufacturing Limited (January 2012) for ₹104.24 crore to be completed by January 2014. Due to poor performance of the contractor, BOM issued (February 2017) RPN to the contractor and balance work was divided into four sub-packages. So far ₹173 crore has been spent on the project which was yet to be completed. Audit observed that inability of BOM to provide working fronts, lack of statutory clearance and delay in completion of linked packages resulted in delay in completion of enhancement of production capacity.

Management replied (February 2020) that statutory issues were not there at the time of conceptualisation of project and placement of order. Efforts were being made to finalise and complete the RPN packages so that clear front is provided for linked packages. Claim of ₹51.86 crore plus interest filed before the IRP was rejected and against the rejection, application was filed before the NCLT, Kolkata for enforcement of the claim.

Reply of Management is not acceptable because there was delay on the part of BOM even before the statutory issues cropped up. BOM had handed over a portion of D and Panposh area to the contractor in April 2014 even after expiry of scheduled completion date i.e. January 2014. The liquidator rejected (January 2020) the claim of ₹51.86 crore on the grounds of the claim not being substantiated, various cases being pending between the parties and substantial amount being payable by SAIL to the other party.

iii) Meghahatuburu iron ore mines

To achieve production capacity of MIOM to 6.5 mtpa, management decided to implement five packages for ₹105.77 crore to be completed by May 2012. Main package work for Augmentation of Crushing, Screening, Downhill Conveyor System and Replacement of Reclaimer was awarded (May 2010) to M/s Tecpro Systems Limited (TSL) for ₹72.02 crore to be completed by April 2012. TSL abandoned the work in August 2014 and ₹57.35 crore was paid to them. The left-out work was awarded to Hindustan Steelworks Construction

³⁵ *An adjudicating authority to make a reference to the Insolvency and Bankruptcy Board of India for recommendation of an insolvency professional under provision of the Insolvency and Bankruptcy Code, 2016*

Limited (HSCL) in December 2015 and M/s Lepton Project Private Limited (October 2017) under RPN which was also not yet completed.

Audit observed that management took three years to award the entire contract under RPN which prevented the Company in taking legal action due to delay in finalising claim. TSL became insolvent in August 2017 and SAIL filed a claim of ₹7.72 crore before IRP on 30 May 2018 which was not considered being time barred.

Management replied (February 2020) that the matter has been taken up with its Corporate Law Department for further course of action.

iv) Expansion of Gua ore mine

SAIL approved (March 2010) expansion of GOM from 2.4 to 10 mtpa with installation of Pellet plant of four mtpa for ₹2,952 crore. The project was a priority project to gainfully utilise dumped iron ore fines, slimes and rejects from future production at GOM to produce pellet. The contract for installation of 'Crushing, Beneficiation and Pellet Plant' was awarded (April 2014) to L&T for ₹1,926.95 crore to be completed within 40 months.

Audit observed that work was awarded without obtaining Stage-II FC for GOM. Site for preliminary jobs could not be handed over to L&T and the contract was closed in October 2018. L&T claimed (January 2016) ₹93.08 crore being five *per cent* of the total contract value for initial drawing, design and supply of plant, equipment and building structure which was not yet paid. Management accepted the fact that L&T had incurred expenditure on jobs like mobilisation, soil investigation, test of materials at NMDC and foreign laboratory, engineering costs etc. for 44 months, for which a reasonable amount was to be paid.

Audit also observed that ₹25.05 crore was paid to MECON for procurement assistance services for installation of beneficiation and pelletisation facilities.

Management replied that they were in the process of making an amicable settlement with the consortium. The expenditure on MECON could not be considered as infructuous as the base documents prepared were being referred by Centre for Engineering and Technology, SAIL for preparation of revised scheme.

Audit noted that L&T claimed over ₹250 crore plus for jobs done by them and SAIL was in process of amicable settlement with the party.

13.3.4.14 Transportation of Raw materials

i) Avoidable expenditure due to delay in surrender of excess land at Bolani mines

Bolani mines acquired (April 2008) 38.504 acre of land from Railway on license basis for Railway siding. When land licensing fee was hiked by Railways, Management decided (March 2011) to engage RITES to submit new land licensing plan based on actual requirement and also to look into possibility of reducing the area. RITES arrived at (October 2011) land requirement of 19.016 acres of land instead of 38.504 acres acquired by the mines. It suggested to BOM to carry out survey of total land on which infrastructure was already installed. BOM awarded (October 2017) the job for survey of railway land and

assess the requirement of land for ₹0.07 crore after lapse of six years. The work scheduled to be completed in January 2018 was not completed till March 2019.

Audit observed that structures were constructed by BOM at various locations for loading of iron ores on the railway land which were not taken into consideration by RITES because they were not marked on the plan. Presence of unplanned structures necessitated reassessment of requirement of land and non-surrender of excess land. Had Management undertaken planned construction of structures to utilise land optimally and taken decision to surrender surplus land at an early stage, payment of ₹27.37 crore during 2014-19 for surplus land could have been avoided.

Management replied that land requirement of only 19.016 acres for Railway siding could not be verified from the records/ correspondence available at the Mines.

The reply was not acceptable as RITES had stated (20 October 2011) that required land for siding at Bolani mines was 19.016 acres.

ii) Avoidable expenditure due to delay in surrender of excess land at MIOM

MIOM entered into an agreement with Railways in June 2005 for 9.072 acre of land for private siding at Karampada for dispatch of iron ore. As per the agreement, SAIL was to pay license fees at six *per cent* per annum of the market value to be revised every five years. SAIL noticed that only 1.107 acre of land was being used for rack movement and decided (July 2013) to surrender the unused 7.965 acres of land. Railway suggested (November 2013) to submit revised plan and SAIL appointed a consultant in February 2017. The consultant asked (May 2017) SAIL to submit copy of land agreement plan, siding agreement, land licensing agreement etc. to prepare the revised plan.

Audit observed that SAIL was unable to submit the documents as it did not have land agreement plan and the contractor requested to rescind the contract. The surrendering process of unused land is yet to be completed. Inordinate delay in completing the surrendering process of unused railway land resulted in avoidable expenditure of ₹14.17 crore during 2014-19 as license fees which would increase with passage of time.

Management accepted (February 2020), that Land Agreement Papers required for preparation of DPR could not be traced, and in the meantime, the validity of the appointed consultant expired and he left the job. MIOM is exploring options for appointment of an alternate consultant.

iii) Extra expenditure on transportation of coal in Jitpur collieries

Coal from Jitpur colliery is transported to washery plant at Chasnalla colliery by aerial ropeway with nine km running through inhabited areas thereby posing threat to the safety of inhabitants. The cost of transportation of coal by road (₹168 to ₹179 per tonne) was significantly less as compared to the cost incurred (₹632 to ₹1,003 per tonne) during the period 2014-19 through aerial ropeway. A committee constituted by ISP in August 2007 recommended discontinuance of ropeways and transportation through alternative route by constructing new road. Transportation of coal at higher cost was taken up by Audit earlier also and SAIL management in its reply (April 2013) had assured to undertake a fresh study

under present condition for road transport through alternative routes. It was, however, noted that no progress was made in this regard and coal transportation continued to be done through ropeways entailing additional expenditure of ₹25.74 crore in the last five years.

Management replied (February 2020) that transportation of Jitpur Coal by ropeway to Chasnalla was necessary to comply with statutory norms.

Audit could not find anything in records to support the fact that transportation of Jitpur Coal by ropeway to Chasnalla was necessary to comply with the statutory norms.

iv) Payment of demurrage, overloading and under loading charges

Railways recover demurrage from SAIL if wagons are not loaded within prescribed time and punitive charges for overloading of wagons. Railways also charges freight as per permissible carrying capacity even if wagons are loaded below permissible capacity. During 2014-19, SAIL paid ₹33.83 crore, ₹70.99 crore and ₹248.12 crore to Railway for demurrage, over loading and under loading charges respectively

Audit observed that there were delays in starting contractual wagon loading at BSP mines, absence of rapid loading system at BOM, absence of proper dimension conveyor belt at KIOM, excess time consumed for loading which resulted in payment of demurrage. Further, in absence of weighment system, loading was done on eye estimation. As a result, rakes were either overloaded or under loaded which attracted overloading and under loading charges.

Management replied (February 2020) that belt weigher at KIOM, MIOM & BOM is optimised to reduce the impact of under and overloading. The reason for increased demurrage at Gua and BSP mines was due to reduction in free time by Railways from five to three hours.

The fact however remains that Management paid ₹352.94 crore on demurrage, overloading and underloading.

13.3.4.15 Manpower and machineries

i) Irregular payment of ₹94.22 crore as incentive to the employees

Section 28 and 30 of Mines Act, 1952 stipulates that no person shall be allowed to work in a mine for more than six days or 48 hours in a week. Further, as per Section 29(1), any person employed therein deprived of any of the weekly days of rest shall be allowed compensatory days of rest.

To build up the stock in mines to meet the requirement of steel plants, four³⁶ iron ore mines under RMD and Collieries³⁷ deployed employees for entire week without any holiday. Employees were compensated with extra wages as 'Make-up' incentive for their work on seventh day and paid ₹94.22 crore during 2014-19.

³⁶ *MIOM, KIOM, GOM and BOM*

³⁷ *Ramnagore and Chasnalla*

Audit noted that 'Make-up' incentive scheme was not approved by SAIL Board. Moreover, the APP of company (based on six working days in a week), is linked with the production linked incentive scheme, where actual production is compared with the APP for payment of incentive and production of seventh day of the week is also considered for payment of production linked incentive. The 'Make-up' incentive to employees was paid with approval of head of mines. Thus, the company made irregular payment of ₹94.22 crore during 2014-19 to its employees, which would further increase.

Management replied (February 2020) that in order to meet increased demand from Steel Plants for fulfilling their annual target of production, operation of RMD mines on holidays sometimes was necessary and the concerned employees got paid in the form of 'Make-up' incentive. Deployment of manpower in Collieries on Sundays was approved by ED (Colliery) to overcome the threat of safety *vis-a-vis* statutory compliance.

The reply of Management is not acceptable as ED does not have delegated power to approve incentive or reward schemes. Moreover, out of the total payment of 'Make-up' incentive made, only two *per cent* was made to the statutory manpower in collieries.

13.3.4.16 Utilisation of heavy earth moving machinery (HEMM)

Mines use HEMM like dozers, drill machine, dumpers, excavators, pay loaders, shovels etc. The norms for utilisation of HEMM are based on recommendations of two committees³⁸ of 2008. The status of utilisation of HEMM during 2014-19 is shown as under:

Table 13.3.3: Utilisation of HEMM vis-à-vis norms at RMD and BSP mines

(in percentage of working hours to scheduled hours)

HEMM	RMD Mines				BSP Mines			
	Norm	Utilisation during 2014-19			Norm	Utilisation during 2014-19		
		Min	Max	Average		Min	Max	Average
Dozers	49	10	70	20	42	7	57	26
Drill Machines	49	9	41	23	49	14	67	39
Dumpers	56/ 68	8	34	24	53	20	37	31
Excavators	68	10	51	27	39	4	79	32

Audit observed the following:

- Utilisation of Excavators (in percentage) at BOM ranged between 22 and 25 *per cent*. Similarly, dozers were under-utilised (23 to 30 *per cent*). Management attributed the underutilisation to shortage of HEMM operator, procurement of dozer (2014), excavator (2015) and three dumpers (2015) under augmentation scheme of BOM though the expansion of mines was yet to be completed (March 2019).
- In KIOM, three 100 tonne dumpers were added during 2014-17. However, net utilisation decreased from 59.62 *per cent* (2014-15) to 28.70 *per cent* (2018-19) due to less utilisation of old 50 tonne dumpers.

³⁸ Committee for fixing fleet strength and equipment size in RMD mines (August 2007) and a Committee (November 2006) for fixing norms for availability and utilisation HEMM for RMD iron ore mines

- In MIOM, utilisation of dumpers increased from 29.95 (2014-15) to 36.93 *per cent* (2015-16) but after addition of two dumpers in 2016-17, net utilisation decreased to 30.50 *per cent* (2018-19) due to non-availability of matching number of shovels.
- At Gua mines, utilisation of HEMMs was less than 50 *per cent* due to delay in procurement of spares/ sub-assemblies due to financial limitations, ageing of HEMMs etc.
- In Nandini mines of BSP, the percentage utilisation of dumpers and dozers was very low between 22 and 51 due to underutilisation of CSP.

Management replied (February 2020) that action has been taken to engage four attendant-cum-technician to operate HEMM in BOM. In KIOM, 50 tonne dumpers had completed the economic life and were under process of survey off. In MIOM, one shovel was shifted from KIOM to match the requirement of dumpers and shovels. In GOM, a shovel has been commissioned in September 2019 to increase dumper utilisation and procurement action of spares/ sub-assemblies was under process. In BSP mines, mining operation is carried out in different locations and benches due to scattered ore body.

The reply of Management needs to be viewed in the light of the fact that Management failed to assess the HEMM utilisation and take corrective action during 2014-19. Moreover, the norms for equipment utilisation were based on consideration of all operational factors and condition of equipments and therefore the norms should have been achieved by mines.

13.3.4.17 Environment and Safety Issues

i) Environmental hazards caused by overflow of Hitkasadam at BSP

The tailings³⁹ generated from Crushing and Screening Plant (CSP), Dalli mines in slurry form is deposited in Hitkasa dam. 15.14 mt of slime was accumulated in the dam since inception (1978). As per mining plan (2018-23) CSP would continue to discharge 0.75 mt of slime slurry annually. These iron ore slimes with average Fe content greater than 45 *per cent* are suitable for use as blast furnace grade pellets after beneficiation. The capacity for de-silting operation was not sufficient and therefore SAIL awarded contracts for desilting of slime at Hitkasa dam for ₹42.03 crore from 2008-19.

The proposals (2007 and 2013) for setting up iron ore beneficiation cum pellet plant of 0.9 mtpa capacity and installation of 1.0 mtpa pellet plant along with Slime Beneficiation System (October 2014) did not materialise due to lack of viable technical and commercial bids and the financial non viability. SAIL engaged (April 2015) HSCL for ₹13.65 crore for a period of two years to de-silt Hitkasa dam. HSCL executed only half of the work for ₹6.95 crore and left the work. Management estimated ₹8.12 crore to complete unexecuted quantity but did not take RPN action against HSCL.

Audit observed that red water had overflowed from dam and damaged nearby paddy fields and therefore the Chhattisgarh Environment Conservation Board issued a closure notice in 2009.

³⁹ Tailings are the materials left over after separating the valuable fraction from uneconomic fraction of an ore

The work of desilting (Phase-V) of Hitkasa Dam was awarded to M/s. Technoblast. Audit however observed that, desilted material was being stacked in Slime Dumps near Hitkasa Tailing Dam and the issue of red water degrading of agriculture soil still persists.

Management replied (February 2020) that a consultant has been appointed for survey/assessment of condition of Hitkasa Tailing Dam. The work has started from January 2020 onwards. After completion of technical study about stock of slime, condition of dam and other risk factors would be known and it was expected that problems in Hitkasa Dam would be controlled.

ii) Non-development of tailing dam

MIOM and KIOM are operating in same lease. As per conditions of EC, mines had to maintain catch drains and siltation ponds to prevent run off of water and flow of sediments directly into river and other water bodies. Further, as per clause 6 of specific condition of CTE there shall be zero discharge from mines. KIOM and MIOM each has a tailing dam where wastewater (slime) generated was collected to prevent contamination of surrounding water bodies and environment.

Audit observed that tailing dam of KIOM was full and there was no space for further collection of slime. In MIOM, the dam was filled upto height of 20 meters against maximum height of 23 meters. RMD in its Environment Impact Assessment/ Environment Management Plan report (April 2013) had proposed to set up beneficiation plant to de-silt the tailing dam but no action was taken. As tailing dam is constructed to prevent contamination of surrounding environment, delay in decision to de-silt the tailing dam may result in over flow of waste water to surrounding areas.

Management replied (February 2020) that they have submitted (September 2019) application to GoJ to grant permission to sell sub-grade mineral (tailings and sub-grade iron ore). Provision for excavation of tailings has been incorporated in Mining Plan 2020-25 and amendment of EC for excavation of tailings from KIOM & MIOM was also under consideration.

iii) Deployment of statutory manpower

Laws governing the mining activities (Mines Act 1952; Metalliferous Mines Regulations 1961, MMDR 1957) stipulate deployment of manpower with prescribed skills and qualifications in mines, known as statutory manpower (Surveyor, Mine foreman, Mining mate, Blaster). Position of deployment of statutory manpower in mines of SAIL on 31 March 2019 is shown as under:

Table-13.3.4

Category of Statutory manpower	RMD Mines			BSP mines			Collieries division		
	Sanctioned strength as per statute	Actual strength	Short fall	Sanctioned strength as per statute	Actual strength	Short fall	Sanctioned strength as per statute	Actual strength	Short fall
Surveyor	12	7	5	9	7	2	3	2	1
Mine Foreman	80	61	19	62	53	9	49	36	13
Mining Mate	119	69	50	78	47	31	95	25	70
Blaster	18	2	16	21	15	6	0	0	0
Total	229	139	90	170	122	48	147	63	84

Audit observed that there was shortfall in deployment of required statutory manpower in every mine as on 31 March 2019. Against requirement of 546 statutory manpower under the above four categories, the actual deployment was 324 (shortfall of 41 *per cent*). Running of mines without adequate statutory manpower is not only violation of statutory provisions but it also poses threat to safe mining operation.

Management replied (February 2020) that process has been initiated to fill up vacancies and to meet norms and future requirements against statutory positions.

13.3.5 Conclusion

SAIL did not apply due diligence and conduct techno-commercial viability study to assess viability before the allotment of Parbatpur and Sitanala Coal Block and which had to be surrendered subsequently. The amount spent on development of these coal mines thus became infructuous. Production lower than the planned levels at Dalli, Rajhara and Barsua mines, led to transfer of iron ore from distantly located mines by BSP and RSP with extra expenditure on freight differential. At Barsua mines, the non-compliance of FCA 1980, on account of use of forest land for non-forest purpose, without approval led to payment of penal NPV and CA. Non-compliance of OMR 2007 by Bolani mines led to additional expenditure on differential royalty. Additional royalty payments were made at Manoharpur mine, as Iron ore was graded at the highest grade and at Nandini mines on rejected limestone chips that were not suitable for iron making. GoO and GoJ demanded compensation on account of mining beyond quantity permitted under EC/ CTO by the Iron ore and Limestone mines under RMD. Delay in surrender of excess Railway land at Bolani at Meghahatuburu mines led to avoidable expenditure. There was 41 *per cent* shortfall in statutory manpower against the requirement in mines.

The para was issued to the Ministry in January 2020; their response was awaited (June 2020).

13.4 Safety and Environment Management in SAIL

13.4.1 Introduction

Steel Authority of India Limited (SAIL or the Company), a leading steel-producing company in India produced 17.51 million tonnes (mt) of hot metal during 2018-19. The company has five integrated steel plants⁴⁰ and three Special Steel Plants⁴¹.

⁴⁰ Bhilai Steel Plant (BSP), Bokaro Steel Plant (BSL), Rourkela Steel Plant (RSP), Durgapur Steel Plant (DSP) and IISCO Steel Plant/ Burnpur (ISP)

13.4.2 Audit Objectives and criteria

The objectives of audit were to assess whether

- the company's safety policy, procedures and practices conform to the norms/ standards as prescribed under Act/ Rules/ Regulations and Standard Operating Practices (SOP);
- adequate measures were taken on the recommendations of various Committees and safety audit;
- the company has Environment and Pollution Control Policy, Environment Management Plan and System to discharge environment related responsibilities like pollution control, management of waste and compliance with laws; and
- adequate resources were provided for social responsibility on environmental and pollution control, safety standards and application of the best industrial practices.

The audit criteria used were the Factories Act 1948, Safety Policy and SOPs of SAIL, Inter Plant Standard for Steel Industry (IPSS)⁴², National Environment Policy 2006, Environment (Protection) Rules 1986 amended in 2012 and EIA notification 2006, Water (Prevention and Control of Pollution) Act 1974 amended in 2011, Air (Prevention & Control of pollution) Acts 1981 amended in 1987, National Ambient Air Quality Standard 2009, Bio-medical Waste Management Rules, 2016 amended in 2018, Solid Waste Management Rules 2016, Guidelines and instructions issued by the Central and State Pollution Control Board (SPCBs).

Audit examined the records relating to decisions, management processes and activities relating to safety policy and environment management in all the steel plants, SAIL Safety Organisation and Environment Management Division for a period of five years (2014-19).

13.4.3 Audit Findings

13.4.3.1 Safety Management in SAIL

SAIL Safety Organization (SSO) was set up at Ranchi to coordinate, monitor and facilitate the safety related activities of the Company. SSO formulates safety policies, procedures, systems, action plans, guidelines and follows up their implementation to ensure accident-free work environment. Safety Engineering Department (SED) in each steel plant implements the safety policy of the company.

13.4.3.2 Non-compliance of Safety Policy and Safety Manual

Corporate Safety Policy of SAIL stipulates safety audit to assess compliance to safety standards, mitigating plans, develop improvement plan and accountabilities for completion and follow up on timeline and recommendations. Audit observed that, SSO did not develop any plan or frame timeline to implement its recommendations. Out of 686 recommendations

⁴¹ Alloy Steels Plant (ASP), Salem Steel Plant (Salem) and Visweswaraiya Iron & Steel Plant/ Bhadravati (VISP)

⁴² Inter Plant Standards in Steel Industry –issued by the committee of different steel plants but mainly finalised by SAIL.

made by SSO to different plants prior to 2018, 258 recommendations were yet to be complied.

Management replied (February 2020) that it would ensure that all the recommendations were implemented in a phased manner.

13.4.3.3 Non-achievement of zero accident

Safety Policy and Safety Manual envisages zero accident. As per Section 88 of The Factories Act 1948, notice in respect of any accident, in any factory which causes death, or bodily injury due to which a person is injured or is prevented from working for 48 hours or more immediately following the accident, shall be sent by the manager of the factory to such authorities⁴³, in the prescribed form and within the prescribed time. In the event of occurrence of an accident in plant area, initial report is prepared by the concerned plant shop and sent to Safety Department. The Safety Department reports only those cases, which meet the criteria for reporting, to the Factory Inspector.

Audit noted that 85 fatal and 577 non-fatal accidents occurred in the company during 2014-19. Out of above 577 non-fatal accidents, 158 were reported to the authorities. The company lost 5.34 lakh man days and paid ₹9.62 crore to the employees besides payment to contractual workers through ESIC. Audit however observed that, all cases of non-fatal accidents were not reported at BSL. 45 cases were reported as non-fatal accidents (2014-19), whereas as per the Incident Investigation Report prepared by Safety Department, BSL there were 134 non-fatal accidents. Audit also observed that the accidents occurred due to non-adherence to SOP, lack of communication, supervision and non-compliance of Inter Plant Safety Standards-Steel Industry (IPSS) 1-11-011-01.

Management replied (February 2020) that strict adherence to safety measures and SOPs, awareness programmes and training of workers were being ensured to prevent accidents.

It is recommended that, Management should ensure that all reportable cases are reported to the statutory authorities as per the Factories Act, 1948.

13.4.3.4 Accident in gaseous area

As per (IPSS): 1-11-002-12, gas masks should be used while working in hazardous gas area; workers shall carry portable Carbon Monoxide (CO) gas monitor; all workers should be trained.

i) Fire incident at BSP during De-Blanking job of CO Gas Line

CO gas Line in BSP was installed to facilitate supply of CO gas to various shops. A Blank Plate at Column C-50 of COB (Coke Oven Battery) #11, separating the entire gas main into parts was causing pressure fluctuation. To stabilise the gas network, Blank Plate of Column C-50 was required to be removed. During this process (9 October 2018), flames burst out and persons present on the spot got trapped/ exposed in the fire and 14 people died.

Audit noted that, for safe working in the gas line, jobs should be done after depressurising and purging the gas line by bleeding out the gas present because blanking/ de-blanking job

⁴³ *Factory Inspector of the State Government*

done on charged gas lines was risky. Audit observed that, on many occasions, request for shutdown was turned down and the practice was to do the de-blanking/ blanking jobs on charged pipelines without shutdown. BSP therefore decided to do the job under reduced gas network pressure and as a result the fire incident took place. IPSS 1-11-030-2017 on Safety Standard for working on Gas line in Steel Industry specified positive isolation while working on gas lines, but the SOP and protocol of BSP in this regard was not in line with the IPSS. Laxity in taking safety measures and unsafe practice led to death of personnel, loss of production, payment of compensations of ₹30 lakh for each case and ₹15 lakh for each reportable injury.

Management replied (February 2020) that possibility of doing the job in non-gas conditions was also explored but could not be done due to technical difficulties. Due to non-availability of positive isolation facilities, job was carried out on live gas condition. Now all live Gas line Blanking/ De-blanking jobs are stopped and it is carried out by 100 *per cent* positive isolations only.

The reply was not acceptable because in all earlier protocols at BSP for similar jobs, these were carried out after reducing the pressure only to some extent. Moreover, it was noted that other plants of SAIL carried out de-blanking job after complete isolation. Management reply also did not elaborate the technical difficulties.

ii) Leakage of Gas at Pump House-2 of BSP

Blast Furnace (BF) Gas generated in BSP, which contains highly poisonous Carbon Monoxide gas is carried through the pipeline to the Gas Cleaning Plant (GCP) to clean them through water. Pump House-2 (PH) supplies water to GCP. On 12 June 2014, Water Management Department (WMD) noticed fall in the water pressure and huge accumulation of water in the PH due to leakage as Header Water Line-2 of PH supplying water to GCP ruptured between the Header Valves- 47 and 55 side. BF gas leaked and spread in the PH. Six persons died due to the effect of the gas and 30 persons were affected.

Audit noted that as per the show cause notice issued (June 2014) by Dy Controller, Industrial Health and Safety, Government of Chattisgarh, the pipelines in PH were not inspected and maintained and due to absence of non-reversible valves in the water pipeline, BFG came into water pipeline and spread into PH through the ruptured header. Audit observed that despite knowing that the entire plant was a gas prone area, Management had not installed adequate gas monitors and therefore, workers were not aware of the presence of poisonous gas and could not take precautionary measures like use of gas masks. BSP gave compensation of ₹25 lakh for each worker who died.

Management replied (February 2020) that design provision was not envisaged earlier for stoppage of reverse gas leakage from BF and gas leakage incidence was unprecedented. After the above incidence, non-return valves were installed at all GCPs of BF and adequate numbers of CO Monitors were installed at the gas prone PHs.

Reply of Management needs to be seen in the light of the fact that, similar incident had occurred (January 2004) in Bulgaria's largest iron and steel plant, Kremikovtzi when the pressure in the water pipeline supplying the blast furnace's gas-purifying machinery fell. The

poisonous gases started leaking due to a rapid decrease in the water level and the noxious gas killed three people. Management should have gathered knowledge from the incident and envisaged the possibility of such occurrence in their plants and taken necessary precautionary steps for system improvement.

iii) Fatal accidents occurred in DSP in December 2014 and November 2017 due to work in gaseous area without carrying portable CO monitor. Another accident occurred in ISP (September 2014) when CO gas leaked during cleaning the pre-heater tubes of COB#11. The CO gas accumulated in a place with inadequate ventilation caused fire resulting in burn injuries to 24 persons, of whom 05 died. As per enquiry report, the main reasons for accident were leakage of CO gas through pre-heater inlet valve, poor ventilation of pre-heater area and closure of inlet and outlet valves without making pre-heater CO gas completely free.

Management replied (February 2020) that in DSP, more than 212 fixed CO monitors have been installed covering all gas prone areas of the plant to strengthen the safety of personnel working in gaseous areas. In ISP, management has taken action like preparation of pre-check list, SOPs, SMPs, ensured cross ventilation around all gas prone areas etc.

iv) Accident due to fall from height

Para 3.2 of IPSS 1-11-005-14 stipulates that before start of work at height of two meters, all safety requirements (body harness, fall arrester, protective helmets, safety nets) should be applied. Audit noted that absence of adequate safety measures and proper supervision thereof in steel plants of the company, led to many accidents due to fall from height.

Five accidents relating to fall from height occurred in BSP during 2014-17 due to slippage from height. One accident each took place in ASP (October 2015) because support of Trusses was not fool proof. In RSP, a worker lost balance (March 2017) while working and fell as there was opening in the lower level of platform. In BSL an accident took place (September 2017) because corrugated sheet on which work was to be done was not fixed. In SSP an accident occurred (February 2018) due to non-covering of ladder of jib crane, lack of support for holding to reach the platform of jib crane.

Audit observed that these accidents took place because the workers were not using body harness while working on height.

Management replied (February 2020) that remedial measures were being taken. Trainings were provided and all safety appliances for working at height were being ensured in ASP and BSL.

v) Availability of safety officers

Clause 40B of the Factories Act, 1948 stipulates that, State Government by notification in Official Gazette, may specify the number of safety officers to be appointed in each factory where the process or operation involves any risk of bodily injury, health hazard etc. The duties, qualifications etc. of safety officers shall be such as may be prescribed by the state govt. As per Bihar Factories Rules, 1950, the duties of Safety Officer shall be to advise and assist the factory management in the fulfillment of its obligations, statutory or otherwise, concerning prevention of personal injuries and maintaining a safe and healthy working

environment. As per rules, 26 safety officers were required in BSL as against which there were only 17 to 19 safety officers during 2014-19. West Bengal Factories (Safety Officers) Rules, 1978 prescribed the number of Safety Officers as six whereas, in DSP, only three safety officers were in place (March 2019). Similarly, 20 safety officers were available in September 2019 against requirement of 26 in RSP.

Management while accepting the audit views replied (February 2020) that recruitment of required number of safety officers was under process in BSL, DSP and RSP.

13.4.3.5 Fire Management

The Factories Act, 1948 categorised integrated steel industry as hazardous process industry. Section 38 of the Act stipulates that in every factory, all measures be taken to prevent outbreak of fire and its spread and to provide safe means of escape in event of fire and necessary equipment and facilities for extinguishing fire. Audit noted that there were 1,405 fire incidents in SAIL plants during 2014-18. Out of these, 515 fire incidents took place in ISP, 268 in ASP, 192 in VISP and 190 in BSP. Main reasons for the fire incidents were hot metal/ slag/ spark, overheating/ heat radiation and electrical fault/ short circuit, non-cleaning of spillage of oil, non-working of fire detection etc.

Management replied (February 2020) that measures were being taken to prevent outbreak of fire.

Reply of management needs to be seen in light of the fact that despite taking measures, fire incidents continued to take place. For instance, in ISP, 60 fire incidents (2 major and 58 minor) took place during 2019-20.

13.4.3.6 Availability of fire hydrant and extinguishers

BSL had procured 8,500 fire extinguishers till 2008-09. As per Bureau of Indian Standard (BIS) (IS: 15683-2006) implemented in 2012, all fire extinguishers were to be replaced. Audit observed that only 5,100 fire extinguishers were procured till December 2019. Further, number of specialised men in fire services was reduced from 97 as on March 2015 to 41 as on March 2019. In DSP there was six operational fire tenders. The stipulated life of the fire tenders is 10 years but two fire tenders were more than 30 years old and one was 16 years old. Audit observed that requisite criteria was met at BSP, RSP and ISP.

Management replied (February 2020) that in BSL, remaining fire extinguishers would be procured and replaced during 2019-21. In DSP, proposal to replace two fire tenders would be moved in 2020-21.

13.4.3.7 Inadequate Fire detection and Alarm system

BIS IS 2189:2008 stipulates that the purpose of fire detection and alarm (FDA) system is to detect fire and give an alarm so that appropriate action can be taken. Audit observed that FDA was not installed in all shops vulnerable to fire in BSL. Further, automatic FDA system installed in the shops were not working (September 2019). Automatic FDA system was not installed in DSP except those installed under MEP, power station areas and Computer and Information Technology. In RSP, out of 82 FDA systems in various areas/ units of the plant,

43 were not working and four were yet to be commissioned. In ISP out of 71 automatic FDA systems, 33 were defective and in BSP out of 18 automatic FDA systems, 10 were defective.

Management replied (February 2020) that, in many shops except Cold Rolling Mill-III, FDA systems in BSL were obsolete due to old technology and thus required replacement. In DSP, to strengthen fire safety measures, Dry Chemical Powder modular system with automatic detection and suppression mechanism would be installed in old assets, vulnerable to fire and procurement action were initiated for retrofitting/ replacement of FDA Systems in RSP.

13.4.3.8 Environment Management in SAIL

As per Corporate Environment Policy, SAIL is committed to improve environmental performance. Each steel plant has Environment Control Department (ECD), which is responsible to monitor environmental issues and report to the SPCB and CPCB. Environment Management Division (EMD) at Kolkata carries out functions related to environment and enactment of environmental laws. Ministry of Environment, Forests and Climate Change (MOEF&CC) is the nodal agency for planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes.

13.4.3.9 Non-renewal of environment clearance certificate for MEP

Environment Clearance (EC) granted (October 2008) for Modernisation and Expansion Plan (MEP) of BSL was valid for five years, which was extended upto October 2018. Extension of EC for further period was not allowed. Audit noted that, MEP at BSL was not fully completed (October 2018) and BSL applied for fresh EC in February 2018 which was pending with MoEFCC. Work for installation of new Sinter Plant and Up-gradation of SMS-I packages was stopped (October 2018) on which ₹991 crore was spent due to non-availability of EC. Delay in issue of EC was mainly due to non-fulfilment of conditions like disposal of fly ash dumps in project area, disposal of slag dump, non-setting up of sewage treatment plant etc.

Management replied (February 2020) that to obtain fresh EC, the process was started in February 2018 and EC was expected to be issued by March 2020. Management further intimated (April 2020) the process for obtaining EC was disrupted and would be resumed after lock-down.

The reply of Management may be seen in the light of the fact that the preconditions for issuing EC being the setting up of sewage treatment plant over Garga River was yet to be approved by the company. Further, reply was silent regarding disposal of fly ash.

RSP started the work of installation of Hot Strip Mill (HSM) in September 2015 i.e. prior to obtaining EC, which was availed in December 2016. Odisha SPCB directed RSP (April 2016) to stop construction activity of new HSM till receipt of EC and as a result the work was suspended between May 2016 and September 2016. The contractor claimed ₹20 crore for compensation for idling of resources during that period.

Management replied (February 2020) that RSP started tendering for enabling jobs parallelly in anticipation of Public Hearing, which could be held in June 2016.

Management reply needs to be viewed in the light of the fact that taking up enabling jobs without obtaining consent to establish from the Board and EC was a violation of various Acts.

13.4.3.10 Air Emission Management

Steel industry accounts for 6-7 *per cent* of the total Green House Gas (GHG) emissions in India. CO₂ in steel plant is generated from burning of coke/ charcoal as fuel. Blast Furnace gas (BFG), Coke Oven gas (COG) and LD⁴⁴/ BOF gases produced from BF, Steel Melting Shop and Basic Oxygen Furnace respectively. These gases contain CO, CO₂ and Nitrogen, which are used as fuel for heating in steel making process, power generation or burnt in air. India, a signatory to the Paris Agreement under United Nations Framework Convention on Climate Change (UNFCCC) has committed to reduce the emission intensity by 33 to 35 *per cent* by 2030 from 2005 level. Details of emission and reduction of CO₂ by SAIL, RINL and TATA Steel during 2014-15 to 2018-19 is given below:

Table- 13.4.1

(Unit: Tonne/ Tonne of crude steel (t/ tcs))

Year	SAIL	RINL	TATA Steel
2014-15	2.65	2.79	2.47
2015-16	2.60	2.79	2.30
2016-17	2.61	2.78	2.29
2017-18	2.56	2.62	2.30
2018-19	2.57	2.59	2.29
Reduction during last 5 years (<i>per cent</i>)	3.01	7.17	7.29

Audit noted that international standards for CO₂ emission was 1.8-1.9 t/ tcs. CO₂ emission in SAIL was higher as compared to the international standards and also TATA Steel. SAIL fixes plant wise norms for CO₂ emission yearly. It was noted that among the steel plants of SAIL, BSL, RSP and ISP achieved the target during all the years 2014-19. BSP could not achieve the target for CO₂ emission during 2014-15 to 2018-19. DSP could not achieve the target in 2014-15, 2016-17 and 2018-19.

Management replied (February 2020) that, BSP and DSP could not achieve the target due to delay in execution of MEP and non-stability of newly added units respectively. SAIL would be in position to achieve specific CO₂ emissions of 2.43 t/ tcs by 2020-21 and 2.3 t/ tcs by 2030-31.

Reply of Management is to be viewed in light of the fact that the Ministry of Steel emphasised (July 2018) to achieve international benchmarks.

13.4.3.11 Flaring up of gases in absence of Gas holder

In an integrated steel plant, many gases are generated from BFs, Coke Ovens and Steel Melting Shops or Basic Oxygen Furnace. These gases contain high amount of CO gas, which can be used as a fuel for different purposes. Gas Holder helps in storage of useful CO gas,

⁴⁴ Converter gas or BOF gas is also known as LD (Linz and Donawitz) gas

which is otherwise flared into the atmosphere. Audit noted instances of flaring up of gases to environment due to delay in completion of air pollution control system.

(i) SAIL decided (May 2007) to install a gas holder of higher capacity and new ID Fan at BSL with energy conserving mechanism to prevent flare up of LD gases (mainly CO and CO₂ gas). Contract for Gas Holder package and ID Fan Complex was awarded in August 2008 and January 2013 respectively. Though the gas holder was completed in 2013, ID fan complex could be completed in April 2017. During commissioning of gas holder, management found that most of the items fitted in it were not functioning and required replacement or rectification as the same was idle for about four years. The gas holder unit was yet to be operationalised. Thus, due to delay in completion of gas holder and ID fans, BSL vented out LD gas (6.68 lakh tonne CO₂ for ₹81.35 crore⁴⁵) between April 2017 and June 2019 causing air pollution, loss of saving of energy and excess consumption of coal.

Management replied (February 2020) that though LD Gas Holder project was available for use since 2013, the same was not commissioned due to malfunctioning of various equipments. National Safety Council (NSC)⁴⁶ has conducted Hazard and Operability (HAZOP) Study and Dispersion Modeling of LD Gas Holder required for regular recovery of LD gas. Recommendations of NSC for safe operation of the facilities were likely to be implemented by 31 October 2020.

Audit noted that due to mismatch in planning and delay in pre-commissioning activities of gas holder project, project was delayed which resulted in venting of CO gas in air and excess consumption of coal.

(ii) BSP placed order (October 2008) for installation of SMS-3 and Gas Holder on M/s GmbH Austria. Production from SMS-3 started from March 2018 but the gas holder has not been completed till date. In the absence of gas holder LD Gas was flared up in the air during 2018-19 (0.40 lakh tonne CO₂ valuing ₹4.91 crore).

Management replied (February 2020) that, Gas Holder was expected to be commissioned by September 2020.

13.4.3.12 Dust emission management

Steel making process produces huge amount of dust especially in Sinter Plant (SP) and SMS, which can be recycled to produce sinter. Capturing of dust is made in two modes by Electrostatic Precipitation (ESP) and Battery Cyclone⁴⁷. Charter on Corporate Responsibility for Environmental Protection (CREP)⁴⁸ issued by the MoEF (March 2003) stipulated to reduce the fugitive emission by 100 per cent by March 2008. SAIL selected various projects not only to reduce dust within the current prescribed limit but also to meet higher standards

⁴⁵ Calculated considering calorific value of LD gas and equivalent tonnage and value of coal

⁴⁶ National Safety Council – set up (1966) by the Ministry of Labour, Government of India with the mission of eliminating preventable deaths at work, in homes and communities, and on the road through leadership, research, education and advocacy

⁴⁷ ESP works in dry mode where dust are accumulated and reprocessed in SP and Battery Cyclone was of wet type dust collection system in which the slurry water is discharged to settling tank.

⁴⁸ MoEF launched (March 2003) CREP with the purpose to go beyond the compliance of regulatory norms for prevention and control of pollution through various measures including waste minimization, in-plant process control and adoption of clean technologies.

applicable in future. Audit noted higher emission of dust in air due to non-completion of the following schemes/ projects.

(i) BSL awarded (August 2007) project to replace battery cyclone (BC) with six ESPs in Sintering Plant to reduce emission, which was to be completed by August 2010. Audit noted that out of the six planned ESPs, one ESP was commissioned in 2010 and emission from this ESP was within the envisaged project norm (<50 mg/ Nm³). Due to non-commissioning of five ESPs, there was higher emission of PM ranging from 140 to 150 mg/ Nm³ in BCs. Thus, sinter dust of 3.08 lakh tonne could not be recycled/ reused and was flown to the main sludge compartment during last five years.

Management replied (February 2020) that emissions were within existing norm of 150 mg/ Nm³. Erection of another ESP was expected to be completed by March 2020. Remaining BCs would be replaced subsequently.

The reply of Management may be seen in view of the fact that the project was finalised with the envisaged target of dust emission below 50 mg/ Nm³, considering future revision of norms as well as deterioration in health of equipment.

(ii) Due to high stack emission at Refractory Material Plant (RMP) of BSL, CPCB directed (March 2011) to upgrade Air Pollution Control Device (APCDs) in RMP by 2012. Due to non-adherence of timelines submitted by BSL for refurbishing the ESPs of RMP, CPCB forfeited the BG of ₹0.50 crore. BSL decided (July 2014) to replace ESPs and awarded a contract in January 2017 with schedule completion of April 2019. Till date only three ESPs (out of six) could be refurbished. Audit noted that PM emission from new ESPs (1, 3 and 6) were within the envisaged project norm (<50 mg/ Nm³) but in remaining ESPs the emission was in the range of 140 to 150 mg/ Nm³ which was more than the prescribed norm.

Management replied (February 2020) that ESP 4 was completed in January 2020 and job for balance two ESPs (2&5) would be completed by September 2020. However, stack emission from these two ESPs was meeting existing norms of 150 mg/ m³, hence there was no non-compliance.

Management reply may be viewed in light of the fact that the envisaged emission norms for the project was <50 mg/ Nm³.

(iii) Sinter Machine-1 of SP-3 at BSP was installed initially to clean the waste gas up to maximum of 75mg/ Nm³. The norm of stack emission was reduced from 150 mg/ Nm³ to 50 mg/ Nm³, which was not met through the existing systems. BSP placed (September 2016) order for installation of the same with schedule date of completion of October 2017. However, the project has not been commissioned resulting in emission of dust in a range of 65-80 mg/ Nm³, which was more than the prescribed norm.

Management replied (February 2020) that the Sinter machine-1 of SP-III is adhering to emission norms as prescribed by CECB i.e. below 50 mg/ Nm³ by regular maintenance and through process control. The emission range stated are sporadic instances of emissions exceeding norms for which corrective action was taken immediately. All efforts are being taken to complete the up gradation of ESPs by September 2020.

The fact remains that the project taken up for upgrading of ESP was yet to be commissioned.

(iv) Dust extraction system at Ore Bedding and Blending Plant (OBBP) of RSP became defunct which was a serious concern to health and safety risk to employees and environment. OSPCB granted (March 2014) consent to operate with the condition to install Dry Fog Dust Suppression (DFDS) to control emission of fugitive dust and comply with the norm of 100 mg/ Nm³ for PM emission. OSPCB noted (May 2017) that PM₁₀ ranged from 121-155 mg/ Nm³ against the norm of 100 mg/ Nm³ and directed to complete the scheme by May 2019. Audit observed that the timeline given by OSPCB had lapsed but RSP had not completed the system.

Management replied (February 2020) that OSPCB had extended timeline for completion of Dry Fog Dust Suppression System in OBBP by 31 March 2020. The system was, however, yet to be commissioned (May 2020).

13.4.3.13 Conservation of energy and natural resources

i) Specific Energy Consumption

Specific Energy Consumption (SEC) is energy consumed in production of one tonne of crude steel. Energy consumption in SAIL, Tata Steel, RINL and World Average during 2014-15 to 2018-19 is given below:

Table 13.4.2

(Unit-Gcal/ tcs)

Year	SAIL	TATA Steel	RINL	World Average
2014-15	6.53	6.01	6.37	4.5 to 5.0
2015-16	6.51	5.77	6.40	
2016-17	6.60	5.67	6.39	
2017-18	6.38	5.67	6.05	
2018-19	6.50	5.69	5.98	
Decrease during 5 years (per cent)	0.46	5.32	6.12	--

From the above, it is seen that average SEC in SAIL was more than the world average as well as its peers like Tata Steel and RINL during the last five years. SAIL also lagged behind its peers with regard to reduction of energy consumption. BSP, ISP and RSP could not achieve the self-fixed target of SEC during 2014-19, which resulted in excess consumption of 112.63 lakh Gcal of specific energy which lead to increase in GHG and adverse impact on environment.

Management replied (February 2020) that there was no annual statutory norm for SEC and Bureau of Energy Efficiency (BEE) set targets for SEC on a three-year cycle. The overall SEC of SAIL has reduced and after stabilisation/ enhancement of production of new units and phasing out of older energy consuming Units, SEC was expected to reduce further.

The fact remains that, higher consumption of SEC lead to increase in GHG and adverse impact on the environment.

ii) Excess consumption of coke

Coke is an important ingredient in iron making and coke rate is denoted by consumption of coke in producing hot metal. Lower coke rate indicates better performance and lower emission of CO₂.

Table 13.4.3: Consumption of coke during 2014-19

Year	SAIL	TATA Steel	RINL	International Norm
2014-15	504	443	543	275-350
2015-16	489	380	543	
2016-17	473	360	490	
2017-18	456	348	459	
2018-19	452	352	465	
Decrease during 5 years (<i>per cent</i>)	10.32	20.54	14.36	

From the above, it could be seen that coke consumption in SAIL was more than the international norm and Tata Steel but less than RINL. SAIL could achieve only 10.32 *per cent* reduction in coke consumption during 2014-19. Further, all five integrated steel plants of SAIL could not achieve the target for coke consumption during the period 2014-19 which resulted in excess emission of 45.96 lakh tonne of CO₂ gas.

Management replied (February 2020) that coke rate of SAIL had improved during last five years and further reduction is expected with progressive upgrading of old BF's, closing down the old and inefficient BF's and up-gradation/ installation of new stoves.

13.4.3.14 Solar Power management

Solar power, a renewable energy helps in reduction of CO₂ emission by reducing consumption of fossil fuel. GoI has committed to United Nations to increase share of electric power from non-fossil fuel-based resources to 40 *per cent* by 2030. GoI also issued (January 2016) notification to promote generation of electricity from renewable sources.

13.4.3.15 Non-installation of solar power system

SAIL committed (February 2015) to Ministry of New and Renewable Energy (MNRE) to install solar plants of 200 MW by 2019 and decided to install 162 MW of solar projects by JV Companies NSPCL and BPSCL⁴⁹. The Company, however ascertained (March 2018) that the projected tariff of solar power (₹3.59/ unit) was high and decided not to pursue through the JVs. SAIL Board accorded (February 2019) 'In-principle' approval for installation of solar power plants of total 240 MW in a new JV to be selected through tariff-based bidding process. Tendering was under progress with estimated cost of ₹972 crore. SAIL has to invest 26 *per cent* of ownership in the JV to ensure status of captive power plant.

Audit noted that as per business plan of SAIL for 2018-19, out of 10,700 million units (MU) of power required by the company, only 6,700 MU was expected to be generated by own captive power plant and rest to be purchased from grid. The cost of grid power ranged between ₹4.50 to ₹7.60/ kwh which was considerably higher than the cost from solar (₹2.50 to ₹3/ kwh). Thus, due to delay in taking decision to install solar power plant, the

⁴⁹ NTPC-SAIL Power Company Limited and Bokaro Power Supply Company Private Limited

Company lost opportunity to save cost of energy and also emitted 3.30 lakh tonne of CO₂ gas annually in the atmosphere.

Management replied (February 2020) that proposal to provide land to the proposed JV in this regard has been submitted to MoS for approval.

MNRE emphasised (July 2018) that roof solar sector had tremendous potential for generating solar power and to reduce energy bills by utilising available rooftops, vacant areas in the premises of public and private buildings. MNRE advised MoS to issue necessary directions to install roof top solar projects in all public buildings. Audit noted that BSP installed a Rooftop Solar Photovoltaic (0.2 MW) at Bhilai Niwas in 2013 for ₹2.44 crore which was inoperative from March 2018. BSL, RSP and ISP installed (2015/ 17) roof top solar system of two MW, 10 KW and 160 KW respectively. No roof top solar system was installed in DSP.

Management replied (February 2020) that tender for the project for installation of about 6.195 MW capacity Rooftop Solar Plants across SAIL Plants under MNRE's 'Award-cum-Incentive Scheme' had been taken up. Rooftop Solar Photovoltaic system at Bhilai Niwas would be operative by July 2020. Tendering for installation of Rooftop Solar system at DSP was under process.

13.4.3.16 Shortfall in meeting Renewable Energy Purchase Obligation (RPO)

The Electricity Regulatory Commissions of various states have notified RPO. Under this, the power distribution licensees, users of captive power and those utilising power through open access have obligation to utilise specified percentage of renewable energy or purchase renewable energy certificates from energy exchange.

(i) The Odisha Electricity Regulatory Commission (OERC) published (2010) OERC (Renewable & Co-ordination Purchase Obligation and its compliance) Regulation, 2010. As per the regulation, RSP being user of captive generation of electricity, was an obligated entity and had to purchase electrical energy under RPO from renewable sources. As per stipulation it was to purchase, not less than five *per cent* of the total energy used from captive plants from the year 2011-12 which was subject to increase of 0.5 *per cent* every year till 2015-16. Further, out of five *per cent* of RPO, 0.1 *per cent* must be purchased from solar power plant. Audit noted that RSP treated the co-generation in CPP-I through gas/ steam generated in the steel making process as fulfilment of RPO obligations. OERC had not granted (August 2015) any exemption to co-generation captive users and demanded ₹43.23 crore as RPO obligation from 2010-11 to August 2015. RSP challenged (April 2016) the OERC order before Hon'ble High Court of Odisha which is pending.

Management replied (February 2020) that High Court had stayed the implementation of order of OERC.

(ii) OERC published (September 2015) OERC (Procurement of energy from Renewable sources and its compliance) Regulation, 2015 which states that every obligated entity should meet its RPO target from its own renewable sources or by way of purchase of Renewable Energy Certificates (REC). If the obligated entities does not fulfil the RPO obligation during any year and also does not purchase the RECs, the Commission may direct the obligated

entity to deposit a penalty on the basis of the shortfall in units of RPO and the forbearance price decided by the Central Commission. Audit observed that RSP has not fulfilled the RPO (332.32 MU) during 2015-16 to 2018-19 and liability against RPO was ₹64.94 crore.

Management replied (February 2020) that in the light of order of Ministry of Power (1 October 2019) relating to RPO for power plants commissioned before 2015-16, the RPO and corresponding liability was ₹54.21 crore. Appropriate decision to purchase renewable energy or REC would be taken based on the outcome of the judgment. Audit however noted that the liability would be ₹64.94 crore as per the revised order and RSP has not yet purchased renewable energy.

13.4.3.17 Waste management in steel plants

Industrial solid wastes are source of toxic metals and hazardous wastes, which may spread on land and can cause harm to soil productivity. Toxic substances may leach or percolate to contaminate the ground water. An inefficient solid waste management system may create serious negative environmental impacts like infectious diseases, land and water pollution, obstruction and impact biodiversity. Huge quantity of slag wastes from BF and BOF (or LD) are generated in steel making process. BF slag is rich in silica, ferrous, lime, alumina, silicon dioxide, which can pollute air and water. As per Charter of CREP 2003, 100 *per cent* of BF and BOF slag were required to be utilised by 2007.

13.4.3.18 Under-utilisation of BF slag in BSL and BSP

CPCB directed BSL (March 2011) to install Cast House Slag Granulation Plants (CHSGP) at BFs and utilise 100 *per cent* BF slag by October 2012. CPCB issued show cause notice to BSL in June 2013 due to non-compliance of above. Since BSL was already having CHSGP in BF 4 and 5, it planned to install CHSGP in remaining BFs (1, 2 & 3) under MEP. Audit noted that only four out of six CHSGPs were installed. Due to delay in completion of CHSGP project, granulation of slag was 45 to 74 *per cent*, resulting in under-utilisation of BF slag. MoEF during inspection (November 2018) found that a large dump of slag was lying in the project area which needed to be disposed in an environment friendly manner. Audit observed that only current generation of BF slag were being utilised. MoEF&CC while granting EC (March 2008) for MEP of BSP imposed condition to granulate all the BF Slag and to provide it to cement manufacturers. Audit noted that utilisation of BF Slag at BSP during 2014-19 was between 72 *per cent* and 90 *per cent*.

Management replied (February 2020) that in BSL, CHSGP 4 had been commissioned in BF-2 recently and CHSGP 2 was expected to be commissioned by March 2020. Audit noted that due to delay in installation of CHSGPs, only 45 to 74 *per cent* slag could be granulated by BSL. In case of BSP, Management replied that, 100 *per cent* slag from all working BFs was being granulated and sold regularly based on market demand. Audit however noted that stock of slag increased from 1.59 lakh tonnes as on March 2018 to 5.54 lakh tonnes as on March 2019.

13.4.3.19 Under-utilisation of LD slag in BSL, DSP and RSP

BOF/ LD slags are generated in Basic Oxygen furnace (BOF) during steel making. Para 4.10.4 of the National Steel Policy, 2017 stipulated steel plants to set up SMS slag

weathering/ steam ageing plants to enable them to supply processed/ sized slag for road making, rail ballast etc. However, during last five years SAIL did not make efforts for alternate use of LD slag in road making or rail ballast or any other eco-friendly use. The utilisation of LD slag in SAIL ranged between 56 and 84 *per cent* during 2014-15 to 2018-19.

- In BSL, for installation and commissioning of a pilot scale steam ageing facility of LD slag, order was placed in May 2016. However, the same was not implemented and around 30-35 *per cent* of slag generated was used in internal road making. The utilisation of LD slag in railway ballast and external road making processes was less than five *per cent*. Ministry of Steel had requested SAIL (December 2016) for commercial availability of processed slag in rural road construction and setting up of pressurised steam ageing plant for reduction of free lime. However, no action was taken by Management in this regard.

Management replied (February 2020) that consumption of 0-5 mm processed LD Slag increased significantly in sinter making since August 2019. Cost benefit analysis of steam matured slag vis-à-vis naturally weathered slag was being explored.

- BSP could utilise 100 *per cent* of BOF slag generated but utilisation of BOF slag in DSP, RSP and ISP ranged between 65 and 76 *per cent*, 15 and 58 *per cent* and 22 and 45 *per cent* respectively during 2014-19. In DSP, 10 lakh ton of BOF slag was lying (September 2018) in open yard. DSP had not taken any initiative for utilisation of this waste. Gainful utilisation of slag helps not only in reduction of cost of steel production but also helps in reducing environmental hazards.

Management replied (February 2020) that in BSP, BOF slag was utilised in SMS-I, however, in other plants there were limited avenues for utilisation. Other avenues were being explored by BSL and RSP to increase the sale of slag. In DSP initiative has been taken to utilise weathered slag in road making under Pradhan Mantri Gram Sadak Yojana.

13.4.3.20 Other waste and hazardous waste in steel plants in SAIL

i) Under-utilisation of BOF sludge⁵⁰

BOF sludge is the fine solid particles recovered after cleaning of gas emerging from LD convertors. In BSL, BOF sludge had significant Fe content and could be used for sinter making. Audit noted that BOF sludge generated at BSL (24,500 tonnes annually) flowed to the mixed sludge compartment. This remained unutilised due to unavailability of dedicated pond for this purpose and absence of wastewater/ slurry water treatment facility. It also contributed in polluting the water and impacted the soil condition. The utilisation of BOF sludge, in other steel plants of the company ranged between - RSP (32 *per cent* and 58 *per cent*), DSP (nil to 20 *per cent*), ISP (seven and 15 *per cent*) and BSP (2 *per cent*) during 2014-15 to 2018-19.

Management replied (February 2020) that to sort out the issue, expert agencies had been roped in to explore the utilisation of BOF sludge at BSL. RSP, DSP and ISP were taking steps to increase utilisation of BOF sludge.

⁵⁰ Also called SMS sludge or LD sludge

ii) Non completion of hazardous pit

As per Hazardous and other Wastes (Management and Trans-boundary Movement) Rules, 2016 (HWMR), the waste generator is required to ensure proper and safe collection, storage, treatment, transportation and disposal of hazardous waste. In BSL, on an average 1,700 tonne of hazardous wastes (acid tar sludge, vanadium pentaoxide, sulphur sludge and decanter tar sludge etc) are generated annually. We noted that two hazardous pits used (since 2007) for disposal of hazardous waste in BSL were filled up and were required to be closed. As a result, BSL disposed off the waste in open area in violation of the above rule.

Management replied (February 2020) that hazardous waste pits were filled up due to accumulation of rainwater which will evaporate gradually. Construction of new pit was under process.

iii) Accumulation of hazardous EAF dust in ASP

Electric Arc Furnace (EAF) of ASP generates bag filter dust or EAF dust during production process. Being hazardous in nature, the disposal of EAF dust was to be carried out under the provisions of HWMR, 2016. As per Section 8(1) of the Rule, on site storage of hazardous waste was not permitted beyond 90 days. Audit noted that 174 tonne to 270 tonne per year of EAF dust was generated in ASP during 2014-19. WBPCB also served (February 2018) a notice on ASP, for violation of disposal norm of hazardous waste. Non-disposal/ utilisation of EAF dust has resulted into accumulation of hazardous waste polluting environment and violating the statutory guidelines.

Management replied (February 2020) that ASP has reduced stock by 1,100 tonne during 2014-19 and new avenues were being developed to utilise EAF dust as per the SOPs issued by CPCB. Audit however noted that, over 2,000 tonne (31 March 2019) of EAF dust was accumulated and stored on site for more than 90 days in violation of rules.

iv) Management of Municipal Solid Waste

Municipal Solid Waste (MSW) comprises of all waste/ garbage generated from domestic households, residential colonies and market areas. MoEF&CC notified (September 2000) 'Municipal Solid Waste (Management and Handling) Rules 2000' (replaced by Solid Waste Management Rules 2016-SWMR, 2016) for collection, segregation, transportation, processing, treatment and disposal of the MSW scientifically. Audit observed that the plant management did not take appropriate steps to fulfil the legal and social requirements regarding environment and pollution control, as discussed in the following paragraphs:

v) Processing/ disposal of MSW

BSP could not identify space for disposal and processing of MSW even after 16 years of implementation of the MSW Rules. MSW was dumped at different places, which was stopped after protest by residents. BSP initiated (December 2018) a proposal to establish a Solid and Liquid Resource Management Center at Jawahar Udyan (Bhilai) for processing of MSW by segregation of solid waste, composting, recycle of plastic waste etc. It entered into an agreement for installation of Baling Machine to make plastic balls for use at cement plants

which was yet to be installed. Audit also observed that, there was no waste disposal centres for domestic hazardous waste in RSP.

Management replied (February 2020) that RSP plans for establishment of waste deposition centres for collection of domestic hazardous waste in coming year.

vi) 'Waste to Energy' plant and solid waste processing facilities not implemented

Rule 21 of the SWMR, 2016 stipulated that non-recyclable waste having calorific value of 1500K/ cal/ Kg or more shall not be disposed of on landfills but utilised for generating energy either through refuse derived fuel or by giving away as feed stock for refuse derived fuel. Rule 22 stipulates that the local bodies and other concerned authorities may directly or by engaging agencies, set up solid waste processing facilities having one lakh or more population within two years from notification (8 April 2016) of this rule. Audit observed that BSL, RSP, ISP and BSP have not set up solid waste processing facilities.

Management replied (February 2020) that in BSL, a Technology Selection Committee has been constituted to examine proposal to set up Solid Waste Processing and Sanitary Landfill Facility. In BSP, tendering for setting-up of Waste to Energy plant was under process. RSP was also exploring alternatives for setting up micro-compost facility.

vii) Bio-Medical Waste

MoEF&CC issued (July 1998) 'Bio-Medical Waste (Management and Handling) Rules, 1998' for management of Bio-Medical Waste generated in hospitals which was revised (March 2016) as Bio-Medical Waste Management Rules, 2016 (BMW, 2016).

viii) Non-installation of Effluent Treatment Plant in Hospital

Schedule I Rule-F of BMW, 2016 stipulates to install Effluent Treatment Plant (ETP) in hospitals. Audit noted that BSP, BSL, and ISP have not installed ETP in their hospitals. Effluents from these hospitals are drained to oxidation pond and discharged into open nallah/ river.

Management replied (February 2020) that, ETP at the main hospital of BSP would be installed before December 2021. BSL was planning to construct Sewage Treatment Plant (STP) after completion of which no effluent from Bokaro General Hospital (BGH) would be discharged in Garga River. ETP at ISP was expected to be commissioned by March 2020.

ix) Water Conservation System

CPCB and SPCB issued instructions to the steel plants to re-use/ recycle water, which is flown to the river by installing ETP/ STP with Zero Liquid Discharge (ZLD). CPCB issued (January 2015) guideline on implementation of ZLD for water polluting industries to recover clean water from wastewater.

13.4.3.21 Non-installation of ETP and ZLD in plants

BSP and DSP have installed ETP/ STP, however, ZLD has not been installed fully in all the steel plants. Cases of non-installation of STP/ ETP and ZLD are given below.

i) In BSL, total water requirement is about 30 million gallons per day (MGD) for plant and township. About 10 MGD sewage water was discharged in oxidation ponds and 10 MGD was discharged into Garga River. CPCB issued (September 2011) direction for installation of STP with ZLD by December 2012. Since it was not complied by BSL, show cause notice was issued (June 2013) to complete the STP. Jharkhand PCB also advised BSL to stop discharging sewage and waste water to river without treatment. Audit observed that management initiated (2015) project for treatment and recycling of sewage and waste water of BSL Township but thereafter no action was taken. Due to non-installation of STP, BSL was losing 547.5 million gallons (approx.) of water annually and draining water without treatment to Garga River polluting the water. In plant area, recycling of water was not fully achieved because one out of two outfalls were not completed and water was discharged in Garga river which would have saved 3471 million gallons of water annually. Thus, BSL lost opportunity of annual saving of ₹11.05 crore⁵¹ due to non-recycling of water.

Management replied (February 2020) that setting up of STP in BSL township was at DPR stage.

ii) BSP had committed to zero discharge from its outlets along with seven mt expansion plan to prevent environment pollution. Out of three outlets for discharging industrial wastewater from plant, waste water was recycled in one outlet but was discharged into river in other two outlets. Chattisgarh Environment Conservation Board (CGECB) while renewing water consent instructed (August 2018) BSP to complete Water Recycling System for Outlet-B and C. BSP placed order (October 2014) for recycling of wastewater from Outlet-B to be completed in 15 months which was yet to be completed. Further, BSP placed order (May 2019) for Outlet-C to be completed by June 2020. Thus, due to delay in installation of Water Treatment Plant (WTP), BSP could not recover projected 16.43 Mm³ of water and gross margin of ₹12.22 crore annually on account of water savings.

Management replied (February 2020) that target date of completion for both projects were within revised timeline issued by CGECB (October 2021). The reply may be viewed in the light of the fact that for granting extensions for some Environmental Schemes, BSP had to submit BG of ₹27.25 crore to CGECB.

iii) DSP has STP in plants and township for treatment of effluent water and treated water is discharged into river. MoEF has given conditional clearance for MEP of DSP in 1996 that after modernisation, DSP would not discharge any effluent to downstream (ZLD). DSP entered into an agreement with DVC (2016) for supply of water, which allowed incentive of 20 per cent on the water bill on taking measures for zero effluent discharge. DSP has not implemented the ZLD yet and treated water was still discharged in river. DSP also suffered a loss of benefit of rebate of ₹3.81 crore annually.

Management replied (February 2020) that actions to achieve ZLD was at proposal stage.

iv) In RSP, an average 6.5 MGD of domestic sewage generated by township and storm water is sent to three oxidation ponds for treatment, which is discharged in a river. However,

⁵¹ 547.5 million gallon plus 3,471-million-gallon x ₹27.50 being current cost of water treatment for 1000 gallon

6.5 MGD of treated sewage water could be reused/ recycled to achieve a zero discharge. The proposal initiated (January 2015) to recycle domestic sewage was yet to be completed. Due to non-implementation of STP, the company is losing ₹10.51 crore per annum.

Management replied (February 2020) that RSP is committed to implement the scheme of recycling the domestic sewage expeditiously. Reply was silent on the steps taken to implement the scheme.

13.4.3.22 Non-compliance of ZLD in ISP

ZLD was not started at ISP. Audit noted that the agreement with DVC for supply of water provides for 20 *per cent* rebate on ZLD certification from West Bengal PCB. As per water audit report (February 2019) of FICCI, the quality of wastewater measured at point of discharge (Dihika) in respect of total dissolved solid, chlorides, hardness etc was very high in comparison to that at the point of intake. Thus, due to delay in ensuring ZLD at ISP, the Company apart from causing water pollution was also losing rebate on water of ₹0.47 crore annually (2018-19).

Management replied (February 2020) that preparation of Feasibility Report and Tender Specifications for ZLD at ISP was in progress.

13.4.4 Conclusion

SAIL Safety Organisation did not develop any plan or frame time line to implement its recommendations. Out of 686 recommendations, 258 were yet to be complied. Rupture in pipelines in Pump House at BSP led to fall in water pressure and BF Gas spread into PH causing death of six persons. Laxity in taking safety measures and unsafe practice of doing De-Blanking job of CO Gas Line on charged pipelines caused accident at BSP where 14 people died. There were less number of Safety Officers posted in plants than the statutory requirement. Non-disposal of fly ash and slag dump and non-setting up of sewage treatment plant led to delay in issue of EC in absence of which work for Sinter Plant and SMS-I packages at BSL was stopped. CO₂ emission in SAIL was higher than international standards as well as TATA Steel. Delay in completion of air pollution control system led to flaring up of gases in the environment. Average Specific Energy Consumption in SAIL was more than the world average as well as Tata Steel and RINL.

The para was issued to the Ministry in March 2020; their response was awaited (June 2020).

13.5 Avoidable expenditure by SAIL/ RSP

Failure of SAIL/ Rourkela Steel Plant to comply with Industrial Policy Resolutions of Government of Odisha regarding availing exemption from payment of electricity duty on captive power generation, led to avoidable payment of ₹16.35 crore.

Government of Odisha (GoO) introduced an Industrial Policy Resolution (IPR) 2007 (effective from 2 March 2007) to extend various incentives to different Industries. Para 20.2 of IPR 2007 provided that new industrial units setting up Captive Power Plants (CPP) shall be exempt from payment of 50 *per cent* electricity duty (ED) for self-consumption for a period of five years from the date of its commissioning. Department of Energy, GoO issued (8 August 2008) Operational Guidelines to enable the eligible industrial units to avail the

above exemption. Clause 6 of the guidelines stipulated that the exemption claim shall be filed in the prescribed form within six months from the date of commissioning of CPPs. Application received after the due date/ incomplete in any respect was liable to be rejected and delay in filing application was not to be condoned. Further, clause 7 of the guidelines stipulated that the eligible industrial unit claiming exemption shall submit application to the concerned General Manager (GM)/ Project Manager (PM), District Industries Centres (DIC) of GoO. Receipt of application along with relevant documents would be acknowledged by the department in prescribed form.

GoO subsequently introduced IPR 2015 (effective from 24 August 2015) wherein Para 5.4.4 (c) provided that new and existing industrial units setting up CPP with non-conventional sources and bio-fuel shall be exempted from payment of ED for five years from the date of commissioning as Green Energy Subsidy. The procedure to avail exemption from payment of ED was similar to that prescribed in operational guidelines under IPR 2007 except that the applicant was required to submit the claim within a period of one year from the date of commissioning of the unit.

Three power generating units⁵² of different capacities were commissioned at SAIL/ Rourkela Steel Plant (RSP) in March 2014, December 2014 and March 2015 respectively for its captive use. Another one MW Solar Power Plant (SPP) was also commissioned in February 2016 at RSP. As per the Operational guidelines, the application for exemption of ED was to be submitted by September 2014, June 2015, September 2015 and February 2017 respectively.

Audit observed that RSP submitted (July 2014), the application for exemption of ED under IPR 2007, in respect of 2x18 MW Steam Turbine Generators (STG) power plant. The acknowledgement of receipt of application from the Department of Industry, GoO was however, not available in the records. The Department of Energy, GoO, in response to a correspondence from RSP, denied (April 2015) receipt of any communication from RSP for exemption of ED. While applying for exemption from ED in respect of STG (July 2014), Management had informed GoO in the forwarding letter, that 'another 14 MW TRTG and 6.5 MW BPTG' were going to be commissioned soon. Application for exemption of ED was not submitted (July 2019) in respect of TRTG, BPTG and SPP, in the prescribed format as stipulated by the Operational Guidelines by RSP.

Audit also noted that generation of power started from STG and RSP started paying ED since November 2013. In respect of TRTG and BPTG also full payment for ED is being made by RSP since inception, whereas in respect of SPP, no payment of ED is being made. Claim was raised (16 November 2018) by GoO regarding payment of ED from SPP and in response, RSP requested (28 November 2018) for exemption from payment of ED. GoO however, clarified (December 2018) that such exemption could be availed only in case application for such exemption was made within prescribed time period as per IPR-2015.

⁵² *2x18 MW Steam Turbine Generators (STG) at Power and Blowing Station, 1x14 MW Top Recovery Turbo Generator (TRTG) in BF-V complex and 1x 6.5 MW Back Pressure Turbo Generator (BPTG) in CO complex commissioned on 21/03/2014, 08/12/2014 and 15/03/2015 respectively.*

Management replied (November 2019) that RSP applied for exemption of ED for all the generating units (STG, TRTG and BPTG) for five years on 21 July 2014 as per IPR 2007. It further stated that the matter had been taken up by the highest authority of RSP with the GoO to exempt all the generating units of PBS from the purview of ED.

Reply of Management is not acceptable as:

- Acknowledgement was not available in records regarding the application for exemption from payment of ED filed for STG. Moreover, only reference of two other power plants was made in the forwarding letter for application for exemption of ED in respect of STG and separate applications in the prescribed format were not submitted. Though correspondence was taken up (June 2015) by CEO, RSP with Principal Secretary, Department of Energy, GoO, seeking exemption from payment of ED for the first three power plants (STG, BPTG and TRTG), the matter was not followed up closely. After August 2015, the matter was only taken up verbally and RSP continued to pay ED.
- GoO did not accept the request of RSP regarding exemption from payment of ED for SPP and while raising a claim of ₹3.47 crore including interest, it stated (December 2018) that exemption could not be availed unless same had been applied for within prescribed time and obtained.

Thus, the failure of RSP to comply with the Industrial Policy Resolutions of Government of Odisha regarding availing exemption from payment of Electricity Duty on captive power generation, led to avoidable payment of ₹16.35 crore between November 2013 and March 2019 in respect of three power plants, which will increase till the completion of five years since commissioning of BPTG⁵³. Further, GoO raised (December 2018) demand for ₹3.47 crore on account of ED (including interest) with respect to the SPP which was yet (January 2020) to be paid.

The para was issued to the Ministry in December 2019; their response was awaited (June 2020).

⁵³ *BPTG (March 2020)*