सत्यमेव जयते

Report of the Comptroller and Auditor General of India on Operational Performance of Hindustan Copper Limited

SUPREME AUDIT INSTITUTION OF INDIA

लोकहितार्थ सत्यनिष्ठा

Dedicated to Truth in Public Interest

Union Government (Commercial)
Ministry of Mines
No. 12 of 2023
(Performance Audit)

Image: Malanjkhand Open Cast Mines

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Laid on the table of Lok Sabha and Rajya Sabha on……..

CONTENTS

Preface

The Performance Audit Report on Operational Performance of Hindustan Copper Limited has been prepared under the provisions of Section 19-A of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act, 1971. The Audit has been carried out in line with the Regulations on Audit and Accounts, 2007 (amended in 2020) and Performance Audit Guidelines, 2014 of the Comptroller and Auditor General of India.

The Audit covered the period from 2016-17 to 2021-22. The Report is based on the scrutiny of documents pertaining to the Hindustan Copper Limited and Ministry of Mines, Government of India.

This Report examines the adequacy of efforts of the Management towards systematic exploration, expansion of mining capacity and mining of copper ore. Moreover, Audit also examined the economy, efficiency and effectiveness in plant operations and marketing of products by the Company.

Audit acknowledges the co-operation and assistance extended by the officers and staff of Ministry of Mines, Government of India and Hindustan Copper Limited during the Performance Audit.

Executive Summary

EXECUTIVE SUMMARY

Hindustan Copper Limited (the Company) is the only copper mining company in the Country, having access to approximately 80 *per cent* of the copper reserves in India.

Justification for taking up this audit

This performance audit was conducted to assess the operational performance of the Company and to ascertain whether the Company was undertaking desired measures to enhance availability of copper in India by exploiting the domestic natural resources.

The objectives of the performance audit were to assess whether:

- Systematic exploration and adequate mine development activities were undertaken to produce the required quantity of ore.
- The Company was able to produce desired quantity and quality of copper ore and copper concentrate.
- The Company operated its manufacturing capacity efficiently, economically and effectively to establish itself as a sustainable market player in the industry.
- The Company was able to market its products efficiently and effectively in order to maximise the revenue.

A summary of the audit findings and audit recommendations is given below:

Audit Findings:

The profitability of the Company was primarily driven by mining operations as more than 95 *per cent* of the value was in copper mining. The Company, therefore, in its Corporate Plan 2020 envisaged (November 2011) to consolidate its position in the mining domain by increasing its mining capacity from the existing 3.39 million tonnes per annum to 12.20 million tonnes per annum over the next five to seven years. The smelting and refining business of the Company was not a value creator, mainly due to its limited plant capacity and locational disadvantages, therefore, the Management planned that copper concentrate rather than refined copper products, would be the primary product of the Company in future. Development of new mines through green field exploration was also planned by the Management.

Geological Exploration and Expansion of Mining Capacity

The Company had not undertaken any greenfield exploration in the last three decades. Since 2010, the Company had made only eight applications for greenfield explorations, which had not yet been approved by the Ministry of Mines. Even after receiving the status of Notified Exploration Agency, the Company did not adequately work in green field exploration activities.

Recommendation 1: The Company may revisit its extant procedures for identification of deposits, submission of applications for greenfield geological exploration and their follow up to make them more efficient and effective.

(Para 2.1.1)

The Company did not have any specific policy or guidelines for exploration of its existing copper mines. No time bound physical targets were fixed for the same either. The Brownfield exploration activities of the Company were deficient to the extent that the Company had not yet completed lateral and depth exploration of its existing mines in prescribed time.

Recommendation 2: The Company may plan its exploration activities so as to ensure detailed exploration of the entire potentially mineralised area as per the Mineral Conservation and Development Rules, 2017.

(*Para 2.1.2*)

The Company planned to increase its mining capacity from 3.39 million tonnes per annum to 12.20 million tonnes per annum by 2016-17 under its Corporate Plan 2020. However, the mining capacity could be enhanced to only 5.20 million tonnes per annum mainly due to multiple lapses by the Management in areas of planning, execution and monitoring. Further, lack of development of *Khetri* Phase-II compelled the Management to undertake activities which would cause avoidable expenditure of approximately ₹139.55 crore.

Recommendation 3: The Management may ensure that sufficient geological studies are undertaken before conducting any expansion activities especially in areas influenced by geological faults.

(Para 2.2.2.1)

Due to lack of preparation and approval of Detailed Project Report in the planning phase, the Management could not ensure encumbrance free access for the contractor for executing expansion activities at *Surda* mines. Other planning related lapses such as improper selection of site, delayed receipt of Environment Clearance and mining lease causing suspension of development activities, sudden abandonment of site by the sub-contractor etc., also contributed to the delay in the project. Thus, due to inadequate planning by the Management for undertaking expansion activities at *Surda* mines, the work remained incomplete resulting in unfruitful expenditure of ₹51.44 crore.

Recommendation 4: The Management may ensure that Detailed Project Reports are prepared before award of mining expansion projects.

(Para 2.2.2.2)

The decision of the Management to award the work order for development of underground mines at *Malanjkhand* for ₹1,176.12 crore to a blacklisted Contractor with strained financial condition was not prudent. Only 50 *per cent* of the work was completed after spending

₹606.83 crore (excluding escalation) and further ₹1,107.73 crore was required to complete the remaining work. The expected cost escalation of the project stood at ₹538.44 crore.

Recommendation 5: The Management may include appropriate clauses in the tender documents, such as parameters to screen financially sound bidders (net worth, corporate debt restructuring etc.), linking of contractual milestones with recovery of liquidated damages, descoping of work in case of poor execution etc., to ensure timely completion of work. The Management may initiate proceedings to fix responsibility for lack of proper screening the financial viability of the Contractor at the tendering stage.

(Para 2.2.3.1)

Lapses by the Management at multiple stages such as faulty preparation of initial tender document, delay in seeking environmental clearance, lower fund allocation for conducting brownfield exploration etc., created conditions due to which capacity expansion of *Kolihan* mines could not take place and opportunity to increase revenue was also lost.

The Company, for getting Stage II Forest Clearance, obtained (November 2014) compliance under Forest Rights Act, 2006 for only surface area instead of total forest area under the mining lease leading to delay in the *Rakha* and *Kendadih* Mines projects by 18 months each.

Recommendation 6: The Management may institute a system to ensure that updated knowledge regarding all applicable laws, rules and guidelines is regularly available with the Company and all decisions are taken accordingly.

(Paras 2.2.3.2 and 2.2.3.3)

Mining operations and Allied activities

The Company had seven mining leases, namely *Surda, Kendadih, Rakha, Malanjkhand, Khetri, Kolihan* and *Chandmari* mining leases spread across three states of *Jharkhand, Madhya Pradesh* and *Rajasthan*. Of the above mining leases, *Surda, Malanjkhand, Khetri* and *Kolihan* were operational as on April 2016. *Kendadih* was subsequently reopened (December 2017) while *Rakha* and *Chandmari* were not in operation upto March 2022.

The actual ore production of the Company was ranging between 3.27 million tonnes (2020-21) to 4.14 million tonnes (2018-19) against the target ranging between 3.80 million tonnes (2021-22) to 4.78 million tonnes (2019-20).

Delay in submission of requisite documents to the Ministry of Environment, Forest and Climate Change caused delay in receipt of Environment Clearance and Mining Lease leading to suspension of mining operations in *Surda* mines during the period from September 2014 to June 2015 and again from April 2020 to May 2022. During this period, the Company was not able to produce 11.91 lakh tonnes of copper ore. Moreover, as per the provisions of Mines and Minerals (Development and Regulation) Amendment Act 2021, upon renewal of mining lease

not granted through auction, the Company would have to pay ₹13.18 crore as additional 50 *per cent* royalty for ore extracted.

Recommendation 7: The Management may ensure that necessary steps are taken in a timely and organised manner so that all statutory clearances like Environment Clearance, renewal of mining lease and Consent to operate from the State Pollution Control Board are received timely and non-availability of the same do not adversely affect the mine operations.

(Para 3.1.1)

Awarding of contract by the Management without getting the mine ready for production and simultaneously, failure of the contractor to mobilise the required resources for the project resulted in loss of opportunity to generate revenue from *Malanjkhand* underground mine to the tune of ₹1,051 crore. Further, the Company did not impose Liquidated Damages as per provision of the contract and rather made adhoc payment of ₹49.48 crore, which was not payable as per the provisions of the Contract.

Recommendation 8: The Management may ensure that the payments to the contractors are made as per the provisions of the contract. In case of deviation, the Management may fix accountability and take corrective action so that the financial interest of the Company is safeguarded.

(Para 3.1.2)

Scrutiny of records of *Khetri* and *Kolihan* Mines during the period from 2016-17 to 2021-22, revealed that the annual production target fixed by the Management was lower than the Mining Plan approved by the Indian Bureau of Mines by 1.18 million tonnes (valuing ₹627.42 crore)

Recommendation 9: The Management may plan mine development and ore production works in such a manner that optimum ore production is achieved that is commensurate with mines' capacities.

(Para 3.1.3)

Due to inadequate crushing of ore at *Khetri* concentrator plant, the Company was not able to ensure optimum recovery of copper metal. It failed to ensure conservation of scarce minerals of the Country, leading to under recovery of 877.49 tonnes of copper metal valuing ₹47.35 crore.

Recommendation 10: The Management may ensure that equipment such as screens, meshes and On-Stream Analyser are installed and working as per design parameters at all stages of the beneficiation process to achieve optimum recovery of metal from the ore.

(Para 3.3.1)

Due to lack of corrective action by the Management to improve the quality of copper concentrate of *Khetri*, the Company had to liquidate the lower quality copper concentrate through export at a lower price which resulted in loss of revenue amounting to ₹136.23 crore.

(Para 3.3.2)

Due to negligence and lack of due diligence by the Management, the Company made excess payment of ₹4.91 crore towards Net Present Value of 106.23 hectares of forest land which was not under the mining lease of the Company. Moreover, ignoring the findings of 3-D subsidence study, the Company incurred avoidable payment of ₹0.53 crore towards Net Present value of forest land which was not payable as per the March 2019 notification of the Ministry of Environment Forest and Climate Change.

Recommendation 11: The Management may review payments of Net Present value in Surda mines and take necessary steps for recovery/adjustment of excess payments from the State Government.

(Para 3.4.1)

The Company had to bear undischarged liability of the contractors due to improper monitoring of the contractors at *Surda* mines. Moreover, in four out of 13 contracts relating to mining activities, the Management also failed to enforce the terms of the contracts, resulting in undue advantage to the contractors as well as avoidable expenditure of ₹30.68 crore. Over a period of time, due to improper maintenance and non-upgradation of the *Mosabani* Concentrator plant, its capacity reduced from 0.9 million tonnes per annum to 0.4 million tonnes per annum

Recommendation 12: The Management may assess the ore beneficiation capacity as per its mine expansion plan and improve the ore beneficiation plants for optimum recovery of metals.

(Para 3.5)

Plant Operations

The Company operated its smelting and refinery unit at *Ghatsila* at a loss of margin of ₹296.06 crore. There was under recovery of metal valuing ₹203.64 crore and higher consumption of oxygen and fuel oil costing ₹20.59 crore. Moreover, the operations were also affected due to non-development of Indian Copper Complex group of mines ultimately leading to suspension of the Plant.

The Company did not have any comprehensive plan for renovation and upgradation of the existing Indian Copper Complex, *Ghatsila* Smelter and Refinery Plant. Certain activities like installation of new Nickel recovery plant, replacement of steam blower with electric blower etc., were carried out but, due to improper planning and implementation, the same remained unfruitful.

The activities undertaken by the Management towards addition of new smelting and refining units remained futile after incurring expenditure of more than ₹571.99 crore because of deficiencies in planning and execution of the same. Due to deterioration of the financial health of the Company, the Management had to raise equity capital through Qualified Institutional Placement whereby the shareholding of Government of India was diluted by 3.29 *per cent*.

Recommendation 13: The Management may fix responsibility for running an unviable Smelter and Refinery plant despite the decision of the Company in its Corporate Plan 2020 to discontinuing the operations of its existing smelting and refining plants.

Recommendation 14: The Management may ensure that the plan for its copper smelting and refining operations is aligned with its overall Business Plan and does not adversely affect the Company's financial position and performance.

(Paras 4.2.1, 4.2.2, 4.2.3 and 4.2.5)

The Company in its Corporate Plan decided to ensure 90 *per cent* capacity utilisation of *Taloja* Copper Project through enhanced job work thereby reducing the overall cost of *Taloja* Copper Project. However, due to highly saturated market, technological challenges, disadvantageous batch size and absence of road map the Company could not enhance the job work.

Recommendation 15: Considering the Management's decision not to produce copper cathode, the tolling policy for Taloja should be updated so that 90 per cent capacity utilisation of the Plant is ensured.

(Para 4.3.1)

Sub-optimal capacity utilisation of *Taloja* Copper Project not only caused lower revenue generation but also caused generation of defective products and incurrence of higher fuel expenses.

Recommendation 16: The Company may frame a documented strategy for optimum utilisation of Taloja Copper Project.

(Para 4.3.2)

19.6 millimetres diameters wire rods produced by *Taloja* Copper Project were frequently failing the quality tests due to presence of flakes, surface cracks, chippings and pit marks.

Recommendation 17: The Management may ensure technological upgradation of the Taloja Copper Plant to ensure manufacturing of products with desired dimensions and acceptable quality.

(Para 4.3.3)

Sales and Marketing Activities

Although the Company shifted its business strategy from sale of refined copper to sale of copper concentrate, the Management had not yet developed a dedicated marketing policy for sale of bigger lots (greater than 25 tonnes) of copper concentrate. Further, in the absence of any marketing policy, the Company was not able to ascertain the optimum lot size of available copper concentrate for sale resulting in higher inventory holding cost.

Recommendation 18: The Management may adopt a well-defined marketing policy covering new market discovery, ensuring despatch of goods as per declared specification, proper material handling, laying better grievance and dispute redressal mechanism etc.

Recommendation 19: The Management may ensure that the new Marketing Policy includes adequate guidance to facilitate minimisation of inventory holding period through efficient tendering with optimum lot sizes.

(Paras 5.2.1 and 5.2.2)

The quality control by the Management was inadequate. Due to ineffective testing, there was over projection of copper content leading to cancellation of sale contract. Non screening of copper concentrates before despatch resulted in delay of lifting by the customer.

Recommendation 20: The Management may ensure that various aspects of its sales process such as storage, transportation, quality control, monitoring and internal control mechanisms are systematically upgraded and improved so that objectives such as customer satisfaction, full realisation of product value and preservation of the Company's goodwill are satisfactorily achieved.

Recommendation 21: The Management may fix responsibility for delay in raising sales invoices.

(Para 5.4)

Chapter: 1
Introduction

CHAPTER 1

INTRODUCTION

1.1 Introduction

Copper, a malleable and ductile metallic element, is an excellent conductor of heat and electricity. Application of copper is found in sectors such as electrical and electronic products, building construction, industrial machinery and equipment, transportation equipment and consumer and general products.

As per the data published in the Indian Minerals Yearbook 2020, published in June 2022 by the Indian Bureau of Mines, India has a limited copper reserve of about 2.73 million tonnes of copper metal which is only 0.31 *per cent* of world reserves of 870 million tonnes. During the fiscal year 2019-20, 29,771 tonnes of copper was mined in India which was only 0.14 *per cent* of the world copper metal production of 20.70 million tonnes. Chile continued to be the largest single producer of copper with 28 *per cent*.

The domestic refined copper production was around 1.70 *per cent* (0.41 million tonnes) of the global refined copper production of 24.10 million tonnes. China was the largest producer of refined copper with 9.78 million tonnes in the year 2019 (41 *per cent* of world production) followed by Chile (9 *per cent*).

The Company sells its copper concentrate in both domestic and international markets. The export of copper concentrate during 2019-20 was mainly to China (75 *per cent*) followed by Malaysia (14 *per cent*) and Taiwan (10 *per cent*). The other Indian companies do not have mining operations in India and primarily rely on import of copper concentrate to produce end products. The import of copper concentrate was mainly from Chile (63 *per cent*) followed by Peru (12 *per cent*) and Australia (9 *per cent*).

During the period from 2016-17 to 2021-22, the export[1] of copper concentrate ranged from 0.03 million tonnes (2021-22) to 0.21 million tonnes (2019-20) while the import of copper concentrate ranged from 0.42 million tonnes (2020-21) to 1.49 million tonnes (2017-18). This deficit of foreign trade in copper concentrate contributed to an average of 1.44 *per cent* to the total trade deficit of the country during the period 2016-17 to 2021-22 as illustrated in Table 1.1:

[1] ***The Company sells copper concentrate through tendering in which the highest bidder is selected. The successful bidder may be domestic company or international company. Further, the Company does not have influence over the importing decisions of other companies of this sector.***

Table 1.1: Trade Deficit due to import of Copper Concentrate

Period	Total Trade Surplus/ (Deficit) of the Country (US$ million)	Foreign Trade in Copper Ore and Copper Concentrates			
		Import Value (US $ million)	Export Value (US $ million)	Trade Surplus/ (Deficit)	*Per centage* of Total Deficit
2016-17	-1,08,504.60	2,725.96	15.68	-2,710.28	2.50%
2017-18	-1,62,054.83	4,319.07	59.09	-4,259.98	2.63%
2018-19	-1,84,000.33	1,753.58	236.81	-1,516.77	0.82%
2019-20	-1,61,348.24	1,225.34	289.52	-935.82	0.58%
2020-21	-1,02,627.40	796.63	103.19	-693.44	0.68%
2021-22	-1,91,047.65	3,008.67	52.74	-2,955.93	1.55%
Total	**-9,09,583.05**	**13,829.25**	**757.03**	**-13,072.22**	**1.44%**
Average	-1,51,597.18	2,304.88	126.17	-2,178.70	1.44%

Source: Export Import Data Bank, Ministry of Commerce and Industry, Government of India

The table clearly indicates that enhanced efforts of the Company towards increasing the availability of domestically produced copper have the potential to contribute significantly towards reducing the trade deficit of the Country.

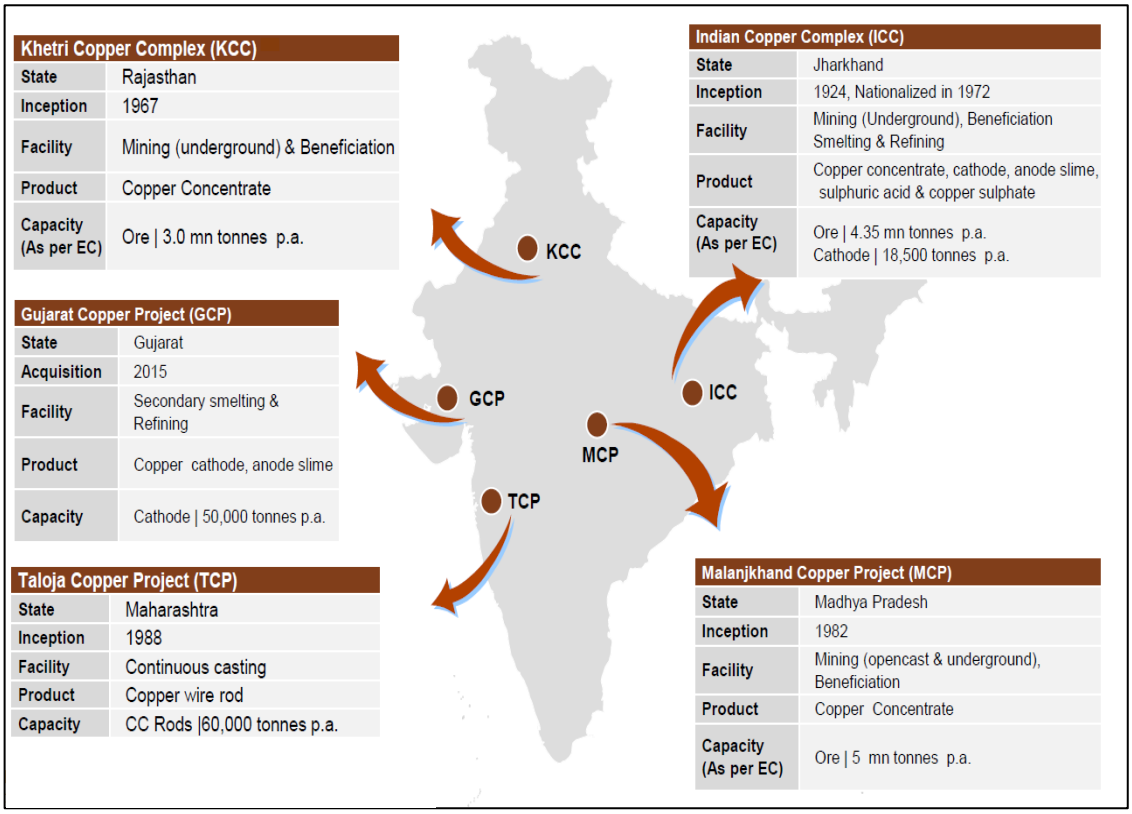
1.2 Company's Profile

The Company is a 'Mini Ratna- Category I' company with its headquarters in Kolkata, West Bengal. It was incorporated by the Government of India (GoI) under the administrative control of Ministry of Mines (MoM) in November 1967.

It undertakes exploration and mining activities, produces and markets copper products like copper concentrates (marketable intermediate product), copper cathodes (finished product) and copper wire rods (value added product). This ability makes it the only vertically integrated copper producer in the country.

The Company operates from mines and plants spread across five operating clusters as depicted in **Figure 1.1**.

Figure 1.1: Units of Company



Source: Records of the Management (Investor Presentation)

a) *Khetri* Copper Project located in *Jhunjhunu* district of *Rajasthan* has three adjacent mining leases, namely *Khetri* mines, *Kolihan* mines and *Chandmari* mines. *Khetri* Mines has two functional blocks, namely *Khetri* and *Banwas*. *Chandmari* mines is non-operational. The ore produced at *Khetri* and *Kolihan* mines are beneficiated at a concentrator plant located within the mining lease area of *Khetri* mines.

b) Indian Copper Complex is located in *Singhbhum* (East) district of *Jharkhand* near *Ghatsila*, with three adjacent mining blocks, namely *Surda*, *Kendadih* and *Rakha* mines. *Kendadih* mines has two blocks *Kendadih* and *Siddheswar* while *Rakha* mines has three blocks, namely *Chapri*, *Rakha* and *Tamapahar*. The ore produced in this group of mines is beneficiated at *Mosabani* concentrator plant near *Surda* mines. Indian Copper Complex, *Ghatsila* houses a Smelter and Refinery plant where copper concentrates from *Ghatsila* mines are also processed to produce copper cathode.

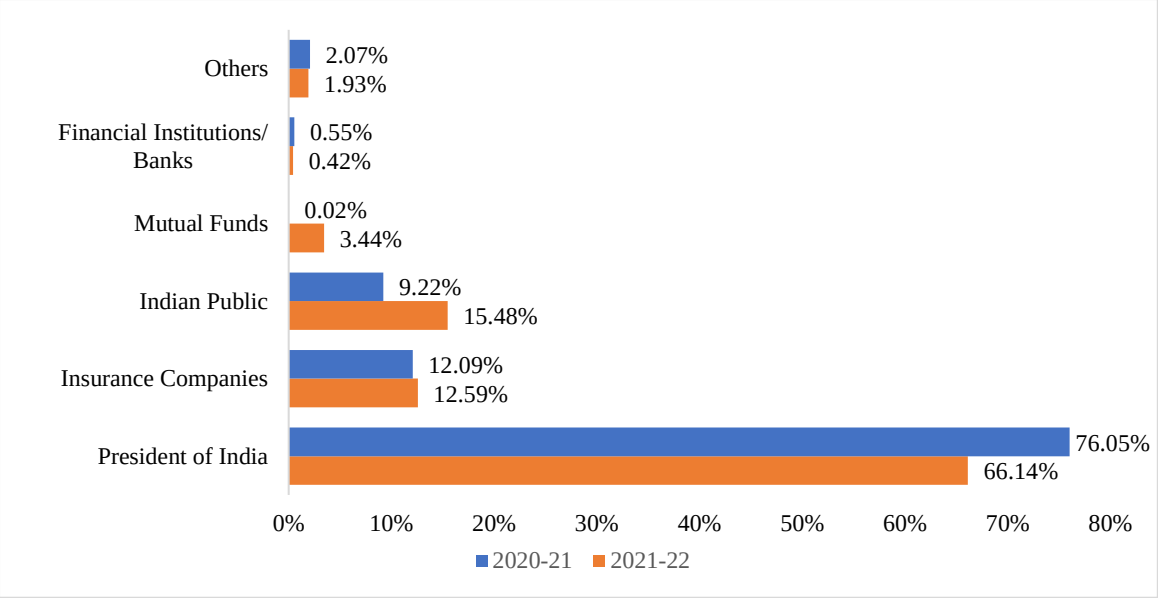
c) *Malanjkhand* Copper Project, located in *Balaghat* district of Madhya Pradesh, houses the largest and the only open cast copper mine with a concentrator plant of suitable capacity.

d) *Taloja* Copper Project was set up in *Raigad* district of *Maharashtra* to make copper wire rods of different sizes from copper cathode with an installed capacity of 60,000 tonnes per annum.

e) *Gujarat* Copper Project located in Bharuch district of Gujarat was a secondary copper smelter and refinery plant having a capacity of producing 50,000 tonnes of cathode per annum.

Shareholding Pattern of the Company: The shareholding pattern in the Company during 2020-21 and 2021-22 is depicted in **Figure 1.2**:

Figure 1.2: Share holding Pattern *(in per cent)*



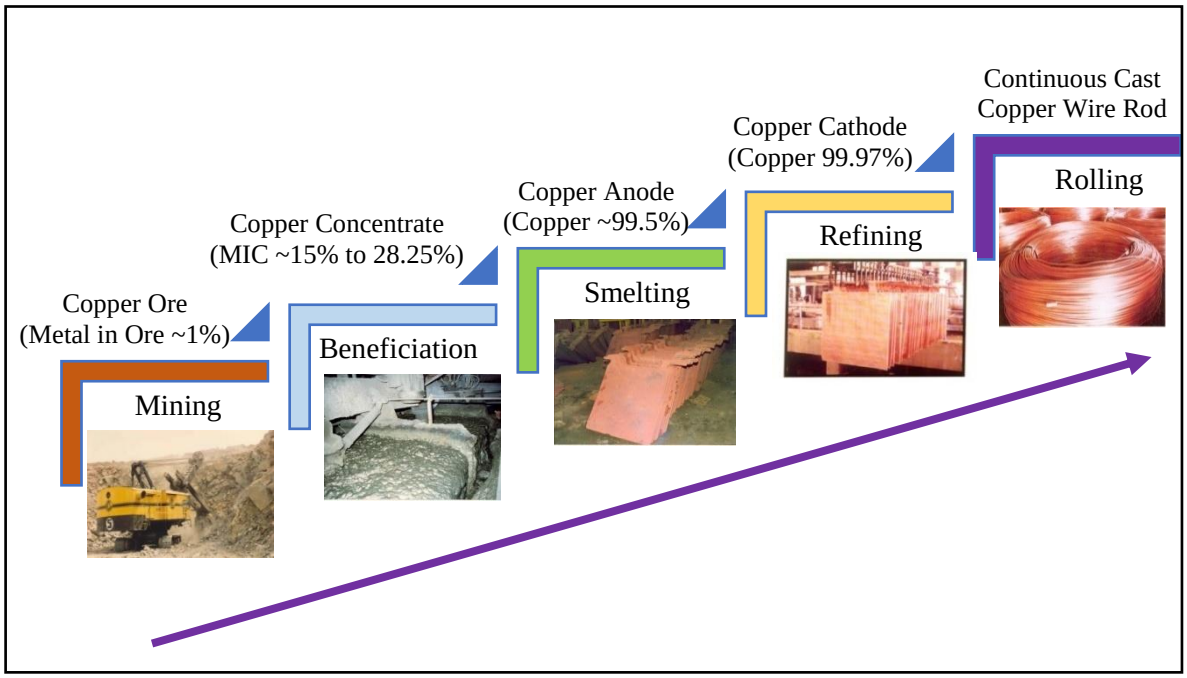
Source: Annual Report of the Company

Figure 1.2 shows that the shareholding of the Government of India in the Company reduced from 76 *per cent* in 2020-21 to 66 *per cent* in 2021-22 due to disinvestment of government holdings in the Company and issue of fresh equity as Qualified Institutional Placements (discussed in paragraph 4.2.5).

1.3 Production process of copper in the Company

The copper ore mined by the Company contains one *per cent* copper. This ore is processed in a concentrator/beneficiation plant to produce copper concentrate (containing 15 *per cent* to 28.25 *per cent* copper) which is converted into copper anodes (containing 99.5 *per cent* copper) by smelting, copper conversion and fire refining. These anodes are refined by an electrolytic process to obtain copper cathode (containing 99.97 *per cent* copper). Copper cathode is melted and cast into continuous cast wire rods. The production process is depicted in **Figure 1.3**.

Figure 1.3: Copper Production Process



(Source: Figure created using relevant records of the Management)

Two by-products i.e., anode mud and sulphur dioxide are produced in the above process. Anode mud may either be sold in the market or precious metals like gold and silver may be recovered by beneficiation process. Sulphur dioxide is used to produce sulphuric acid which is marketable.

1.4 Shift in Business Plan of the Company

The profitability of the Company was primarily driven by mining operations as more than 95 *per cent* of the value was in copper mining as it is the only mining company in the Country. The Company also enjoyed a unique and monopolistic position in India. However, the smelting and refining business of the Company was not a value creator, mainly due to its limited plant capacity and locational disadvantages, involving transportation cost of copper concentrate to smelter plants. The smelting and refining segment in India was mainly dominated by two strong competitors (Hindalco Industries Limited [2]and Vedanta Limited[3]).

The Company, therefore, planned (November 2011) to consolidate its position in the mining domain over the next five to seven years which would establish the platform for aggressive growth thereafter. It was planned that copper concentrate rather than refined copper products, would be the primary product of the Company in future.

Corporate Plan 2020 (November 2011) and Corporate Plan 2030 (June 2020) were adopted by the Company, which among other goals, primarily envisaged enhancement of ore

[2] ***Dahej unit of Hindalco Industries Limited was established in 1998.***
[3] ***Sterlite Copper a unit of Vedanta Limited was established in 1996.***

production capacity to a level of 12.20 million tonnes per annum by 2016-17 in stages and 20.45 million tonnes per annum till 2030.

Development of new mines through green field exploration was also envisaged by the Management. The Company considered continuing operations of Smelter and Refinery Plant at its Indian Copper Complex, *Ghatsila* for strategic reasons rather than economic. The Company would then have option either to directly sell the Cathode produced from its *Ghatsila*'s Smelter and Refinery or feed the Cathode in its *Taloja* Copper Project[4] for production of the continuous cast copper wire rods.

The future development of the Company as envisaged in the Corporate Plans was a paradigm shift in business plan of the Company, from undertaking operations as an entity which was till then the only vertically integrated copper industry in India, to a Company which would now be limiting its role primarily to mining and selling of copper concentrate to achieve higher revenue.

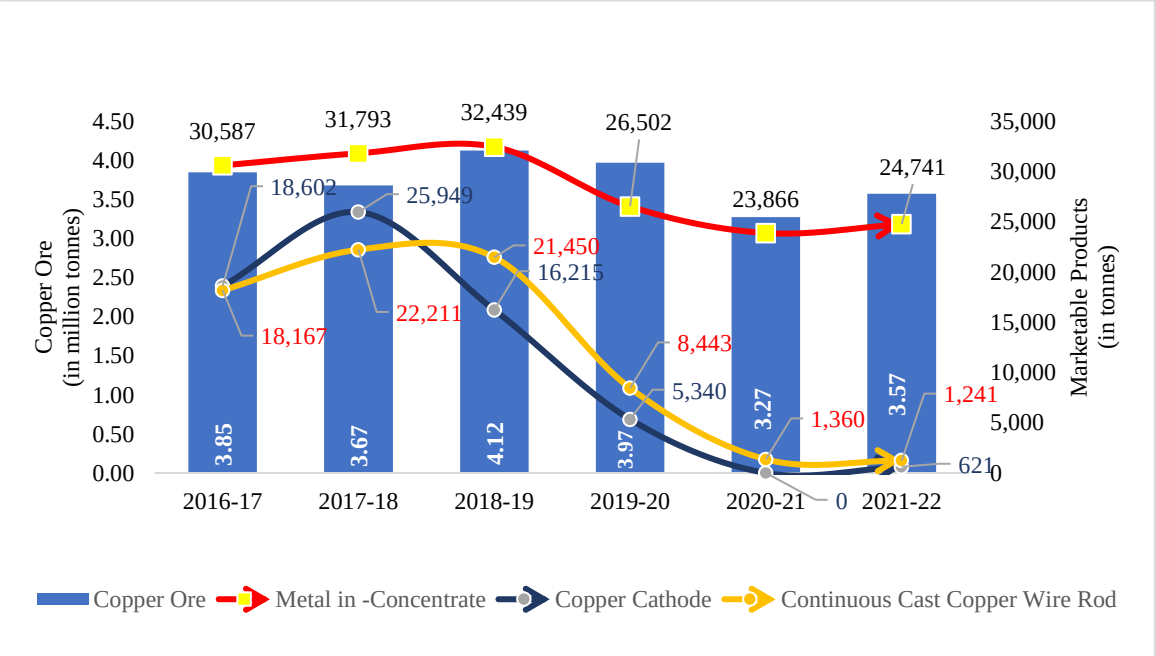
1.5 Production Performance of the Company

1.5.1 Performance of the Company over the years

Production of the main products of the Company during the last five years ending 31 March 2022 is as below:

Figure 1.4: Production Performance of the Company

(in tonnes)



(Source: Annual Report of Hindustan Copper Limited)

[4] ***Wire rods manufacturing plant at Taloja, Maharashtra***

Production of Copper Ore:

From the above figure, it may be observed that:

- The production of the copper ore increased from 3.85 million tonnes in 2016-17 to 4.12 million tonnes in 2018-19. This was mainly due to commissioning of *Banwas* Block of *Khetri* Mines.
- However, the production of copper ore fell during the period from 2019-20 to 2021-22 mainly due to suspension of mining activities in *Surda* Mines and constraints in *Khetri* copper mines (discussed in Chapters 2 and 3).
- Due to the suspension of operation of Indian Copper Complex, *Ghatsila* from December 2019, the production of copper cathode drastically decreased in 2019-20 and became nil in 2020-21, which had a cascading effect on the production of continuous cast copper wire rod at *Taloja* Copper Project (discussed in Chapter 4).

1.5.2 Performance of the Company *vis-a-vis* its domestic peers

Production of Copper Cathode: The performance of the Company in production of copper cathode in comparison with the other two domestic peers during the period starting from 2016-17 to 2021-22 was as below:

Table 1.2: Installed Capacity of Copper Cathode and Capacity utilisation

(in lakh tonnes)

Period		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Hindustan Copper Limited	Capacity	0.69	0.69	0.69	0.69	0.19	0.19	0.52
	Production	0.19	0.26	0.16	0.05	0	0.01	0.11
	Capacity Utilisation	27.54%	37.68%	23.19%	7.25%	0.00%	5.26%	21.34%
Vedanta Limited	Capacity	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	Production	4.03	4.03	0.87	0.77	1.01	1.25	1.99
	Capacity Utilisation	100.75%	100.75%	21.75%	19.25%	25.25%	31.25%	49.83%
Hindalco Industries Limited	Capacity	5.00	5.00	5.00	5.00	4.20	4.20	4.73
	Production	3.76	4.10	3.47	3.26	2.62	3.59	3.47
	Capacity Utilisation	75.20%	82.00%	69.40%	65.20%	62.38%	85.48%	73.24%
Total	Capacity	9.69	9.69	9.69	9.69	8.39	8.39	9.26
	Production	7.98	8.39	4.5	4.08	3.63	4.85	5.57
	Capacity Utilisation	82.35%	86.58%	46.44%	42.11%	43.27%	57.81%	60.19%
Market share of the Company	Capacity	7.12%	7.12%	7.12%	7.12%	2.26%	2.26%	5.65%
	Production	2.38%	3.10%	3.56%	1.23%	0.00%	0.21%	2.00%

(Source: Annual Report of respective Companies)

From the above table, it may be seen that:

- With the commissioning (October 2016) of Gujarat Copper Project (0.50 lakh tonnes per annum), the refinery capacity of the Company increased to 0.69 million tonnes per

annum which was approximately 7 *per cent* of the total domestic capacity. However, after suspension of smelting and refining operations at Gujarat Copper Project (July 2019), the capacity reduced to 0.19 million tonnes per annum which was only 2 *per cent* of the total domestic capacity. Thus, the Company was never a significant player in the Indian Copper Industry as far as production of copper cathode was concerned.

- The capacity utilisation of the Company during the period starting from 2016-17 to 2019-20 was lower than its domestic peers due to suboptimal operation of Gujarat Copper Project. This was due to inadequate quantity of raw material. Moreover, the Company also suspended the operation of the smelting and refinery plant at Indian Copper Complex (December 2019) as the Company decided to sell copper concentrate instead of further processing. This further affected capacity utilisation.
- During the period starting from 2016-17 to 2021-22, Hindalco Industries Limited alone accounted for 51 *per cent*[5] of installed capacity and 62 *per cent*[6] of the total production of copper cathode in India.

Production of Copper Wire Rods: The performance of the Company in the production of copper wire rods in comparison with that of the other two domestic peers during the period from 2016-17 to 2021-22 was as below:

Table 1.3: Installed Capacity and Utilisation of Copper Wire Rod Production Plant

(in lakh tonnes)

Period		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Hindustan Copper Limited	**Capacity**	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Production	0.18	0.22	0.21	0.08	0.01	0.01	0.12
	Capacity Utilisation	30%	37%	35%	13%	2%	2%	20%
Vedanta Limited	**Capacity**	2.40	2.40	2.40	2.40	2.58	2.58	2.46
	Production	2.08	2.03	1.11	1.00	1.22	1.80	1.54
	Capacity Utilisation	87%	85%	46%	42%	47%	70%	63%
Hindalco Industries Limited	**Capacity**	3.65	3.65	3.65	3.65	3.15	5.40	3.86
	Production	1.50	1.56	2.45	2.45	2.35	2.59	2.15

[5] ***4.73 lakh tonnes /9.26 lakh tonnes = 51.08 per cent***
[6] ***3.47 lakh tonnes /5.57 lakh tonnes = 62.30 per cent***

Period		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
	Capacity Utilisation	41%	43%	67%	67%	75%	48%	56%
Total	**Capacity**	6.65	6.65	6.65	6.65	6.33	8.58	6.92
	Production	3.76	3.81	3.77	3.53	3.58	4.40	3.81
	Capacity Utilisation	57%	57%	57%	53%	57%	51%	55%
Market share of the Company	**Capacity**	9.02%	9.02%	9.02%	9.02%	9.48%	6.99%	8.76%
	Production	4.79%	5.77%	5.57%	2.27%	0.28%	0.23%	3.15%

(Source: Annual Reports of respective Companies)

From the above table, it may be seen that:

- The installed capacity of the Company has been stagnant at 0.60 lakh tonnes per annum for the above period.
- The capacity utilisation of the Company has shown a declining trend from 2017-18 onwards. This was mainly because the Company has not been processing its copper concentrate into copper cathode. Moreover, since January 2020, the Company was utilising only *Taloja* Copper Project facility for the purpose of tolling[7] for third party cathode (discussed in Chapter 4).
- The capacity utilisation of the Company has been much lower than its peers.

1.6 Financial performance of the Company

The financial performance of the Company during the period from 2016-17 to 2021-22 is given in the **Table 1.4**:

Table 1.4: Financial Position and Performance of the Company

(₹ in crore)

Particulars	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Share Capital	462.61	462.61	462.61	462.61	462.61	483.51
Other Equity	1,004.35	1,064.68	1,174.36	497.66	626.71	1,427.74

[7] ***Job work (tolling activities) for conversion of copper cathode to continuous cast copper wire rod***

Borrowings	472.07	656.95	1,070.11	1,563.67	1,137.43	408.32
Net Block (including CWIP)	632.86	991.54	1,338.60	1,569.05	1,501.01	964.30
Net Worth (Excluding Deferred Expenditure)	829.04	831.59	953.38	339.29	536.75	810.85
Turnover[8]	1,101.81	1,599.26	1,753.29	803.17	1,760.84	1,812.21
Profit before tax	94.20	121.69	230.00	-538.00	86.90	381.72
Debt Equity Ratio	0.49	0.68	0.95	4.21	2.12	0.50
Operating Profit Margin (%)	6.30%	6.23%	14.19%	-66.56%	6.51%	19.89%
Net Profit Margin (%)	5.12%	4.87%	8.30%	-70.89%	6.25%	20.63%

(Source: Annual Reports of Hindustan Copper Limited)

From the table, it may be observed that:

- Despite the fall in production of copper concentrate from 30,587 tonnes in 2016-17 to 24,741 tonnes in 2021-22 during the period from 2016-17 to 2021-22, the turnover of the Company increased from ₹1,101.81 crore to ₹1,812.21 crore. This was mainly due to increase in copper prices in the international market (namely London Metal Exchange). For instance, the average value of copper concentrate increased from ₹3.46 lakh per tonne (2016-17) to ₹7.22 lakh per tonne (2021-22).

- Increase in international copper prices improved the margins of the Company which is evident from the increase in profit before tax of the Company from ₹94.20 crore (2016-17) to ₹381.72 crore (2021-22).

- Loss before tax in 2019-20 and lower profit before tax 2020-21 was mainly due to higher provisions towards capital work-in-progress (₹127.78 crore) and finished goods (₹183.31 crore).

Profitability (EBITDA Margin)

A comparison of the Revenue from operations and Earnings Before Interest Tax Depreciation and Amortisation (EBITDA)[9] in respect of copper business of the above three entities during the period from 2016-17 to 2021-22 is given in **Table 1.5**:

[8] ***The financial figures had been revised / regrouped by the Management.***

[9] ***EBITDA is a widely used measure to assess the profitability of the business irrespective of the cost of financing, taxation policy, idle capacity, and depreciation policy of the business. Negative EBITDA figure means loss before charging interest, depreciation, corporate tax and amortisation.***

Table 1.5: Comparison of Revenue from operation and EBITDA

(₹in crore)

Period		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Hindustan Copper Limited	Revenue	1,216.94	1,647.90	1,753.44	803.17	1,760.84	1,812.21	1,499.08
	EBITDA	245.46	307.98	538.70	-186.61	444.68	560.88	318.52
	EBITDA margin (*Per cent*)	20.17%	18.69%	30.72%	-23.23%	25.25%	30.95%	21.25%
Vedanta Limited	Revenue	22,129.00	24,951.00	10,739.00	9,053.00	10,890.00	15,151.00	15,485.50
	EBITDA	1,693.00	1,055.00	-235.00	-300.00	-177.00	-115.00	320.17
	EBITDA margin (*Per cent*)	7.65%	4.23%	-2.19%	-3.31%	-1.63%	-0.76%	2.07%
Hindalco Industries Limited	Revenue	19,408.00	22,382.00	22,198.00	18,533.00	22,446.00	36,723.00	23,615.00
	EBITDA	1,456.00	1,539.00	1,683.00	1,276.00	869.00	1,390.00	1,368.83
	EBITDA margin (*Per cent*)	7.50%	6.88%	7.58%	6.89%	3.87%	3.79%	5.80%

(Source: Annual Report of respective Companies)

From the above table, it is seen that though the revenue of the Company was lower than other copper producing companies, the Company was earning higher EBITDA margins in terms of percentage. This was primarily because profitability was more in mining and beneficiation activities as compared to smelting and refining activities at the overall copper industry level.

1.7 Justification for taking up this Audit

The Company is the only copper mining company in the Country, having access to approximately 80 *per cent* of the copper reserves (metal in ore) in India (2.20 million tonnes out of 2.73 million tonnes). This performance audit was conducted to assess the operational performance of the Company and to ascertain whether the Company was undertaking desired measures to enhance availability of copper in India by exploiting the domestic natural resources.

1.8 Scope of Audit

This Performance Audit covered the performance of Greenfield and Brownfield Exploration activities of the Company, development and operation of all seven mining leases, development, maintenance and operation of two smelters & refineries, operation and maintenance of rolling and allied plants along with the marketing activities towards

the products produced by the Company during the period 2016-17 to 2021-22. However, matters relating to earlier and subsequent years were also included wherever pertinent.

1.9 Audit Objectives

The objectives of the performance audit were to assess whether:

- Systematic exploration and adequate mine development activities were undertaken to produce the required quantity of ore.
- The Company was able to produce desired quantity and quality of copper ore and copper concentrate.
- The Company operated its manufacturing capacity efficiently, economically and effectively to establish itself as a sustainable market player in the industry.
- The Company was able to market its products efficiently and effectively in order to maximise the revenue.

1.10 Audit Criteria

Examination of different production and operational aspects under the performance audit were carried out with reference to the following criteria:

- Corporate Plan of the Company,
- Mining Plans approved by the Indian Bureau of Mines
- Periodic Mine Production Plan
- Memoranda of Understanding entered with administrative Ministry
- Procurement of Goods & Services Manual of the Company
- Norms for specific consumption of input/raw materials adopted by the Company

1.11 Audit Methodology

The audit examination commenced with an Entry Conference with the Management on 25 November 2021 wherein the scope of audit, audit objectives and criteria thereof were discussed. At the end of field audit, the draft Performance Audit Report was issued (27 June 2022) to the Management and an Exit Meeting was also held on 20 July 2022. The draft Performance Audit Report after incorporating the replies and views of the Management was issued (22 July 2022) to the Ministry of Mines. After receipt of the Ministry's reply, an Exit Conference was held (23 November 2022) with the Ministry, wherein the broad audit observations as well as the recommendations thereon were discussed. The views of the Ministry/Management have been duly incorporated in this report.

1.12 Structure of the Report

This report contains chapters containing audit observations on the performance of the Company regarding geological exploration and expansion of mining capacity, mining

operations and allied activities, plant operations and sales & marketing activities. The report also includes recommendations wherever relevant.

1.13 Acknowledgment

Audit acknowledges the co-operation extended by the Management of the Company and the officials of Ministry of Mines in facilitating the conduct of this Performance Audit.

Chapter:2

Geological Exploration and Expansion of Mining Capacity

CHAPTER 2

GEOLOGICAL EXPLORATION AND EXPANSION OF MINING CAPACITY

2.1 Geological Exploration

Mineral deposits are dwindling assets and with continuous exploitation through mining, the ore reserves deplete. To maintain continuity in mining business, a mining company has to undertake exploration activities for discovery of new mineralised zones (greenfield exploration). Exploration activities are also required to be conducted by mining companies to assess the depth and lateral continuity of the existing known deposits (brownfield exploration).

Accordingly, one of the main objectives of the Company was to search for, inspect, prospect, examine and explore copper ore reserves. India, at present, has 2.73 million tonnes of copper in its known reserves out of which the Company has been allotted mines having nearly 2.20 million tonnes (80 *per cent*), while the remaining are yet to be allotted.

2.1.1 Greenfield Exploration

The Company's long-term exploration plans are guided by their Corporate Plans formulated from time to time. As per the Corporate Plan 2020, the key strategy of the Company towards exploration was to undertake vigorous exploration to locate economically feasible deposits all over the country, explore funding options for conducting regional exploration, consider creating a separate joint venture company for greenfield exploration and form a cell at their corporate office, which would identify deposits and submit applications for mining leases on a continuous basis.

The Company last acquired a mine in 1982 (*Malanjkhand* mines). Further, Audit examination revealed that the reasons for not adding a single economically feasible deposit during the period covered by Audit could be attributed to inadequacy of efforts from the Management and the Ministry of Mines towards greenfield exploration. These are discussed below.

2.1.1.1 Adequacy of the Management's efforts towards greenfield exploration

(a) Planning and funding of greenfield exploration activities

Scrutiny of records showed that the Company did not have any specific policy or guidelines for exploration of new deposits. No physical targets were fixed by the Company towards greenfield exploration either. The Company had not undertaken any greenfield exploration in the last three decades.

For the purpose of exploration and exploitation of copper and associated minerals in *Chhattisgarh*, the Company incorporated (May 2018) a joint venture company called

Chhattisgarh Copper Limited with *Chhattisgarh* Mineral Development Corporation Limited, a government company of Chhattisgarh Government wherein equity stake of the Company was 74 per cent. However, the Joint Venture Company is not yet operational, as the approval for formation of Joint Venture was still awaited (March 2022) from the Ministry of Mines.

Since 2010, the Company had made only eight applications for getting mining lease, six applications in the state of *Rajasthan* and two applications in the state of *Chhattisgarh*. The applications in *Chhattisgarh* was made in favour of its newly formed Joint Venture Company, namely, *Chhattisgarh* Copper Limited *Bodal* Block (21.75 sq.km) and *Hiddar* Block (28.60 sq. km) in *Rajnandgaon* district, *Chhattisgarh* for greenfield explorations, which are yet to be approved by the Ministry of Mines, Government of India.

The Management, in respect of *Chhattisgarh* Copper Limited while accepting the facts, stated (November 2022) that the Company was planning to initiate the process for closure of *Chhattisgarh* Copper Limited in view of its own poor financial position.

Further, Audit observed that to do prospecting and exploration without obtaining prospecting licence[10], the Company requested (March 2018) the Ministry of Mines to notify it as an Exploration Agency, under the Mines and Minerals (Development and Regulation) Act, 1957. Accordingly, Government of India notified (July 2018) the Company as an exploration agency. However, even after receiving such status, the Company had not undertaken (as of March 2022) any greenfield exploration activity.

National Mineral Exploration Trust (NMET) was set up by the Government of India as per provisions of the Mines and Minerals (Development and Regulation) Act, 1957 with the objective of providing financial assistance to greenfield exploration activities. However, brownfield exploration activities were outside the purview of funding through NMET.

Audit scrutiny revealed that despite being aware that the Company had the option of getting funding from NMET for greenfield exploration activities, the Company clarified to the Ministry of Mines that it would carry out exploration activities of greenfield copper deposits in *Bodal* Block (21.75 sq.km) and *Hiddar* Block (28.60 sq. km) of *Rajnandgaon* district, Chhattisgarh, from its own scarce financial resources, if they are allocated in favour of its joint venture company, namely, Chhattisgarh Copper Limited.

Also, the Company submitted (August 2018) proposals for geological and geophysical exploration at an estimated cost of ₹175 crore in respect of five existing brownfield mining leases to NMET for funding. However, these applications were rejected by NMET on the ground that the Trust's mandate did not include funding of brownfield exploration activities.

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[10] ***Under the Mines & Minerals (Development & Regulation) Act, 1957, "Prospecting Licence" means a licence granted by the Government to the mining companies for the purpose of undertaking activities necessary for exploring, locating or proving mineral deposits.***

In its reply, the Management stated (July 2022) that due to poor financial condition of the Company upto financial year 2021-22, budget for exploration activities was limited and was focused on only brownfield explorations. Regarding applying for NMET funding, the Management stated that it was advised by the Ministry of Mines that NMET would not fund the exploration of any block that was allotted to a Central Public Sector Undertaking and therefore, the Company stated that exploration would be done from its own funds.

The reply of the Management is not acceptable, as being a notified exploration agency, the Company was eligible to apply for financial assistance to NMET for greenfield exploration activities. Further, Management's reply about Ministry's advice on applying for NMET funding may be viewed in light of the fact that any greenfield exploration activity of any notified exploration agency could be funded by NMET while brownfield exploration activities was not included in its mandate.

While endorsing the reply of the Management, Ministry of Mines stated (November 2022) that the Company had been advised to focus on exploration in existing mining leases (brownfield) where immediate production could be started.

This resulted in lack of development of any new greenfield copper mines in the country.

(b) Following up of greenfield exploration applications

With a view to identify deposits and submit applications to concerned authorities for undertaking exploration activities it was envisaged in the Corporate Plans (2020 and 2030) that a separate cell or department in the corporate office would be formed. This cell would also have the responsibility to follow up on these applications and ensure that their clearances are expedited.

Scrutiny of records showed that a separate cell/department tasked with monitoring the progress of greenfield exploration applications and taking timely action to resolve concerns, was not formed (as of March 2022).

Audit observed that the work for preparing and submitting applications for Reconnaissance Permit and Prospecting Licenses, required for undertaking exploration activities, was generally done by the local management at unit level. However, follow up of such applications with the Central Government and State Governments was not seen on records. That there were lapses in the process is evident from the fact that the Company had made (September 2015) applications for six mining blocks in the State of Rajasthan which the State Government declined[11] (February 2017) to allot to the Company. However, not only did the Corporate Plan 2030 state that no written communication from State Government was received after 2016 but it also mentioned these applications as pending.

[11] ***Applications for Reconnaissance Permit and Prospecting Licenses of six mining blocks in Rajasthan was rejected by the State Government as one block was already in process of auctioning and the other five blocks, were in Aravalli Hills and pasture land; and as such, they were not available for allocation.***

The Ministry/Management, while accepting the above facts, stated (November 2022) that centralised dedicated cell had been formed in Corporate Office.

Recommendation 1: The Company may revisit its extant procedures for identification of deposits, submission of applications for greenfield geological exploration and their follow up to make them more efficient and effective.

2.1.2 Brownfield exploration

As per the industry practice, mining companies are required to plan for carrying out explorations within their mining lease areas in a consistent, systematic and phased manner so as to maintain the buffer level of reserves. Broadly, brownfield exploration is carried out through two approaches – depth exploration and lateral exploration.

Scrutiny of records showed that Company's planning for brownfield exploration activities was also deficient. It was seen that the Company did not have any specific policy or guidelines for exploration of its existing copper mines. No time bound physical targets were fixed for the same either.

Audit examination of the efforts made by the Company in carrying lateral and depth exploration are discussed in subsequent paragraphs.

2.1.2.1 Efforts towards Depth Exploration

Depth exploration activities were to be carried out to assess depth and strike wise extension of the ore bodies and to enhance resource base to ensure availability of reserves to achieve production expansion targets under the Corporate Plans as well as for future business planning.

As per the Corporate Plan 2030, the Company was required to assess the potential of copper mineralisation upto a depth of about 1,500 meters in its existing mines. In this connection, the Company planned (June 2020) to undertake exploration activities for vertical depth of about 1,000 meters considering factors such as potential of extension of ore body beyond current level of exploration in the leased mines, availability of proven technology required for underground mining operation upto 1,000 meters depth and economic viability. However, this exercise was yet to be completed as evident from **Table 2.1** below:

Table 2.1: Exploration and Working levels

(in metres)

Name of Mines	Current working level	Exploration Level (against 1000 metres target)
Surda	490	Average 500, Maximum depth of 800
Kendadih	150	300
***Rakha* (including *Chapri*)**	*Rakha* 230	*Rakha* 300, *Chapri*: 650
Khetri	370	670
Kolihan	424	600
Chandmari	76	424
Malanjkhand	250	640

Source: Records of the Management

Insufficient depth exploration of existing mines have started showing its adverse effect on the mining activities of the Company. In *Kolihan* Mines, the Company was planning to enhance its mining capacity from 0.50 million tonnes per annum to 1.50 million tonnes per annum by enhancing the ore hoisting[12] capacity. However, due to inadequate depth exploration, the Management did not have confidence on the continuity of ore body below explored areas. Hence, the capacity expansion programme of *Kolihan* mines was under hold till the completion of depth exploration activities (discussed in para no. 2.2.3.2).

More importantly, similar issues may be faced in *Surda* Mines and *Kendadih* Mines where current mining levels (including development zone) have already reached 490 metres and 150 metres, against the explored zone of 500 meters and 300 meters respectively.

The Management, while accepting the fact of inadequate depth exploration, attributed (July 2022) limited budget for exploration as the reason for the same. The Management, however, stated that the Company enhanced the annual exploration budget to ₹50 crore from ₹10 crore from financial year 2022-23 to increase focus on depth exploration throughout its leases.

The fact remains that delay in depth exploration has caused stoppage of expansion activities at *Kolihan* mines and unless the underlying issues such as allocation of adequate funds for exploration is not resolved, similar fate for other mines such as *Surda* Mines and *Kendadih* Mines cannot be ruled out.

[12] ***Ores mined in the underground mines are collected in the surge bin from where it is lifted upto the surface through a shaft. This process is called ore hoisting.***

Figure 2.1: Exploration Drilling

Workmen conducting Exploration Drilling with the Drill Machine

Drill Cores obtained during drilling

Source: Records of the Management

2.1.2.2 Efforts towards Lateral Exploration

Exploration is generally conducted in four successive stages: reconnaissance (G4)[13], prospecting (G3)[14], general exploration (G2)[15] and detailed exploration (G1)[16], to generate resource data with a clearly defined and high degree of geological assurance. These four stages of exploration are in order of geological assurance where detailed exploration (G1) is the highest category and reconnaissance (G4) is the lowest category.

As per Rule 12(4) of the Mineral Conservation and Development Rules, 2017, the Company was required to conduct detailed exploration (G1 level) of the entire potentially mineralised area in all mines of the Company within a period of five years from the date (27 February 2017) of commencement of the rules.

Scrutiny of records showed that the Company had not carried out G1 level exploration. Although, the Company planned to undertake general exploration (G2 level) in various

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[13] ***Reconnaissance (G4): A Reconnaissance study identifies areas of enhanced mineral potential on a regional scale based primarily on results of regional geological studies, regional geological mapping, airborne and indirect methods, preliminary field inspection, as well as geological inference and extrapolation. The objective is to identify mineralised areas worthy of further investigation towards deposit identification.***

[14] ***Prospecting (G3): Prospecting is the systematic process of searching for a mineral deposit by narrowing down areas of promising enhanced mineral potential. The methods utilised are outcrop identification, geological mapping and indirect methods such as geophysical and geochemical studies.***

[15] ***General Exploration (G2): General Exploration involves the initial delineation of an identified deposit. Methods used include surface mapping, widely spaced sampling, trenching and drilling for preliminary evaluation of mineral quantity and quality (including mineralogical tests on laboratory scale if required), and limited interpolation based on indirect methods of investigation. The objective is to establish the main geological features of a deposit, giving a reasonable indication of continuity and providing an initial estimate of size, shape, structure and grade.***

[16] ***Detailed Exploration (G1): Detailed Exploration involves the detailed three-dimensional delineation of a known deposit achieved through sampling, such as from outcrops, trenches, boreholes, shafts and tunnels. Sampling grids are closely spaced such that size, shape, structure, grade, and other relevant characteristics of the deposit are established with a high degree of accuracy. Processing tests involving bulk sampling may be required.***

mines at *Ghatsila* and *Khetri*, this was also not completed. This not only resulted in non-compliance of the provisions of Mineral Conservation and Development Rules, 2017, but also adversely affected discovery of mineralised zones within its mining areas.

The Management stated (July 2022) that considering the typical shape and nature of copper ore deposits, the Company undertook G1 exploration[17] from the underground levels. The Ministry of Mines endorsed (November 2022) the reply of the Management.

The reply of the Management and Ministry is not acceptable as the Company failed to conduct detailed exploration (G1 level) over the entire potentially mineralised area within a period of five years from the date of commencement of the Mineral Conservation and Development Rules, 2017. Moreover, the Mineral Conservation and Development Rules, 2017 were formulated and governed by the Ministry of Mines itself.

Recommendation 2: The Company may plan its exploration activities so as to ensure detailed exploration of the entire potentially mineralised area as per the Mineral Conservation and Development Rules, 2017.

2.2. Capacity Expansion of Existing Mines

Mining capacity refers to the maximum quantity of ore that can be extracted on a sustainable basis from a given mine using the available resources over a specified period of time. It depends upon various factors like the quantum and nature of deposits, number of mining fronts or faces available, mining capacity of these respective fronts/faces, extent of mechanisation, capacity of mining equipment deployed, capacity of ore hoisting/ evacuation installations etc. Mining capacity of any mining company is the collective capacity of the mines operated by the company.

The Company had access to 80 *per cent* of the copper ore reserves in India and the Company was the sole entity in India with copper mining experience and thus, enjoyed a unique and monopolistic position in respect of mining of copper in India. Moreover, there was a vast gap between the demand and supply of copper concentrate in India. The profitability of the Company was primarily driven by mining operations, as more than 95 *per cent* of its revenue was generated through mining activity. With the increase in the prices of copper in the international market, mining of copper ore became more profitable. Mining was, therefore, identified as the key thrust area for growth of the Company.

2.2.1. Capacity Expansion Plan and its Achievement Status

The Company decided (November 2011) in its Corporate Plan 2020 to enhance its mining capacity to realign its business focus mainly to mining operations by increasing the production capacity of existing mines and by reopening of closed mines to enhance its mining capacity from the existing 3.39 million tonnes per annum to 12.20 million tonnes

[17] ***for which very close spaced (with 30 to 50 meters spacing) drilling is required.***

per annum by 2016-17. Further, as per instructions of Ministry of Mines, Government of India, the Company, in its Corporate Plan 2030, planned (June 2020) for enhancement of ore production target to 20 million tonnes per annum by the year 2030.

The details of capacity of mines in 2010, planned expansion through Corporate Plan 2020 and the expansion achieved upto 2022 are given in **Table 2.2** below:

Table 2.2: Capacity Expansion Plan of the Company

(in million tonnes per annum)

Mine	Actual Capacity as on 2009-10	Corporate Plan 2020 Target (2016-17)		Actual Capacity as on 2016-17	Actual Capacity as on 2021-22
		Increase	**Total**		
(A)	**(B)**	**(C)**	**(D) = (B+C)**	**(E)**	**(F)**
Capacity enhancement of the existing mines					
Malanjkhand	2.00	3.00	5.00	2.00	3.00
Khetri	0.50	0.50	1.00	0.50	0.50
Kolihan	0.50	1.00	1.50	0.50	0.50
Surda	0.39	0.51	0.90	0.39	0.39
Sub Total	**3.39**	**5.01**	**8.40**	**3.39**	**4.39**
Re-opening of closed mines					
Kendadih	0.00	0.20	0.20	0.00	0.20
Rakha	0.00	1.50	1.50	0.00	0.00
Sub Total	**0.00**	**1.70**	**1.70**	**0.00**	**0.20**
Development of new mining blocks					
Banwas	0.00	0.60	0.60	0.00	0.60
*Chapri-*Sideshwar	0.00	1.50	1.50	0.00	0.00
Sub Total	**0.00**	**2.10**	**2.10**	**0.00**	**0.60**
Total	**3.39**	**8.81**	**12.20**	**3.39**	**5.29**

Source: Corporate Plan 2020 and records of the Management.

As evident from the table, the Company failed to achieve the targets of expansion plan by enhancement of mining capacity in existing mines, re-opening of closed mines and development of new mining blocks.

Audit examination of the efforts made by the Company in increasing the mining capacity brought to fore various planning, execution and monitoring related issues that resulted in under achievement vis-a-vis the planned targets. These issues are discussed in detail in the following paragraphs.

2.2.2 Planning for capacity expansion projects

Some of the important activities that need to be undertaken for adequate and effective planning of mining capacity expansion projects include getting sufficient understanding of the geology of areas where mines are to be expanded, preparation of Detailed Project Reports for identifying the activities that need to be carried out and their implementation schedule etc.

2.2.2.1 Conducting geological studies in geologically disturbed areas in *Khetri* Mines

The Company had planned to increase the capacity of *Khetri* mines from existing 0.50 million tonnes per annum (2010) to 1 million tonnes per annum (2014-15). *Khetri* mines was having (August 2010) a limited ore reserve of only 13.56 million tonnes upto '0' meter Reduce Level[18] (Phase-I), of which only 6.82 million tonnes of ores were available for mining due to the presence of ore handling system at '0' meter Reduce Level. These reduced reserves of 6.82 million tonnes were not sufficient for sustaining the prevailing rate of production i.e., 0.60 million tonnes per annum. Hence, it was necessary to deepen the existing mines from '0' meter Reduce Level to (-) 300 meter Reduce Level (*Khetri* Phase-II expansion).

The Company, accordingly, planned (August 2010) to deepen the existing mines upto (-) 300 meter Reduce Level in Phase II by undertaking shaft deepening, equipping and installation of ore handling system, allied excavations and Mine Development at *Khetri* Mine. Sinking of the production shaft was to be done by deepening an existing BGML shaft[19] from (-)85 meter Reduce Level to (-)120 meter Reduce Level and opening a horizontal drive at (-)120 meter Reduce Level towards production shaft for about 35 metres. Accordingly, a work order was awarded to a contractor for ₹96.77 crore with completion period of 60 months (i.e., by 14 July 2016) from the appointed date (15 July 2011).

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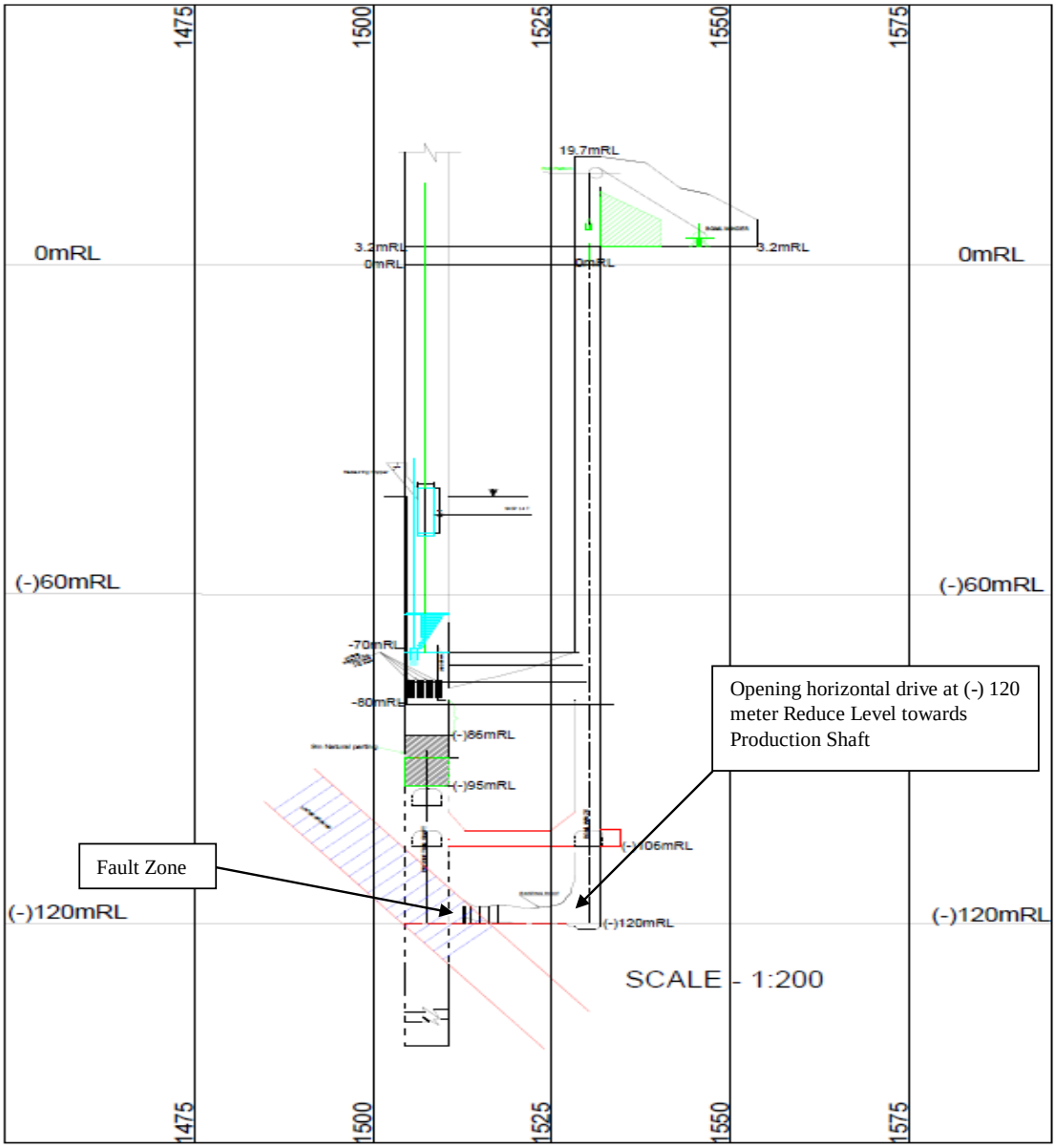
[18] ***It is a vertical distance between survey point and mean sea level near Mumbai.***

[19] ***For collecting and hoisting the spillage of production shaft, a spillage shaft, known as BGML Shaft was sunk from '0' meter Reduce Level to (-) 120 meter Reduce Level about 22 meters from the production shaft. This shaft was 3 metres diameter unlined, rock bolted with separate ladder way compartment.***

Figure 2.2: Diagram showing Production Shaft



Source: Technical drawing provided by Management

Scrutiny of records showed that after driving 17.50 meters horizontally from deepened BGML Shaft towards the production shaft, a bad ground was encountered (March 2015) along with inrush of water from adjoining shot holes. Ingress of water could not be controlled resulting in suspension of work and eventually closure of the contract.

Audit observed that several transverse faults were mapped and marked on the surface of geological map of *Khetri* Copper mines and the same were also known to the Management prior to planning phase II extension. Several mining infrastructure units at '0' meter Reduce Level and below were developed either in proximity of these faults or were under influence of these faults.

Despite having knowledge of these facts, the Management did not conduct any exploratory or geological study to understand the geological condition while planning for sinking of BGML Shaft and its connection with the production shaft.

Hence, when the Management faced bad ground with ingress of water while executing horizontal drive, the Management was not sufficiently prepared, leading to halting and ultimately closure of the entire development work of *Khetri* Phase II expansion. The Company had already incurred an expenditure of ₹16.97 crore on this activity, which has remained unproductive so far. Moreover, subsequent exploration studies revealed that horizontal drive could have been excavated at a safer zone.

Due to this, the Management could not shift the mining infrastructure like crusher, apron feeders etc. from '0' meter Reduce Level to (-)300 meter Reduce Level and continued facing operational constraints at '0' meter Reduce Level, reducing the mining capacity to 0.36 million tonnes per annum against requirement of 1 million tonnes per annum.

Audit further observed that to overcome these constraints, the Management was considering (April 2021) a change in the method of mining, i.e., from track to trackless[20] at '0' meter Reduce Level at an estimated cost of ₹24.42 crore. Additionally, to undertake this modification, expenditure towards rock breaker, chute, grizzly, weigh bridge etc., would also have to be borne.

Moreover, due to delay in development of Phase-II, the Company was left with only two production levels (60 meter Reduce Level and 0 meter Reduce Level). Hence, to reduce further delay in development of *Khetri* Phase-II, the Management, in modification of the original plan, decided to install crushing infrastructures at (-)180 meter Reduce Level instead of going deeper upto (-)300 meter Reduce Level. Estimated expenditure towards installation of such crushing infrastructures for 20 years would be ₹115.13 crore. Hence, the delay in development of *Khetri* phase II, would cause duplication of installation, initially at (-) 180 meter Reduce Level and then again at (-)300 meter Reduce Level, leading to avoidable expenditure of the Company.

Thus, not conducting geological studies before executing mining expansion project despite having knowledge of presence of geological faults that could affect expansion activities points towards ineffective and inadequate planning by the Management. As a result, the Management not only failed to achieve its expansion target of 1 million tonnes per annum but the mining capacity was also reduced from 0.50 million tonnes per annum to 0.36 million tonnes per annum. Further, expenditure of ₹16.97 crore incurred so far has remained unproductive. Lack of development of *Khetri* Phase-II has also compelled the

[20] ***A "track" mine refers to one that has rail installed to provide travel for trains drawn by battery-operated, trolly, or diesel locomotives. A "trackless" or "mechanised mine" refers to the use of rubber tired mobile equipment to advance the later development and haul the ore. In other words, in track mining, rail mounted mining equipment are used while in trackless mining tyre mounted mining equipment are used.***

Management to undertake activities which would cause avoidable expenditure of approximately ₹139.55 crore (₹24.42 crore plus ₹115.13 crore).

The Management stated (July 2022) that having faced difficulties in the past, they had decided to keep suitable provision in the next proposal for countering geologically disturbed area during mines development. Regarding use of alternatives to maintain required level of production, it stated that it was necessary as mining capacity of *Khetri* Block had reduced to 0.36 million tonnes per annum due to delay in commissioning of *Khetri* Phase-II. The Management, however, contended that trackless mining method having advantages over track mining method may have been proposed even if Phase-II expansion had been commissioned. Hence, the expenditure ₹24.42 crore should not be taken as additional expenditure for not commissioning Phase-II expansion in time. Further, the Management accepted that due to delay in commissioning of *Khetri* Phase-II, installation of crushing facility was redesigned at (-)180 meter Reduce Level instead of earlier plan up to (-)300 meter Reduce Level.

The Ministry of Mines endorsed (November 2022) the views of the Management.

The reply of the Management and the Ministry needs to be viewed in the light of the fact that, as stated by the Management (during Exit Conference in November 2022), the Company was in the process of conducting sufficient geological studies to know about the geological faults/disturbances before re-implementation of Khetri Phase II project. Also, trackless mining method would have been optional requirement for '0' meter Reduce Level had Phase-II expansion been commissioned timely. However, conversion of track to trackless mining method at an expenditure ₹24.42 crore became necessary due to the delay in development of *Khetri* Phase-II. The fact remains that lack of adequate geological study before deepening of shaft in an area already known to be under influence of geological faults should have been avoided. It not only caused a delay in expansion of mining capacity but also led to avoidable expenditure.

Recommendation 3: The Management may ensure that sufficient geological studies are undertaken before conducting any expansion activities especially in areas influenced by geological faults.

2.2.2.2 Preparation of Detailed Project Report for expansion of *Surda* Mines

The Company planned (2010) to increase the production capacity of copper ore at *Surda* mines from 0.39 million tonnes per annum to 0.90 million tonnes per annum by creating new infrastructure in the mines. Among other things, this would involve hoisting from deeper sections by sinking a new vertical shaft to hoist ore and to connect it with working levels of the mines. The new vertical shaft would serve the purposes of increased hoisting capacity, improve mines ventilation and serve as main entry to the mines.

In this connection, the Company awarded (November 2011) the work to M/s SriRam EPC Limited at a contract value of ₹206.34 crore with a project completion period of 60 months

(from 18 November 2011 to 17 November 2016) which was subsequently extended upto 30 June 2021.

Shafts No. 3 and 4 were only the entry points of *Surda* underground Mines, which were under the operational control of M/s India Resources Limited, who was conducting mining activities at *Surda* mines since April 2007. The present work of underground mine development and Shaft sinking work also required access to Shafts No. 3 and 4 to reach underground levels for mines development.

Scrutiny of records revealed that the Company had not prepared any Detailed Project Report (DPR)[21] for the said work before awarding the work order to M/s SriRam EPC Limited. In absence of the DPR, important aspects of the project such as access to Shafts No. 3 and 4 of the mines during the mine expansion work were not properly planned. This subsequently became a point of disagreement between the two contractors, namely M/s SriRam EPC Limited (who was executing mine expansion) and M/s India Resource Limited (who was executing mining operations) working in the same mines leading to delays/obstructions in execution of the work.

Audit observed that due to lack of preparation and approval of DPR in the planning phase, the Management could not ensure encumbrance free access to both the contractors for executing their respective work.

Other planning related lapses such as, improper selection of site causing a delay of 15 months, not ensuring timely receipt of Environment Clearance (discussed in para 3.1.1 (a)) and mining lease causing suspension of development activities, sudden abandonment of site by the sub-contractor (discussed in para 3.5.1) etc., also contributed to the delay in the project. Thus, even after a lapse of more than 11 years (as of March 2022), M/s SriRam EPC Limited had completed shaft sinking work of only ₹30.72 crore (28.50 *per cent*) out of total work value of ₹107.78 crore. Similarly, M/s SriRam EPC Limited had been able to execute underground mine development work of only ₹9.12 crore (8.83 *per cent*) out of ₹103.18 crore (March 2022). In this process, the Company has already paid ₹11.60 crore as escalation amount.

Thus, due to inadequate planning by the Management for undertaking expansion activities at *Surda* mines, the work has remained incomplete resulting in unfruitful expenditure of ₹51.44 crore.

The Management while accepting the fact that the work order to M/s SriRam EPC Limited was awarded before preparation of Detailed Project Report, however, contended that two different contractors could work in the same entry of the mines. It stated that the required land was immediately handed over to the contractor after award of the contract. The contractor also started the work accordingly. However, a small portion of the land was under cultivation by local villagers which was provided to the contractor after harvesting.

[21] ***DPR is a very extensive and elaborative outline of a project, which includes essential information such as the resources and tasks to be carried out to complete the project successfully.***

It added that the desired progress could not be achieved due to slow progress of work by the contractor as well as delay in renewal of mining lease by the State Government. Further, the development portion of the contract had been terminated and the case was under arbitration. The Management also added that the Company was exploring the possibility to appoint a new contractor to continue the project.

The Ministry of Mines endorsed (November 2022) the views of the Management.

The Management and the Ministry's replies need to be viewed in the light of the fact that the encumbrance free project site for shaft sinking work was provided (16 February 2013) to the contractor by the Management after a delay of around 15 months.

Recommendation 4: The Management may ensure that Detailed Project Reports are prepared before award of mining expansion projects.

2.2.3 Execution and monitoring of capacity expansion projects

Some of the important activities that need to be undertaken for adequate and effective execution of mining capacity expansion projects include proper tendering, drafting of contracts, getting requisite statutory clearances, proper monitoring of works being executed by contractors etc. In this regard, Audit observed the following:

2.2.3.1 Awarding of work to a financially weak vendor in *Malanjkhand* Mines

The Company planned (November 2011) to enhance its mining capacity of *Malanjkhand* Mines from 2 million tonnes per annum to 5 million tonnes per annum by developing an underground mine below the existing open cast mines. The Company proposed to engage a reputed contractor for development of *Malanjkhand* underground mine by following two-stage bidding. As per Central Vigilance Commission recommendation (December 2002), exhaustive Pre-Qualification Criteria should be included in the bidding document having factors like financial soundness of firms etc.

Scrutiny of records, however, showed that the Management included only one Pre-Qualification Criteria in the tender document, i.e., turnover, to assess the financial soundness of the bidders, which was not exhaustive. Further, the Management did not include factors such as net worth, corporate debt restructuring, cash flow position etc., which were included in later tenders.

The Letter of Intent was issued (November 2011) to M/s IVRCL (the Contractor) for ₹1,176.12 crore with a condition that the contract would be signed after obtaining Environment and Forest clearance by the Company.

Figure 2.3 Underground mining activity at Malanjkhand Copper Project

Source: IBM approved Mining Plan of Malanjkhand Copper Project for the period 2020-21 to 2022-23

Subsequently, the Company received some complaints wherein it was stated that the selected contractor, M/s IVRCL was blacklisted by Gujarat Irrigation Department (July 2014), Jharkhand Water Supply Project and Madhyanchal Vidyut Vitran Nigam Limited (November 2014) due to non-fulfilling of the terms and conditions of the contract agreement and negligence in execution of works thereby causing delay in implementation. Taking cognisance of the same, the Management sought for (January 2015) clarification from M/s IVRCL and demanded a comfort letter from a banker, a certificate from credit rating agency and a list of recent projects awarded, from the contractor. From the documents submitted (February 2015) by M/s IVRCL, it was seen that M/s IVRCL was under Corporate Debt Restructuring mechanism and Cash Flows of M/s IVRCL were being monitored by its Lenders (State Bank of India). The reports of the Credit Rating Agency[22] (upto December 2014) said that the revenue of M/s IVRCL was under pressure due to lack of working capital for execution of its projects. After receipt of Environmental Clearance, the Company entered (April 2015) into a contract with M/s IVRCL for development of underground mines at *Malanjkhand* within a period of 60 months i.e., by April 2020.

Subsequently, the financial position of M/s IVRCL further deteriorated due to liquidity problems which severely affected the execution of the projects. The financial condition of M/s IVRCL deteriorated to such an extent that Corporate Insolvency Resolution Process was initiated (February 2018) against M/s IVRCL under Insolvency and Bankruptcy Code 2016 and the National Company Law Tribunal, Hyderabad ordered (July 2019) liquidation of M/s IVRCL.

[22] ***India Ratings & Research***

Scrutiny of records showed that execution of the contract suffered from delays due to several reasons. It was seen that there was an initial delay in commencement of work by M/s IVRCL at different sites ranging from 3 months (North Decline) to 10 months (Production Shaft). The required umbrella drill/jumbo drill for sinking of ventilation shafts was deployed after a lapse of three years from commencement of the work. Even after deployment, there was a delay ranging from 6 to 8 months for putting it into operation. In the meantime, sinking was done by conventional method i.e., by use of jack hammers. Due to this, the sinking of both the ventilation shafts which was scheduled to be completed by January 2018 was yet to be completed (as of August 2021). Further, M/s IVRCL did not take up the development work and on the contrary allowed both the shafts to get waterlogged up to the top.

The progress of the work was further affected due to liquidation process, as evident from the fact that necessary items amounting to ₹ 241.51 crore were not supplied and there was a delay in mobilisation of additional equipment required for the expeditious completion of the project. The shortfall in supply prevented the installation of the hoisting system by M/s IVRCL. Due to this, ore extracted from the underground mines had to be hauled by dumpers through declines, which not only slowed the pace of ore production but was also responsible for increased transportation cost.

Audit observed that the decision of the Management to award the work order to a bidder who was black listed by government agencies and whose financial condition was strained was not in the financial interest of the Company.

Further, Audit also observed that as per the contract, Liquidated Damages were to be imposed after completion of the period of the contract, instead of being imposed on the value of incomplete work from the running accounts bills. Due to this contractual deficiency, the Company could not recover Liquidated Damages (₹117.61 crore, i.e., 10 *per cent* of ₹1,176.12 crore) from the running bills of M/s IVRCL even though M/s IVRCL could not meet any milestone of the contract.

Scrutiny of the contract showed that if the work was not completed within the extended period of six months, then the Company reserved the right to further extend or terminate the contract, forfeit the Performance Security and get the balance work completed through any other person at the sole risk and cost of the contractor. The contract was closed by efflux of time in December 2021 at the risk and cost of the contractor. M/s IVRCL had completed 50 *per cent* of the total work for a total payment of ₹606.83 crore excluding escalation. M/s MECON Limited was appointed by the Company for assessment of the balance work of *Malanjkhand* Copper Project. As per the estimate of M/s MECON Limited, the total amount required for the balance work was ₹1,107.73 crore. Hence amount recoverable from M/s IVRCL under risk and cost was ₹538.44 crore[23].

[23] ***[₹1,107.73 crore – (₹1,176.12 crore – ₹606.83 crore)]***

In view of the issues discussed above, it is clear that the decision of the Company to award the work order of development of underground mines at *Malanjkhand* to a blacklisted contractor with strained financial condition was not prudent. As only 50 *per cent* of work was completed after spending ₹606.83 crore (excluding escalation) and further ₹1,107.73 crore was required to complete the remaining work, the expected cost escalation of the project stood at ₹538.44 crore {₹ 1,714.56 crore (escalated cost) - ₹ 1,176.12 crore (original cost)}.

The Management accepted (July 2022) the fact that there were initial delays in handing over of site, delay in mobilisation of required equipment by M/s IVRCL and water logging of shafts due to failure of M/s IVRCL. It added that the Company had not received any unfavourable report about the L-1 party at that point of time. The Management further added that it was understood that the rating of the party had been upgraded by Credit Rating agencies from D to B plus. It also added that the contract was not terminated based on the assurance given (July 2019) by the Liquidator of M/s IVRCL that the liquidation process would not affect the progress of the project. The Management also stated that the Company was incorporating a suitable clause in the mining contracts for application of Liquidated damages on quarterly basis, based on performance of contractor against quarterly targets.

Ministry of Mines endorsed (November 2022) the above reply of the Management.

The reply needs to be viewed in light of the fact that the Management had overlooked the remarks of the credit rating agency (December 2014) that revenue of M/s IVRCL was under pressure due to the lack of working capital for execution. Further, the liquidation process of M/s IVRCL had severely affected the progress of the work.

Recommendation 5: The Management may include appropriate clauses in the tender documents, such as parameters to screen financially sound bidders (net worth, corporate debt restructuring etc), linking of contractual milestones with recovery of liquidated damages, descoping of work in case of poor execution etc., to ensure timely completion of work. The Management may fix responsibility for lack of proper screening the financial viability of the Contractor at the tendering stage.

2.2.3.2 Tendering process and other issues at *Kolihan* mines

The Copper ore reserve at *Kolihan* mines was estimated (April 2010) at 13.47 million tonnes with 1.03 *per cent* copper grade. The ore hoisting[24] capacity was only 0.60 million tonnes per annum against which only 0.50 million tonnes could be hoisted annually due to ageing of the equipment. The Company accordingly planned to renovate the existing second outlet shaft by extending upward up to adit[25] level at 425 meter Reduce Level and

[24] ***Ores mined in the underground mines are collected in the surge bin from where it is lifted upto the surface through a shaft. This process is called ore hoisting***

[25] ***a horizontal passage leading into a mine for the purposes of access or drainage***

downward up to (-)102 meter Reduce Level, along with ore pass[26] and necessary crusher and loading station to produce around 1.50 million tonnes per annum of ore. This would cost around ₹147.80 crore with an estimated construction period of 84 months after award of the work order.

Figure 2.4: Loading of mined ores at *Kolihan*

Source: Mining related records of the Management

Audit observations regarding the *Kolihan* mines project are discussed below.

- The Company floated (August 2010) a global tender for increasing ore hoisting capacity at *Kolihan* mines and during pre-bid meeting with the bidders, it was decided (December 2010) to modify the proposed means of increasing ore hoisting capacity by sinking of a new shaft from the surface, instead of deepening/widening of the existing shaft. Moreover, Winder[27] capacity for ore hoisting was also to be increased from 220 tonnes per hour to 500 tonnes per hour.

  It was envisaged that these changes would reduce the project completion period from 84 months to 42 months and create additional ore hoisting capacity which would cater to mining from *Chandmari* intervening block at the same project cost of ₹147.80 crore.

  Based on the above, the changes were incorporated (December 2010) in the bid document with the approval of the Chairman and Managing Director of the Company. M/s SriRam EPC Limited emerged (January 2011) as the successful

[26] ***Ore pass is a vertical or near vertical opening through which ore mined on the different levels are dumped so that they fall by gravity to the lowest level in the mines.***

[27] ***In an underground mine, a hoist or winder is used to raise and lower men, equipment and/or ores within the mine shaft.***

bidder and the work order was awarded at a negotiated (January 2011) value of ₹150.52 crore. However, the Board of Directors of the Company decided (April 2011) to discharge the tender due to change in technical specification and to issue a fresh tender.

- The Company decided to defer shortlisting of bidders till the Environmental Clearance of *Kolihan* Mines was enhanced from 1 million tonnes per annum to 1.5 million tonnes per annum. The application for enhancing environment clearance from 1 million tonnes per annum to 1.50 million tonnes per annum was made only in February 2012 which was received in February 2015.
  Subsequently, the Company decided to appoint a consultant for preparation of updated bid document. The tender for this was floated (September 2018) but was discharged (March 2019) as very high quotations were received.
- The Ministry of Mines advised to enhance the capacity expansion target of the Company to 20 million tonnes per annum. Accordingly, the Company revised (July 2018) the target of *Kolihan* mines expansion to 2 million tonnes per annum (in phases). However, this enhancement programme was subject to positive outcome of proposed exploration and economic viability. Exploration activities were delayed due to lower allocation of funds towards brownfield exploration activities.
- Audit observed that even after lapse of almost 12 years, the capacity expansion of *Kolihan* Mines from 0.50 million tonnes per annum to 1.50 million tonnes per annum was yet to commence fruitfully. The Company had planned mining of 1.50 million tonnes per annum but due to limitations in ore hoisting capacity, the Company was able to plan during the range from 0.60 million tonnes per annum (2016-17) to 0.70 million tonnes per annum (2019-20) of ore during the period from 2016-17 to 2019-20.
- Moreover, as per the provisions of Mines and Minerals (Development and Regulation) Amendment Act 2021, on renewal of mining lease, the Company was to pay 50 *per cent* additional amount as royalty for ore extracted. The Company had planned to produce 5.70 million tonnes of ore during 2016-17 to 2019-20 containing 0.32 lakh tonnes of copper valuing ₹1,305.77 crore. Hence, the Company would now be liable to bear additional royalty of 50 *per cent* on 3.10 million tonnes of unmined ore production to the tune of ₹30.16 crore (***Annexure 1***), whenever it is mined.

Thus, there were multiple lapses by the Management at various stages such as faulty preparation of initial tender document, delay in seeking environmental clearance, lower fund allocation for conducting brownfield exploration *etc*., (as discussed in para no. 2.1.2). Due to these lapses the capacity expansion of *Kolihan* mines could not take place and opportunity to increase revenue was also lost.

The Management while accepting the above, stated (July 2022) that the current estimated reserves do not justify the capital cost that was to be incurred in infrastructure for capacity enhancement from 0.50 million tonnes per annum to 1.50 million tonnes per annum. Reserves were further required to be proved. The Management had already taken action to

prove further geological ore reserves in depth and strike, the outcome of which would help in taking investment decision for mine capacity expansion. The Ministry of Mines endorsed (November 2022) the views of the Management.

The fact remains that the Company planned the capacity expansion of *Kolihan* mines from 0.50 million tonnes per annum to 1.50 million tonnes per annum in August 2010 while the work order for geophysical study of reserves in *Kolihan* was issued in August 2019 i.e., after a delay of almost nine years.

2.2.3.3 Statutory compliances for reopening of closed *Kendadih* and *Rakha* mines

According to the Ministry of Environment, Forest and Climate Change Guidelines (October 2004), all mining projects having mining lease area of more than 5 hectares are required to have Environment Clearance at the time of renewal of mining lease. Moreover, if the project area includes diversion of forest for non-forest activity, forest clearance is also required. During this forest clearance, the project proponent is also required to obtain compliances under Scheduled Tribe and other Traditional Forest Dwellers (Recognition of Forest Right) Act,2006 also called The Forest Rights Act, 2006 through *Gram Sabhas*.

As per the Corporate Plan 2020, the Company planned to reopen *Kendadih* Mines (0.21 million tonnes per annum) and *Rakha* Mines (1.50 million tonnes per annum) to enhance mining capacity by 1.71 million tonnes per annum (by 2016-17). *Kendadih* and *Rakha* mining leases had forest land and thus the Management required above mentioned statutory compliances.

Figure 2.5: One of the accesses to *Kendadih* underground mines

Source: IBM approved Mining Plan of Kendadih Mines for the period 2013-14 to 2017-18

Scrutiny of records revealed that M/s MMPL Limited was awarded (January 2012) the work for re-opening, operations and expansion of closed Kendadih Copper Mines in 48 months from appointed date (January 2012). The value of contract was of ₹73.83 crore.

It started creating some installations and dewatering work (February 2012) in mines. However, at this point of time, the Company did not have Stage II Forest clearance resulting in violation of the Environmental laws. The State Government, accordingly, lodged (February 2014) a case of illegal mining against the Company and this led to stoppage of the work by M/s MMPL Limited till Forest clearance was obtained.

Subsequently, when the Company did initiate the process of getting Stage II Forest Clearance, it obtained (November 2014) compliance under Forest Rights Act, 2006 for only 48.69 hectares (surface area) instead of the total 225.363 hectares (surface 48.69 hectares plus underground 176.673 hectares). Compliances for the remaining 176.673 hectares were obtained in May 2016, thus, causing a delay in the project by 18 months. As a result, Stage II Forest Clearance was also delayed and the same was received only in November 2016.

Moreover, as per the provisions of the Mines and Minerals (Development and Regulation) Amendment Act 2021, on renewal of mining lease, the Company was to pay 50 *per cent* additional amount as royalty for ore extracted. Therefore, due to this delay, the Company also lost opportunity to extract 1.08 million tonnes copper ore during the period from 2016-17 to 2021-22 for which it would now have to pay additional 50 *per cent* royalty on 4.62 *per cent*, amounting to ₹10.54 crore. (Details are given in ***Annexure 2***).

Similarly in the case of *Rakha* mines, the Management made a delay of 18 months in completing compliances under the Forest Rights Act, 2006 as it had done compliance of only 36.90 hectares (surface area) instead of the total 184.80 hectares (surface 36.90 hectares plus underground 147.90 hectares), which was completed in May 2016.

The Management stated (July 2022) that there was no clear-cut understanding regarding applicability of compliances for Scheduled Tribe and other Traditional Forest Dwellers (Recognition of Forest Right) Act, 2006 to underground mine area due to which the Company undertook compliances for surface diversion area only.

The Ministry of Mines endorsed (November 2022) the views of the Management.

The reply of the Management and the Ministry is not acceptable because it was the responsibility of the Management to be well aware of all the extant Acts and Rules and ensure their timely compliance.

Thus, violation as well as ignorance of applicable laws and guidelines by the Management not only led to delay in re-opening of the mines but also created conditions under which additional royalty amounting ₹10.54 crore would have to be paid due to such delay.

Recommendation 6: The Management may institute a system to ensure that updated knowledge regarding all applicable laws, rules and guidelines is regularly available with the Company and all decisions are taken accordingly.

2.2.3.4 Overlapping of Mining Leases in *Rakha* mines

The Company proposed (September 2010) for re-opening and expansion of *Rakha* mines to produce 1.50 million tonnes per annum at an estimated capital cost of ₹293 crore. The Company awarded (July 2013) this work to a consortium led by M/s KOPEX Shaft Sinking Company (Lead Member[28]) at a consideration of ₹259.92 crore.

Rakha mining lease comprises *Rakha* block, *Chapri* block and *Tamapahar* block. *Tamapahar* block of *Rakha* mines of the Company and *Jaduguda* mines of M/s Uranium Corporation of India Limited were having an overlapping lease area of 66.97 hectares.

Figure 2.6: *Rakha* Mines

Source: IBM approved Mining Plan of Rakha Mines

Scrutiny of records revealed that the Management was aware that considering the distance between the overlapping area and the present working area, it would take at least 10 years to reach below the overlapping area for mining operation. Moreover, in both the Corporate Plans (2020 and 2030), the Management had not envisaged opening of the *Tamapahar* block for mining operations. The Management made unsuccessful efforts to get the entire *Rakha* mining lease (including overlapping area) for almost five years (from August 2011 to February 2016). Finally, the Management approached (February 2016) M/s Uranium Corporation of India Limited for no objection certificate which was resolved in joint meeting (January 2017) between the Company, M/s Uranium Corporation of India Limited and Government of Jharkhand on the assurance that no mining activity would be undertaken by the Company in the overlapping area.

[28] ***M/s India Resource Limited was the other Consortium member***

The Management, instead of making efforts for obtaining lease for the entire *Rakha* area, could have initially taken lease only for the undisputed area to start the work of reopening of mines at the earliest as the contract had already been awarded.

During the above period, due to delay in getting the necessary statutory clearances, the contractor, M/s KOPEX Shaft Sinking Company, demanded escalation of work order from ₹259.92 crore to ₹299.38 crore (15.18 *per cent* increase as of March 2016). As a result, the Company cancelled (June 2016) the work order. After termination, the Company could not finalise a new contract even after lapse of almost 6 years (from June 2016 to March 2022).

Moreover, as per the provisions of the Mines and Minerals (Development and Regulation) Amendment Act 2021, on renewal of mining lease the Company was to pay 50 *per cent* additional amount as royalty for ore extracted. Therefore, due to this delay, the Company also lost opportunity to extract 4.50 million tonnes copper ore during the period from 2016-17 to 2021-22, for which it would now have to pay additional 50 *per cent* royalty on 4.62 *per cent*, amounting to ₹42.36 crore. (Details are given in ***Annexure 3***).

The Management accepted (July 2022) that the work order was cancelled (2016) due to demand of higher escalation. It added that the first claim on the overlapping area should be of Hindustan Copper Limited as the mining lease of the same was awarded to the Company much earlier than to the Uranium Corporation of India. However, for early resolution all efforts were made and the matter was resolved with the execution of the pending lease deed.

The Ministry of Mines endorsed (November 2022) the views of the Management.

The reply of the Management needs to be viewed in the light of the fact that the mining lease was renewed only after the Management gave an undertaking that mining activities would not be conducted in the overlapping area. The Management, however, took five years in making this decision which, in turn, delayed the renewal of the mining lease. The fact also remains that the development activities of *Rakha* Mines is yet to be commenced as the cancelled (2016) work order was yet to be retendered (March 2022).

Chapter: 3

Mining Operations and Allied Activities

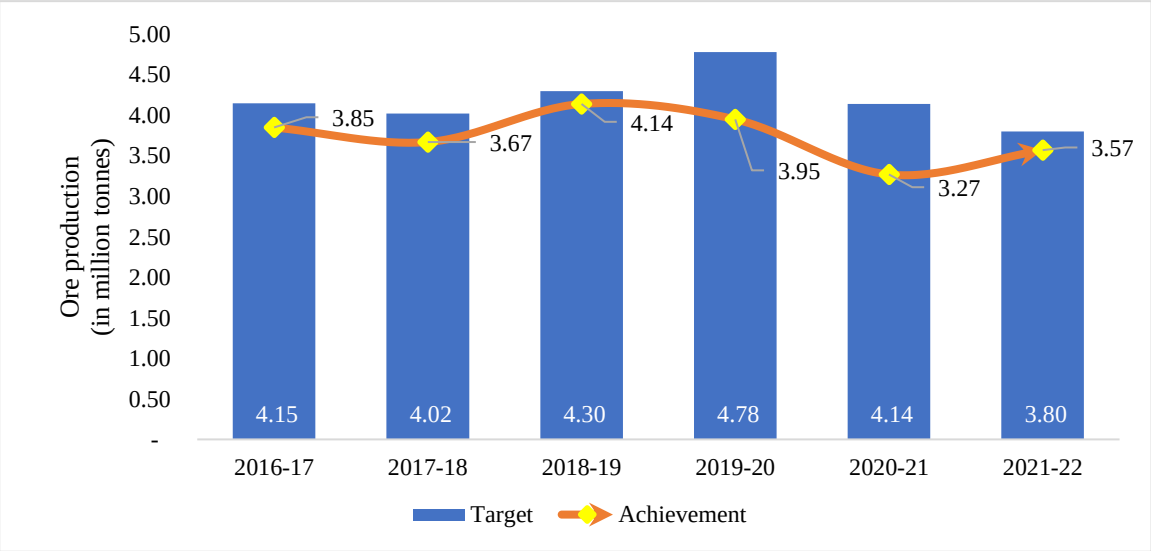
CHAPTER 3

MINING OPERATIONS AND ALLIED ACTIVITIES

Mining is a series of activities undertaken to extract ore from the earth. Mining activities involve mine development (activities necessary for making mines ready for production), excavation of ore and transportation of ore from mining faces to concentrator plant and ore beneficiation in concentrator plant. For smooth conduct of mining activities, mining companies also need- to undertake several allied activities like payment of statutory dues, monitoring the work of the contractors, payment of bills as per the contractual provisions etc.

The excavation of ore by the Company during the period from 2016-17 to 2021-22 is depicted in **Figure 3.1**.

Figure 3.1 Target and actual production of ore



Source: Records furnished by the Management

It may be seen that the actual ore production was between 3.27 million tonnes (2020-21) to 4.14 million tonnes (2018-19). The lower production of copper ore, as a cascading effect, has resulted in lower production of copper concentrate by the Company as the same ranged from 23,866 tonnes (2020-21) to 32,439 tonnes (2018-19) with an average production of 28,321 tonnes per annum.

Audit examination of the various functions and activities undertaken by the Company for ore production and concentration brought to the fore certain issues that affected the Company's performance due to which its targets were not met. Audit observations in this regard are discussed in the succeeding paragraphs.

3.1 Ore Production

Ore production involves development of mines and extraction of ore from the mines. Audit observations in this regard are discussed in the following paragraphs.

3.1.1 Statutory Clearances for Mining Operations

The Management, to conduct mining in any area, is required to have mining lease from the concerned State Government along with Environment Clearance from the Ministry of Environment, Forest and Climate Change. Moreover, if any area requires diversion of any forest land for any non-forest activities, the Management also has to get forest clearance from the Ministry of Environment, Forest and Climate Change.

(a) Environment Clearance for *Surda* mines

It was seen from the records that the Ministry of Environment, Forest and Climate Change had observed (June 2012) that mining in *Surda* mines was conducted without requisite Environmental Clearance leading to violation of Environment Protection Act, 1986. The mining lease of *Surda* mines which expired on 15 June 2014 was also not renewed by the State Government of Jharkhand as the Company did not have requisite Environment Clearance. Subsequently, at the instructions of the State Government, the mining activities were stopped from September 2014. Due to introduction of the Mines and Minerals (Development and Regulation) Amendment Act, 2015[30] by Government of India, the mining lease of *Surda* mines was extended (July 2017) by the State Government upto 31 March 2020. This helped the Company to resume mining operations from 15 June 2015 after suspension of mining operations for nine months. However, the Management again did not timely submit the required documents to Ministry of Environment, Forest and Climate Change which delayed the process of getting Environment Clearance. In the meantime, the mining lease of *Surda* mines which was extended upto 31 March 2020 also expired and the renewal of which could not be achieved for want of environment clearance.

The Expert Advisory Committee of Ministry of Environment, Forest and Climate Change, in its 35th Meeting, observed (August 2020) that the submission of inadequate and improper reply to the Ministry indicated careless approach of the Management along with its consultant. This caused delay in receipt of environment clearance leading to suspension of mining activities from 1 April 2020. Mining operations could resume only from June 2022 after receiving Environment Clearance (30 May 2022).

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[30] ***As per sub section (6) of Section 8A, notwithstanding anything contained in sub-sections (2), (3) and sub-section (4), the period of lease granted before the date of commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, where mineral is used for other than captive purpose, shall be extended and be deemed to have been extended up to a period ending on the 31st March, 2020 with effect from the date of expiry of the period of renewal last made or till the completion of renewal period, if any, or a period of fifty years from the date of grant of such lease, whichever is later, subject to the condition that all the terms and conditions of the lease have been complied with.***

In this connection, Audit observed that suspension of mining operations in *Surda* mines during the period from September 2014 to June 2015 and again from April 2020 to May 2022 resulted in the following:

- During this period, the Company was not able to produce 11.91 lakh tonnes of copper ore. Further, as per the provisions of the Mines and Minerals (Development and Regulation) Amendment Act 2021, upon renewal of mining lease not granted through auction, the Company would now have to pay ₹13.18 crore as additional 50 *per cent* royalty for ore extracted.

- For want of Mining lease and Environment Clearance, the mining operations were suspended for the period from April 2020 to March 2022. However, the fixed cost of ₹26.40 crore was borne by the Company. As there was no revenue earned, the Company did not have any opportunity to recover the fixed cost amounting to ₹26.40 crore.

- Due to the violation of the Environment Protection Act, 1986 the Company had to incur an avoidable expenditure of ₹5.71 crore towards remediation plan and natural & community resource augmentation plan.

- In terms of Supreme Court judgement (August 2017) in Common Cause vs Union of India, for recovery of compensation towards production of minerals without lawful authority, the Company also received a demand of ₹929.40 crore raised by the Government of Jharkhand. As per Company's reply (July 2022, endorsed by Ministry of Mines), the above judgement did not apply to the *Surda* mining lease and the Company had filed revision case against the demand of the State Government in the Ministry of Mines. However, it was still pending (December 2022).

- The Company also carried out continuous dewatering of water seeped in the underground mines during the period of suspension of mining operation after incurring an expenditure of ₹13.51 crore which was in addition to the other fixed cost of *Surda* mines.

The Management contended (July 2022) that the Company submitted (March 2012) the application of Environment Clearance for *Surda* mines in accordance with the provisions of the Environment Impact Assessment Notification 2006. The Company was granted (January 2015) Terms of Reference[31] by Ministry of Environment, Forest and Climate Change. Finally, the Company was granted (May 2022) Environment Clearance for *Surda* mines by Ministry of Environment, Forest and Climate Change.

[31] ***Terms of Reference is provided by the Ministry of Environment, Forest and Climate Change to the project proponents outlining the format and structure of the Environment Impact Assessment Report. It helps Project Proponents to properly plan and design the Environment Impact Assessment Report. It also provides details of all the information required for the Environment Impact Assessment review committee to make an informed decision about awarding the Environmental Clearance.***

The above contention of the Management and the Ministry of Mines needs to be viewed in light of the fact that the delay in getting environment clearance was due to improper follow up and documentation as evident from the strictures passed by the Ministry of Environment, Forest and Climate Change in its meeting held (August 2020) regarding submission of documents by the Company. Moreover, the Environment Clearance granted to the Company was subject to the condition that the State Government was to ensure that the mining operations should not commence till the entire compensation levied for illegal mining is paid by the Company in compliance with judgment of Supreme Court of India.

Thus, delay in submission of requisite documents to the Ministry of Environment, Forest and Climate Change caused delay in receipt of Environment Clearance and Mining Lease leading to suspension of mining operations in *Surda* mines during the period from September 2014 to June 2015 and again from April 2020 to May 2022. During this period, the Company was not able to produce 11.91 lakh tonnes of copper ore. Further, as per the provisions of Mines and Minerals (Development and Regulation) Amendment Act 2021, upon renewal of mining lease not granted through auction, the Company would now have to pay ₹13.18 crore as additional 50 *per cent* royalty for ore extracted.

(b) Environment Clearance for *Chandmari* Mines

Chandmari mines is one of the copper ore mines of the Company at *Khetri* Copper Complex, *Rajasthan*. The mines have 45.74 million tonnes of ore reserves of 1.27 *per cent* copper grade. The Ministry of Environment, Forest and Climate Change observed (28 December 2011) that the Company had changed the mining technology from opencast mining to underground mining without requisite prior Environment Clearance thereby violating the provisions of the Environment (Protection) Act, 1986. The Company was not able to secure Environment Clearance leading to non-operation of *Chandmari* mines with effect from 2011. The Mining lease of *Chandmari* mines was scheduled to expire on 26 December 2022. Therefore, due to non-operation of *Chandmari* mines, the Company had to pay dead rent to the State Government of Rajasthan, amounting to ₹78.31 lakh for the period from 1 April 2012 to 31 March 2022.

Figure 3.2: Benches of *Chandmari* open cast mines

Source: Records of the management

Moreover, as per the provisions of Mines and Minerals (Development and Regulation) Amendment Act 2021, on renewal of mining lease, the Company was to pay 50 *per cent* additional amount as royalty for ore extracted. During the period 2012-13 to 2020-21 the Company had planned to produce 1.52 lakh tonnes of copper ore valuing ₹92.25 crore. Hence, the Company would now be liable to bear additional royalty of 50 *per cent* on 1.52 lakh tonnes of unmined ore production to the tune of ₹2.13 crore (***Annexure 4***), whenever it is mined. Thus, due to non-compliance to provisions of the Environment (Protection) Act, 1986 the Company not only had to make payment of dead rent amounting to ₹0.78 crore but would also have to pay additional royalty amounting to ₹2.13 crore in future.

The Management accepted (July 2022) that 1.52 lakh tonnes of copper ore was planned for production between the years 2012-13 to 2020-21. The Management, however, contended that out of 1.52 lakh tonnes, only 0.74 lakh tonnes could not be done due to non-availability of Environment Clearance. The Management further contended that the production of the remaining 0.78 lakh tonnes could not be produced due to the prevailing economic scenario of the country. The Ministry of Mines endorsed (November 2022) the views of the Management.

The replies of the Management and Ministry of Mines are not acceptable as the Management has not yet received Environment Clearance for the *Chandmari* copper mines in absence of which the Management would not be in a position to undertake any mine development/ operation activities irrespective of the economic scenario. Moreover, in the same period, the Management was undertaking mine development activities in the other mining areas of the Company.

Recommendation 7: The Management may ensure that necessary steps are taken in a timely and organised manner so that all statutory clearances like Environment Clearance, renewal of mining lease and Consent to operate from the State Pollution Control Board are received timely and non-availability of the same do not adversely affect the mine operations.

3.1.2 Development of *Malanjkhand* underground mines

The Company awarded (August 2019) a contract for production of ore from *Malanjkhand* underground mines for a period of five years to M/s SMS Limited, with a quoted price of ₹1,573.82 crore. As discussed in para no. 2.2.3.1 (*Awarding of work to a financially weak vendor in Malanjkhand Mines)*, only 50 *per cent* of the work for development of underground mines was completed (December 2021).

M/s SMS Limited, before award of contract, visited mines in July 2019 and observed that both the North decline[32] and South decline were not ready for introducing additional equipment to meet the projected targets as per the timelines specified in the Notice Inviting Tender. M/s SMS Limited informed that any mobilisation of equipment immediately after award of Letter of Intent would lead to unsafe operations, extra cost, changes of equipment, under-utilisation of all resources, poor productivity and non-mobilisation of equipment during mobilisation period and would make them liable to imposition of penalties.

Figure 3.3: Low Profile Dump Truck operating in *Malanjkhand* underground mines

Source: Images from records furnished by the Management

[32] ***A decline is a system of ramps and crosscuts (horizontal drives) that connects the access points (points which must be accessed for drilling and blasting operations) and draw points (from which the ore is drawn) to the surface portal or to a breakout from existing mine.***

Under these circumstances, M/s SMS Limited requested the Company to defer the negotiation meeting till the end of August 2019 by which time they would plan implementation schedule, taking into consideration the progress on excavation of passing zones, ventilation and definition drilling. However, stating that the Company could not afford any further delay in finalising the tender as it would have adverse implications on the production schedule from underground mines of the *Malanjkhand* Copper Project, the Sub-Committee on Tender recommended (July 2019) for the award of contract with four months' mobilisation period from the date of issue of Letter of Intent i.e., up to 20 November 2019.

In this connection, Audit observed that M/s SMS Limited had not submitted comprehensive work plan even after two years of issue of Letter of Intent which was required within 30 days of date of issue of Letter of Intent as per Article 6.2.1 of the contract document. Further, against the contractual provision that M/s SMS Limited would mobilise resources and commence the works at the site within four months from the date of Letter of Intent, Audit observed that M/s SMS Limited failed to mobilise any equipment required for development of stopes[33] as well as production. The services/facilities like power, water supply, compressed air, etc., which should have been completed in the mobilisation period itself, were also not established, and a few equipment required for the services like transformers, panels, pumps etc., were not delivered (October 2020) at site. There had also been undue delay in awarding the contracts for services by M/s SMS Limited. The issues discussed above show that the objectives with which the Company took hurried decision to start early production were not fulfilled as the performance of the Contractor turned out to be inadequate. The above lapses resulted in total loss of production of 21,990 tonnes[34] of Metal in Concentrate and consequential loss of revenue of ₹1,051.69 crore which it could have earned by selling copper concentrate. M/s SMS Limited had not been able to extract ore from mines (March 2022).

As per article 8.6.1 of the contract, if the successful contractor was not able to achieve at least 90 *per cent* of the target ore production and mine development, they were liable to pay Liquidated Damages on quarterly basis which would be a maximum of 10 *per cent* of the total awarded value. Audit noticed that despite missing every quarterly target fixed for mine development and ore production, no Liquidated Damages were recovered from the contractor.

Scrutiny of records revealed that M/s SMS Limited had made around 4000 metres of development from January 2021 to November 2021 which was amounting to ₹102.49 crore (including escalation and taxes). As per calculation, the total Liquidated Damages to be recovered from the bills of M/s SMS Limited till October 2021 was ₹105.80 crore. However, rather than recovering Liquidated Damages from the bills, the Company

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[33] ***A stope is a dugout tunnel or space that contains the ore which is being mined. Stoping is the process of extracting the desired ore or other mineral from an underground mine, leaving behind an open space known as a stope. Stoping is used when the country rock is sufficiently strong not to collapse into the stope, although in most cases artificial support is also provided.***

[34] ***2,499 tonnes for developmental and 19,491 tonnes for production.***

recommended for payment of ₹ 60 crore (60 *per cent* of the bills verified) *adhoc* payment to M/s SMS Limited. Based on such recommendation, the unit office of *Malanjkhand* Copper Project paid ₹49.48 crore to the Contractor. Clearly, no payment would have been required had Liquidated Damages been charged. Hence, payment of such amount was injudicious and against the provisions of the contract.

Therefore, awarding of contract without making the mines ready for production as well as failure of M/s SMS Limited to mobilise the required resources for the project resulted in loss of opportunity to generate revenue from underground mines to the tune of ₹1,051.69 crore. Further, the Company also did not impose Liquidated Damages as per provision of the contract and rather made payment of ₹49.48 crore.

The Management accepted the fact that M/s SMS Limited could not complete the mobilisation of equipment in time. The Management also accepted that as the reconciliation was pending, the Management released *adhoc* payments retaining 20 *per cent* of Running Account bills to ensure continuity of work. The Ministry of Mines endorsed (November 2022) the views of the Management.

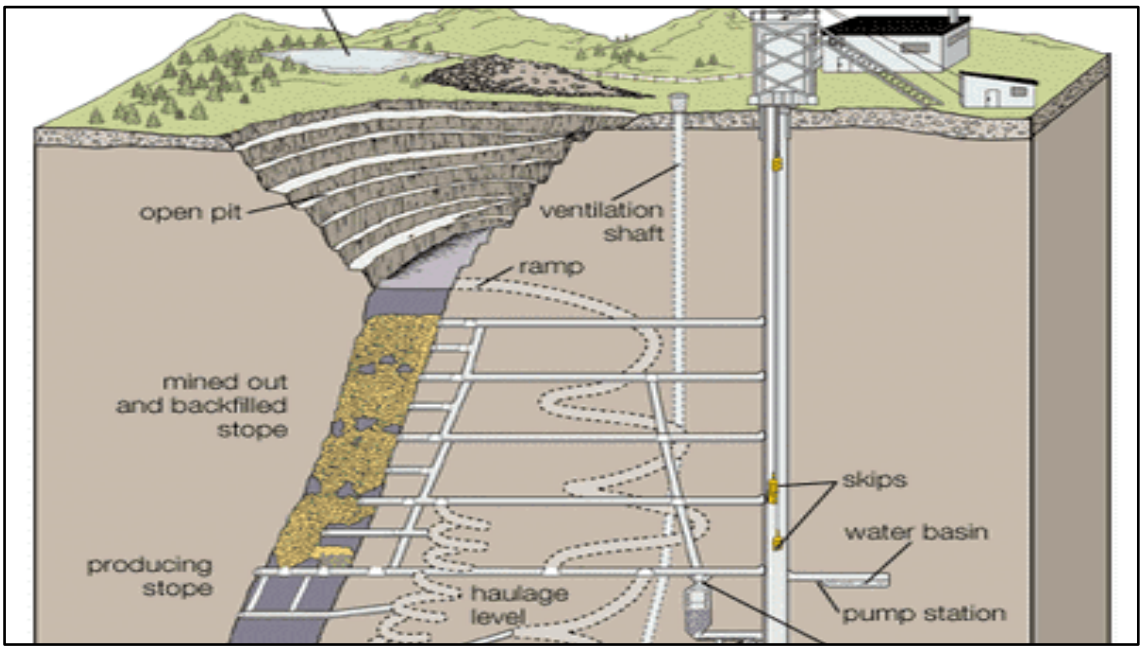
The reply of the Management and Ministry of Mines points to the fact that Management's failure to recover Liquidated Damages was guided by non-contractual considerations.

Recommendation 8: The Management may ensure that the payments to the contractors are made as per the provisions of the contract. In case of deviation, the Management may fix accountability and take corrective action so that the financial interest of the Company is safeguarded.

3.1.3 Fixation of production target - *Khetri* and *Kolihan* Mines

Under the Mineral Conservation & Development Rules, 2017, the existing lessees were to prepare and submit the mining plans to the Indian Bureau of Mines for approval. The mining plan, thus, becomes an extremely vital document for mining as all activities are required to be carried out in accordance with the envisaged proposals in the approved mining plan.

Figure 3.4: Working of an underground mines



Source: www.britannica.com

On scrutiny of records of *Khetri* and *Kolihan* Mines, it was seen that according to the Mining Plan approved by the Indian Bureau of Mines the target of ore production was 9.97 million tonnes during the period from 2016-17 to 2021-22. However, against this target, the Company fixed their production target at only 8.79 million tonnes, which was lower by 1.18 million tonnes valuing ₹627.42 crore.

The Management stated (July 2022) that the targets were fixed on year-on-year basis by the Management considering the ground status for achieving the target production. The Management further stated that the targets in the Indian Bureau of Mines approved Mining Plan are kept on a higher side to avoid frequent revision of the Indian Bureau of Mines approved Mining Plan. The Ministry of Mines endorsed the views of the Management.

The reply of the Management is not acceptable as the Management could not achieve target in any year during the period from 2016-17 to 2021-22. Moreover, the annual production target (1.61 million tonnes) in the Indian Bureau of Mines approved Mining Plan for the year 2019-20 was lower than the annual target (1.80 million tonnes) fixed by the Company.

Recommendation 9: The Management may plan mine development and ore production works in such a manner that optimum ore production is achieved that is commensurate with mines' capacities.

3.1.4 Preparation of contract documents

A Contract document defines the relationship between the Company and its service providers. It provides for the various rights and obligations each of the parties enjoy and are liable to. It is crucial that contract documents are carefully drafted and contain all the

important provisions so that the intended objectives are achieved in a timely manner with the desired quality and for avoiding disputes to the maximum extent.

Audit examined all 13 contracts related to mining operations. The audit observations related to these contracts are given below:

a. Contractual provisions related to employer's contribution to the Employees' Pension Scheme and Employees' Provident Fund

The Company adopted (November 2014 and revised in July 2020) comprehensive guidelines, namely Procurement of Goods & Services Manual (Policy & Procedure) for procurement of goods and services by the Company. As per the clause 18.12 of this Manual, the Management was to ensure that the employer's contribution to the Employees' Pension Scheme and Employees' Provident Fund had been made by the contractor himself before releasing payments to the contractor.

Scrutiny of the records, however, revealed that the Management had not kept any provision in this regard in the Contract awarded (27 February 2021) by the Company to M/s RK Transport Limited for loading and hauling of 8 lakh bank cubic metre rock at *Malanjkhand* open pit mines for a value of ₹68.88 crore. Importantly, in the past also, the Company had awarded (2007) a contract for operating *Surda* mines and *Mosabani* Concentrator Plant to M/s India Resource Limited, where the Company failed to ensure that the employers' contribution was deposited by the contractor. As a result, the Company at the direction of the Provident Fund Authority made (August 2019) payment of ₹2.38 crore as Provident Fund Contribution and ₹0.43 crore as interest.

The Management, in its reply stated (July 2022) that instructions had now been issued to all the concerned departments of the respective Units and Offices, to ensure the compliance of Clause 18.12 of the Procurement of Goods and Services Manual 2020 stating that employer's contribution (12 *per cent* EPS and EPF both) had been made/paid by the contractor himself and he had not availed the benefits under *Pradhan Mantri Rojgar Protsahan Yojana*, before releasing payments to the contractors. In this regard, all the concerned have also been requested to insert this clause in their future tenders and contracts to ensure compliance. Ministry of Mines endorsed (November 2022) the views of the Management.

b. Contractual provision regarding Escalation bill

The work of mine development, production drilling and diamond drilling in *Banwas* Block of *Khetri* Copper Mines, Rajasthan for a period of five years was awarded (February 2010) to M/s TCL-MMPL Consortium. However, unlike the similar work order for 32,100 meters mine development and production drilling at *Khetri* and *Kolihan*, in this work order there was no clause for restricting payment of escalation bill on execution of the unfulfilled quantities in the extended period for reasons attributable to the contractor.

Scrutiny of records revealed that after the expiry of the contractual period of five years (August 2010 to July 2015), the contractor was unable to execute 9,950 metres of mine

development (against revised target of 14,924 meters), 77,538 meters of production drilling (against revised target of 85,000 meters), 22,980 meters of 165 mm drilling (against revised target of 41,000 meters) and 1,680 meters of diamond drilling (against revised target of 12000 meters) due to reasons attributable to the contractor (mainly slow progress of work). However, as the contract had no provision for restricting payment of escalation bill on execution of these unfulfilled quantities in the extended period (August 2015 to September 2016), the Company had to incur extra expenditure of ₹1.36 crore as escalation on wages and fuel.

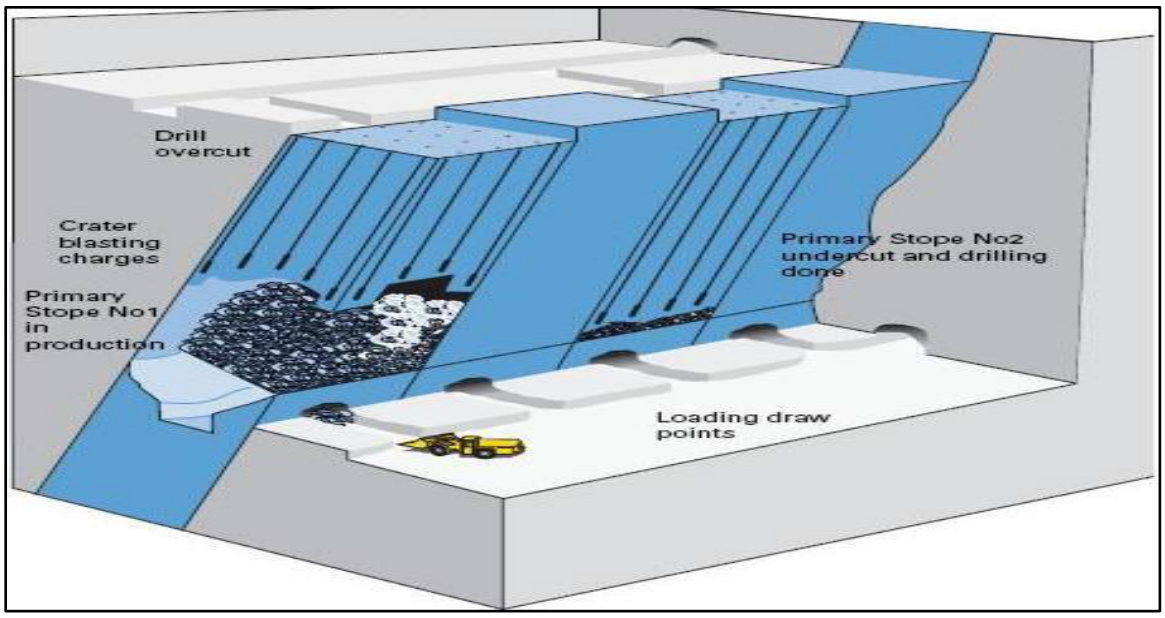
The Management stated (July 2022) that the work order was extended against the time lost on account of the Company and hence payment of escalation was made to the contractor as per the terms and conditions stipulated in the contract.

The above reply of the Management is not acceptable as due to delays attributable to Management, the performance target was reduced quantitatively. The contractor failed to execute these reduced targets and as a result, the contract was extended for a period of one year. However, due to deficiencies in the contract, the Company had to make payments for escalation for the extended period.

3.1.5 Production Performance of *Khetri* and *Kolihan* Mines

Khetri Copper Complex comprises two functional mines, namely *Khetri* mines and *Kolihan* mines. The mining lease of *Khetri* mines comprised two mining blocks, namely *Khetri* Block and *Banwas* Block. Mining in *Khetri* Block was being done through track mining method wherein the mining equipment, mainly ore hauling equipment, moved on iron rails. In case of *Banwas* Block, trackless mining method was being used wherein mining equipment were tyre mounted.

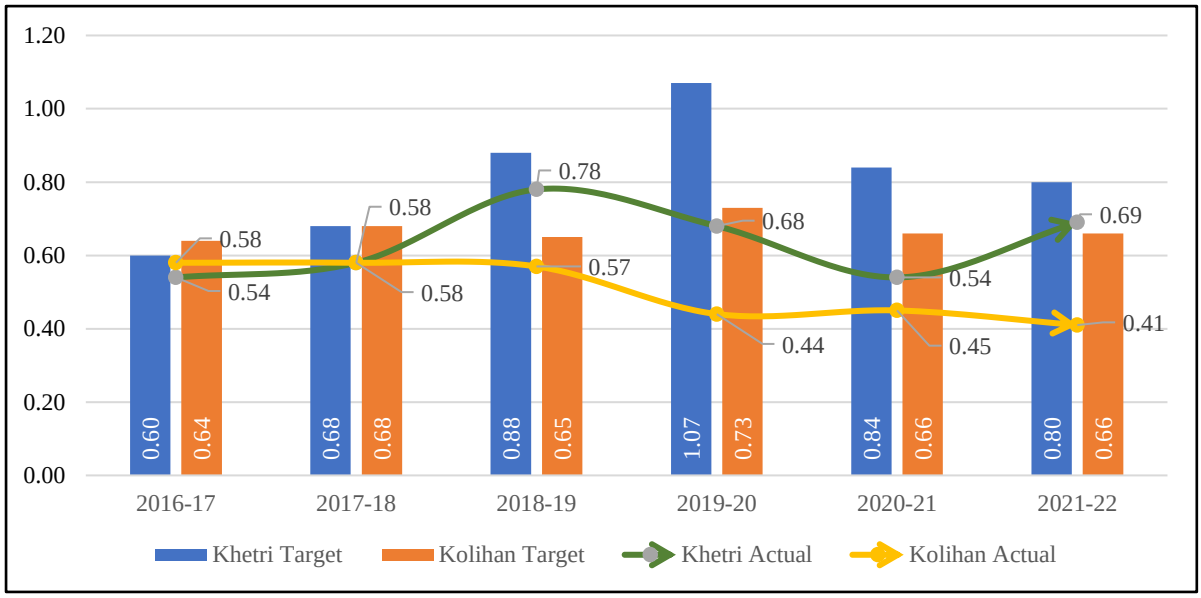
Figure 3.5: Trackless mining method in *Khetri* group of mines



Source: Records furnished by the Management

The production performance of *Khetri* Mines and *Kolihan* mines during the period from 2016-17 to 2021-22 is shown in **Figure 3.6.**

Figure 3.6: Target *vis-a-vis* achievement of *Khetri* Copper Complex



Source: Records furnished by the Management

Scrutiny of the records revealed that during the period from 2016-17 to 2021-22, the actual ore production at both Khetri mines and Kolihan mines was lower than the targets due to shortfall in mine development, deployment of insufficient manpower by the contractor, break-down of equipment deployed by the contractor etc., apart from few months' restrictions due to COVID-19 pandemic.

According to the Mines and Minerals (Development and Regulation) Amendment Act (28 March 2021), "all such Government companies or corporations whose mining lease has been extended after the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, shall pay such additional amount equivalent to 50 per cent of the royalty payable"[35].

Thus, the Company not only suffered loss of revenue due to lower production in a particular year but also would now have to bear extra expenditure as additional royalty on the quantities of ore produced. For instance, during the period from 2016-17 to 2019-20, the Company planned to produce 6.47 million tonnes of copper ore against which the total production was only 4.75 million tonnes, as a result the shortfall in production was 1.72 million tonnes for which the Company would have to pay ₹17.31 crore (***Annexure 5***) as additional 50 *per cent* royalty.

The Management, while accepting the above, stated (July 2022) that suitable steps would be taken by incorporating various terms and conditions in subsequent contracts so that the

[35] ***50 per cent of 4.62 per cent =2.31 per cent***

performance of contractual activities will be better and the targeted quantities would be achieved. The Management, however, contended that any excess payment of royalty due to revision in royalty rate should not be linked with shortfall in ore production as the royalty had to be paid as per Government Guidelines under the Mines and Minerals (Development and Regulation) Amendment Act 2021 which was not under control of the Company.

The contention of the Management is not tenable because the Company would now be liable to pay ₹17.31 crore as additional 50 *per cent* royalty in future after extension of mining lease.

3.2 Transportation of Ore

The *Khetri* Copper Complex of the Company comprises *Khetri* mines (including *Banwas* block), *Kolihan* Mines and *Chandmari* Mines (non-operational). *Khetri* Copper Complex has only one copper ore Concentrator Plant[36] located at *Khetri* Copper Mines. Hence, the copper ore produced at *Kolihan* Copper Mines was required to be transported to *Khetri* Concentrator Plant for its processing. The Environment Clearance of *Kolihan* Mines was granted (February 2015) with a condition that the transportation of copper ore from *Kolihan* mines to the *Khetri* Concentrator Plant would be done through a Bi-cable Aerial Ropeway, having an installed capacity of 1.20 million tonnes per annum. In this connection, it is worth mentioning that the Company had also proposed to enhance the capacity of the Bi-cable Aerial Ropeway upto 1.50 million tonnes per annum.

Figure 3.7: Aerial Ropeway in *Kolihan*

Source: Records furnished by the Management.

[36] ***Concentrator Plant is a facility used in a copper mining industry wherein the economic value of copper ore (with almost 1 per cent copper content) is improved by removing the commercially valueless materials resulting in a higher-grade product called copper concentrate (with 16 to 25 per cent copper content).***

Figure 3.8: Transportation of ore by road in *Kolihan* mines

Source: Records furnished by the Management.

Scrutiny of records, however, revealed that the Management was transporting copper ore mainly through road transportation (95.54 *per cent*) instead of Bi-cable Aerial Ropeway (4.46 *per cent*) resulting in underutilisation of Aerial Ropeway and violation of the terms and conditions of Environment Clearance. During the period from 2016-17 to 2021-22, out of total expenditure of ₹36.42 crore towards Aerial Ropeway, the Company incurred ₹34.21 crore as fixed cost for its operation and maintenance which remained unrecovered due to under-utilisation of Aerial Ropeway. On the other hand, ₹18.02 crore was incurred for road transportation of ore from *Kolihan* mines to *Khetri* Copper Concentrator Plant. Thus, due to underutilisation of Aerial Ropeway, the Company not only violated the terms of the Environmental Clearance but also had to bear fixed cost amounting to ₹32.51crore[37] and extra expenditure of ₹18.02 crore towards road transportation.

The Management stated (July 2022) that Aerial Ropeway was not operated by the Management for want of skilled manpower and other economic considerations.

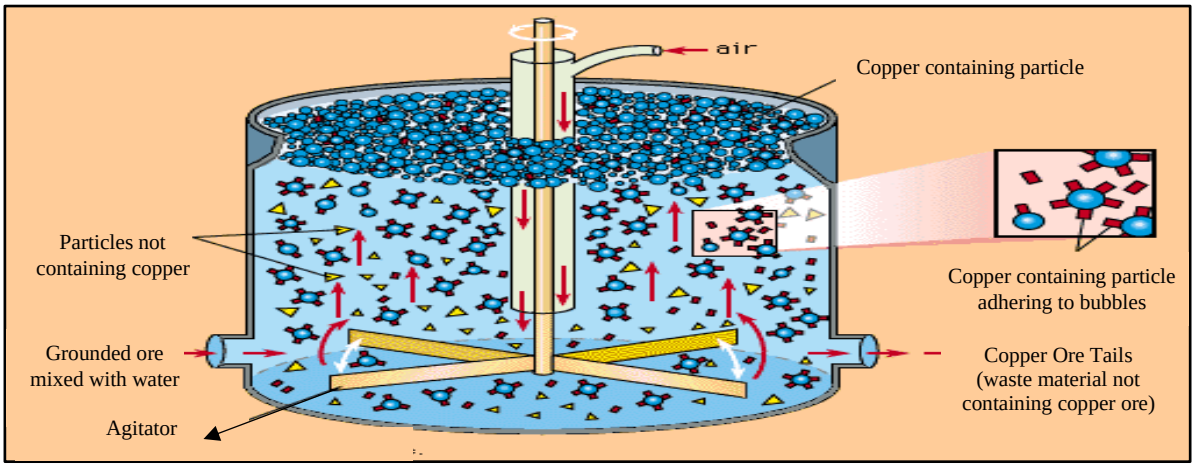
The reply of the Management that Aerial Ropeway was not operated for want of skilled manpower was not acceptable as the Company had floated tenders for engagement of these workers for only one-hour operation in a full day. The contention regarding economic consideration was also not acceptable as the Aerial Ropeway was grossly underutilised, causing higher fixed cost per unit. Moreover, as transportation of mine ore from *Kolihan* mines through aerial ropeway was one of the conditions of the Environment Clearance, non-adherence of the same resulted in its violation, which could lead to suspension of mining operations and levy of penalties.

[37] ***₹34.21 crore x (100-4.98)/100=₹32.51 crore***

3.3 Ore Beneficiation

Copper ore is generally beneficiated by a froth floatation process, wherein the finely ground ore, mixed with water and special reagents, is agitated by devices to produce air bubbles in the ore-water mixture, or slurry. As the bubbles rise to the surface, they carry the copper minerals with them, leaving waste in the cell to be discarded as tailings. Collection of the froth from the surface of the flotation cell yields a copper concentrate.

Figure 3.9 Froth floatation process



Source: www.britannica.com

Audit observed deficiencies in the Concentrator Plant equipment, lapses in proper monitoring by the Management and other issues which have been discussed below.

3.3.1. Crushing and grinding of ore in Concentrator Plant at *Khetri* Copper Complex

To ensure that copper minerals are liberated during the beneficiation process the copper ore received from the mines are crushed in several stages (i.e., primary[38], secondary and tertiary) and grinded very finely.

As per the design parameters, the Concentrator Plant of the Company at *Khetri* Copper Complex requires feeding of crushed ore sized smaller than 150 millimetres and screens/ wire mesh sieves of suitable specifications are required to be placed at the discharge point of the respective crushers for higher liberation of copper from ores. This was further corroborated from the report of M/s GTK Mintec, Finland, a consultant appointed by the Company to study ore beneficiation process and advise improvements. In the report, the consultant concluded (October 2015) that the Company could achieve copper grade of

[38] ***Primary crushing is done by the jaw crusher to a size smaller than 150 millimeters in the respective mines. Secondary and tertiary crushing is done to a size smaller than 20 millimeters by the cone crushers in the Concentrator Plan.***

23.40 *per cent* with copper recovery yield[39] of 84.40 *per cent* from *Khetri* ore provided finer grinding/crushing of the ore could be carried out for higher liberation of copper.

Audit scrutiny revealed following:

- There was no screen provided at the discharge of primary crusher to monitor the size of crushed ore from the crusher due to which there was inadequate control over the size of the output of primary crusher ore. In this regard, the Management stated that the size of the output ore from the primary crusher was being maintained and monitored by the gap between the crusher liners. However, the purpose of crusher was to break down ore and not act as a sieve to separate bigger ore pieces from the smaller ones, for which, screens had to be installed.

- Moreover, no test report was available for evaluating the performance of the primary crusher. Also, the Management could not provide any evidence regarding efforts made to ensure that oversized ores were not being fed in the secondary crusher, indicating inadequate internal control on the part of the Management.

- Further, to reduce frequent plugging and to increase the availability of screens in secondary and tertiary crushing sections of the Concentrator Plant, wire mesh panels of smaller size 20 mm x 20 mm were replaced by rubber panels of bigger size 30 mm x 30 mm. As a result, the Company could ensure only 69.08 *per cent* to 88.83 *per cent* of crushed ore to a size smaller than 20 mm during the period 2016-17 to 2021-22 (upto January 2022).

- The Company commissioned (March 1995) an 'On-Stream Analyser' in the Concentrator Plant after which the assay[40] values (*per cent* copper, *per cent* iron), pulp density[41] etc., were available on real-time basis. The disturbances were decreased and new control strategies were possible to be generated as well as the process circuits could be optimised. This resulted in reduced tailing losses of copper and improvement in recovery by about 2 *per cent*. Audit, however, observed that in the Concentrator Plant at *Khetri*, the 'On-Stream Analyser' was not in working condition during the period from 2016-17 to 2021-22. Hence, the Management was not able to know the real time status of the ore during its processing for estimating the quantity of reagents required, due to which the Management did not have the opportunity to take concurrent and timely corrective action, when required.

Hence, due to the above lapses of the Management, crushed ore sized bigger than 20 mm was being fed in the subsequent processes after tertiary crushing, which had the potential

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[39] ***Copper recovery yield is the percentage of copper metal recovered (Metal in Concentrate) from the total copper metal present in the Ore processed (Metal in Ore) during the beneficiation of copper ore. Arithmetically, Copper recovery yield = Metal in Concentrate/Metal in Ore*100.***

[40] ***Assay means the testing of a metal or ore to determine its ingredients and quality. Copper concentrate is assayed to estimate the content of copper and other precious metal in the copper concentrate.***

[41] ***Pulp density describes the mass of mineral in unit volume of liquid available, usually expressed as a percentage with respect to volume.***

to adversely affect liberation of mineral from the ore. In view of the above, had the Management ensured feeding of crushed ore lower than 150 mm in the secondary crusher by installing a screen of appropriate dimension and not increased the screen size of tertiary crusher from 20 mm to 30 mm, during the period of 2017-18 to 2021-22, the Management could have recovered 877.49 tonnes of more copper metal valuing ₹47.35 crore from the same quantity of ore processed (***Annexure 6***).

The Management, in its reply while accepting the facts, stated (July 2022) that the Mesh sizes were subsequently increased to reduce the downtime of screen and the existing On-Stream Analyser was not in working condition due to non-availability of spares. The Ministry of Mines endorsed (November 2022) the reply of the Management.

The fact, however, remained that increase in mesh size caused passing of bigger sized ores thereby reducing the availability of fine crushed ore. This oversized ore coupled with non-functioning of 'On-Stream Analyser' caused under recovery of copper metal and non-conservation of a scarce natural resource of the country.

Recommendation 10: The Management may ensure that equipment such as screens, meshes and On-Stream Analyser are installed and working as per design parameters at all stages of the beneficiation process to achieve optimum recovery of metal from the ore.

3.3.2. Quality control with respect to Copper to Iron Sulphur ratio in *Khetri* Mines

Chalcopyrite ($CuFeS_2$) is the principal and the most abundant copper bearing ore. Apart from copper it also contains Iron and Sulphur. The copper concentrate produced from processing of copper ore also contains substantial amount of iron and sulphur. However, presence of higher proportion of iron and sulphur affects the quality of copper concentrate. Scrutiny of the technical specifications of the *Malanjkhand* and *Khetri* origin copper concentrates revealed that the average content of copper, iron and sulphur in the copper concentrate of *Malanjkhand* origin was 28 *per cent*, 29 *per cent* and 30 *per cent*, respectively, due to which the average Copper to Iron-Sulphur ratio was 48 *per cent*[42]. On the other hand, the average content of copper, iron and sulphur in the copper concentrate of *Khetri* origin was 17 *per cent*, 36 *per cent* and 29 *per* cent respectively due to which the average Copper to Iron-Sulphur ratio was 26 *per cent*[43].

The Company executed a long-term agreement with M/s Hindalco Industries Limited for sale of copper concentrate of 5,500 Wet Metric Tonnes per month from *Malanjkhand* Copper Project and 1,000 Wet Metric Tonnes per month from *Khetri* Copper Complex and later amended (16 February 2021) to include 2,200 Wet Metric Tonnes from Indian Copper Complex.

[42] ***28 per cent /(29 per cent+30 per cent)***
[43] ***17 per cent /(36 per cent+29 per cent)***

Scrutiny of the correspondences between the Company and M/s Hindalco Industries Limited revealed that the Company requested (September 2021) Hindalco Industries Limited to procure entire *Khetri* and *Ghatsila* origin concentrate produced as per the conditions under which *Malanjkhand* origin concentrate was being procured. In this regard, Hindalco Industries Limited stated that they would lift entire quantity of *Malanjkhand* and *Ghatsila* origin copper concentrates subject to quality as per contract. However, in case of *Khetri*, Hindalco Industries Limited would not be able to consume more than their current commitment of 1,000 Wet Metric Tonnes per month due to quality issues (adverse Copper to Iron-Sulphur ratio).

The Company, in order to liquidate the stock, had to export 57,585 Wet Metric Tonnes of copper concentrate from *Khetri* during the period from December 2020 to February 2022. Audit observed that the margin of revenue to the Company from selling of *Khetri* Copper Complex concentrate through export was lower by an average of ₹23,655.94 per tonne than its sale to M/s Hindalco Industries Limited.

Thus, due to low quality of the *Khetri* concentrate and lack of corrective action by the Company to improve the quality and quantity of copper in the concentrate of *Khetri* even after being aware of the issues resulted in loss of revenue amounting to ₹136.22 crore[44] (***Annexure 7***).

The Management in its reply stated (July 2022) that the quality issue related to the adverse Copper to Iron-Sulphur ratio is related with the mineralogy characteristic of *Khetri* ore.

The reply of the Management needs to be viewed in the light of the fact that M/s GTK Mintec, Finland in its study report had already recommended (October 2015) measures to improve the Copper to Iron-Sulphur ratio. However, even after lapse of more than seven years, the Management was yet to act upon the same.

3.4 Payment of statutory dues

Apart from regular statutory payments such as taxes, cesses etc., mining sector industries are liable to pay certain statutory charges in the form of royalty on ore produced, contribution to District Mineral Fund, contribution to National Mineral Exploration Trust and Net Present Value of diverted forest lands. Additionally, the Company was to ensure that the contractors employed by it were also making regular and timely payments of all the statutory charges due on them.

Audit observations in this regard are given below.

3.4.1. Payment of Net Present Value for diversion of forest land

Net Present Value is a one time monetary payment by a user agency for diversion of any forest land for any non-forest activity. This payment is collected in pursuance of the order[45] of the Supreme Court of India, by the State Government for undertaking forest protection,

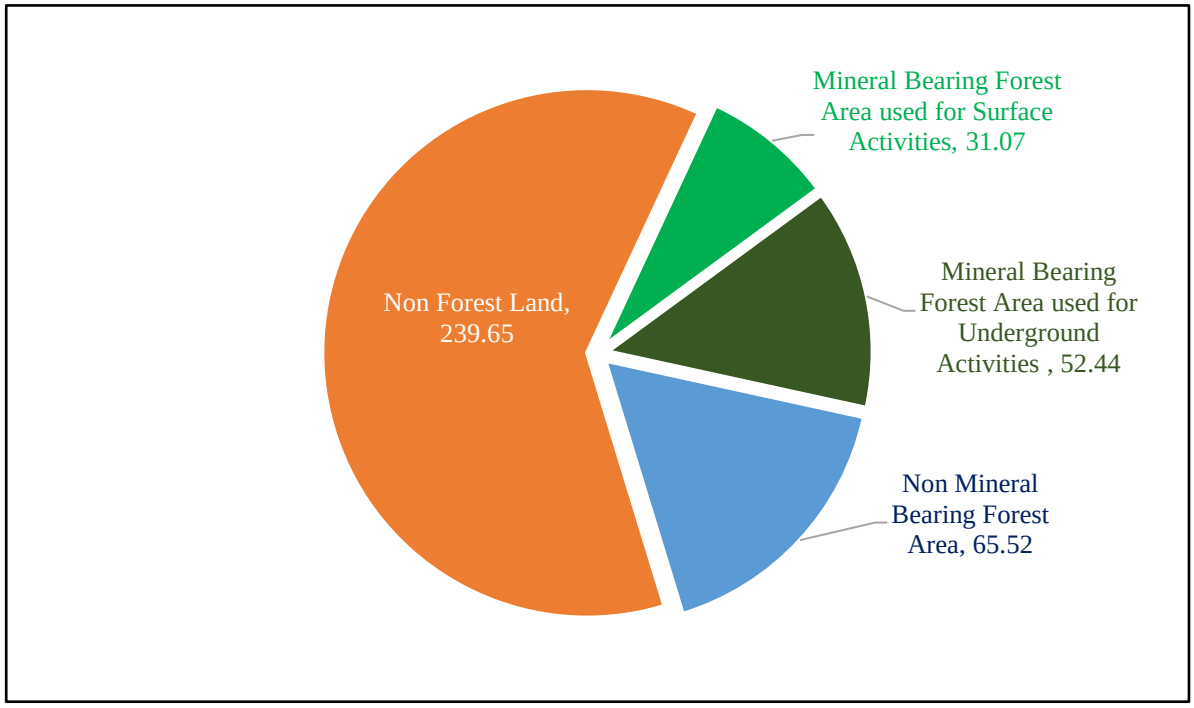
[44] ***57,585 tonnes *₹23,655.94 per tonne = ₹136.22 crore***

[45] ***Orders of 29th October 2002 of the Supreme Court of India in Writ Petition (Civil) No. 202/95***

other conservation measures and related activities. The rate of Net Present Value is determined in line with guidelines issued by the Ministry of Environment Forest and Climate Change through notifications issued from time to time.

The mining lease area of *Surda* mines was spread over 388.68 hectares of land out of which only 149.03 hectares was forest land, and the remaining 239.65 hectares was non-forest land. The details of forest and non-forest land of *Surda* mines is illustrated in **Figure 3.10**.

Figure 3.10: Character of land under *Surda* mines



Source: Records furnished by the Management.

In this connection, Audit observed that:

a) Net Present Value for mineral bearing forest area

Ministry of Environment Forest and Climate Change directed (April 2015) all States to collect from the user agencies Net Present Value of the forest land for the period for which the validity of Forest Clearance had been extended. As the Mining Lease of *Surda* mines was extended (March 2015) upto 31st March 2020, the State Government of Jharkhand directed (July 2016) the Company to pay ₹3.59 crore[46] as Net Present Value for diversion of 83.51 hectares of mineral bearing forest land for mining activities wherein 31.07 hectares was to be utilised for surface activities while 52.44 hectares were to be utilised for underground activities. The Management accordingly paid the said amount (March 2018).

[46] ***₹1.95 crore for surface activities (31.07 hectares *₹6.26 lakh per hectare) and ₹1.64 crore for underground mining (52.44 hectares *₹6.26 lakh per hectare *50%)***

The State Government of Jharkhand, subsequently, raised (August 2019) revised demand of Net Present Value amounting to ₹9.52 crore considering diversion of 189.74 hectares. Moreover, the rate of Net Present Value per hectare was also enhanced from ₹6.26 lakh per hectare to ₹8.03 lakh per hectare. The State Government of Jharkhand directed the Company to pay ₹5.93 crore (₹9.52 crore less ₹3.59 crore) after adjusting ₹3.59 crore already paid, which was accordingly paid (September 2019) by the Company.

In this connection, Audit observed that after surrender of a part of mining lease in June 2004, the Company was in possession of only 83.51 hectares of mineral bearing forest area, of which 31.07 hectares was to be utilised for surface activities while 52.44 hectares were to be utilised for underground activities. Accordingly, the payment of Net Present Value for surface area should have been ₹2.50 crore (31.07 hectares @ ₹8.03 lakh per hectare), instead of ₹3.81 crore (47.49 hectares @ ₹8.03 lakh per hectare) as demanded by the State Government. Similarly, the payment of Net Present Value for underground activities should have been ₹2.11 crore (52.44 hectares @ ₹4.015 lakh per hectare), instead of ₹5.71 crore (142.25 hectares @ ₹4.015 lakh per hectare) as demanded by the State Government. Thus, due to negligence and lack of due diligence by the Management, the Company made excess payment of ₹4.91 crore towards Net Present Value of 106.23 hectares of mineral bearing forest land which was not under the mining lease of the Company.

The Management, while accepting the fact that *Surda* mining lease had mineralised forest area of 83.51 hectares, stated (July 2022) that payment of Net Present Value was made as per the demand of the State Government. Ministry of Mines endorsed (November 2022) the views of the Management.

b) Payment of Net Present Value for non-mineral bearing forest area affected by underground mining activities

According to the guidelines (March 2019) of the Ministry of Environment Forest and Climate Change, the Net Present Value for diversion of forest land affected by underground mining activities should be paid as per quantum of surface strain for underground mining after conducting 3-D subsidence study[47] only. For subsidence up to 5 millimetres per metre, applicable rate of Net Present Value was Nil, while for subsidence greater than 20 millimetres per metre, applicable rate of Net Present Value was 50 *per cent*.

The Company applied (October 2013) to the State Government for forest clearance seeking the diversion of 65.52 hectares of non-mineralised forest area for underground mining operation within *Surda* mining lease. Against the demand of Net Present Value from the State Government, the Company decided to pay Net Present Value after conducting 3D subsidence study of the *Surda* mines based on the guidelines (March 2019) of the Ministry

[47] ***Subsidence is a general term for downward vertical movement of the Earth's surface, which can be caused by both natural processes and human activities. All mining plans are required be accompanied with numerical modelling in 3-Dimension for subsidence prediction through an expert mining engineer/organisation to assess long term damage on surface vegetation due to underground mining along with the mitigation measures suggested by them.***

of Environment Forest and Climate Change. Subsequently, 3-D subsidence study was conducted (July 2021) by the Company through the Indian Institute of Technology (formerly, Indian School of Mines), Dhanbad. According to the report, the applicable rate of Net Present Value for underground mining was "Nil" as maximum surface tensile strain was only 2.20 millimetre per metre. However, scrutiny of records revealed that, the Company had paid ₹0.53 crore (March 2022) to the State Government, which was an avoidable payment.

The Management, in its reply, stated (July 2022) that the surface strain varied from magnitude of 2.20 millimetre per metre to 6.70 millimetre per metre considering *in-situ* stress and the same fell under the category of 5 millimetre per metre to 10 millimetre per metre. Therefore, the applicable Net Present Value under the said category was 10 *per cent* of the normal rate of Net Present Value.

The above reply of the Management is not acceptable as Indian Institute of Technology, Dhanbad (formerly Indian School of Mining, Dhanbad) in its report, concluded (October 2021) that the maximum surface tensile strain was 2.20 millimetre per metre. Accordingly, the applicable rate of Net Present Value for underground mining was "Nil" and not 10 *per cent* as paid by the Management.

Recommendation 11: The Management may review payments of Net Present Value in Surda mines and take necessary steps for recovery/adjustment of excess payments from the State Government.

3.4.2. Payment of Royalty to State Government

(a) Methodology of royalty calculation

As per sub rule 4 of Rule 39 of the Minerals (Other than Atomic and Hydrocarbons Energy Minerals) Concession Rules, 2016 the royalty was to be calculated at the specified percentage of the average sale price of metal for the month as published by the Indian Bureau of Mines of such mineral for the month. Further, the sub rule 1 and 2 of Rule 40 of the Minerals Concession Rules 2016 stated that at the time of removal or consumption of mineral from the mining lease area, the lessee was to calculate the amount of royalty and payments to the District Mineral Foundation as well as to the National Mineral Exploration Trust based on the latest available average sale price of the said mineral grade and pay the same to the Government as provisional payment for the same. Further, after the publication of the Average Sale Price of the Minerals for the month by the Indian Bureau of Mines, due adjustment of the actual amounts payable against the provisional payment may be made.

Scrutiny of the records revealed that the Management made payment of royalty considering the average London Mineral Exchange Price for the month in US dollars and the last day of dollar exchange rate of the month, instead of the Average Sale Price of the Minerals in Indian rupees for the month as published by the Indian Bureau of Mines. For instance, the average London Mineral Exchange price of copper considered by the Management in

respect of *Malanjkhand* Copper Project for the month of April 2016 was ₹3.25 lakh per tonnes whereas the Average Sale Price of copper published by Indian Bureau of Mines for the same month was ₹3.22 lakh per tonne, resulting in excess payment of ₹1.45 lakh as royalty. Moreover, this also caused excess expenditure towards District Mineral Foundation and National Mineral Exploration Trust. Hence, due to non-calculation of royalty as per the provisions of the governing Rules, the Company had to incur excess payment of ₹32.46 lakh[48] towards royalty and ₹10.38 lakh[49] towards District Mineral Foundation and National Mineral Exploration Trust totalling ₹42.84 lakh during the period from April 2016 to December 2021[50].

The Management, in its reply, assured (July 2022) to review the process of calculation of royalty in line with the above audit observation and make suitable changes. The Management further stated that if required, an appeal would be made to the concerned State Mining Departments for adjustment of the excess royalty paid by the Company.

The fact remains that negligence on the part of the Company in following applicable rules resulted in avoidable payment of ₹42.84 lakh.

(b) Payment of enhanced royalty on renewal of mining lease

The Mines and Minerals (Development and Regulation) Amendment Act, 2021 inserted a provision under Section 8A, according to which the period of mining leases, other than the mining leases granted through auction shall be extended on payment of such additional amount equivalent to 50 *per cent* of the royalty payable. Further, it was also clarified that all such Government Companies or Corporations whose mining lease had been extended after the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2021 were to pay such additional amount after the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2021, i.e., after 28 March 2021.

Audit observed that the mining lease of two mines of the Company, namely *Khetri* (including *Banwas* block) and *Kolihan* Mines were renewed from 26 March 2020. However, as per the demand of the State Government of Rajasthan, the Company paid (December 2021) ₹13.24 crore to the government on account of renewal of mining lease. This included ₹9.24 crore (₹ 4.74 crore for *Khetri* Mines and ₹4.50 crore for *Kolihan* Mines) towards the additional amount for extension of copper mining lease which was equivalent to 50 *per cent* of the royalty for the period from May 2020 to March 2021. Since, renewal had happened before March 2021, the Company was clearly not liable to pay the additional amount as per applicable provisions. Hence, the Company made excess payment

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[48] ***₹1.40 lakh for Khetri Copper Complex (Khetri and Kolihan mines), ₹29.79 lakh for Malanjkhand and ₹1.27 lakh for Indian Copper Complex (Surda and Kendadih mines)***

[49] ***₹0.45 lakh for Khetri Copper Complex (Khetri and Kolihan mines), ₹9.53 lakh for Malanjkhand and ₹0.40 lakh for Indian Copper Complex (Surda and Kendadih mines)***

[50] ***As the data of Surda and Kendadih mines were not available for 2016-17 period, the calculation was made for only 2017-18 to 2021-22 (upto November 2021).***

of additional royalty amounting to ₹9.24 crore for the period from May 2020 to March 2021.

The Management, in its reply, stated that as per the Mines and Minerals (Development and Regulation) Amendment Act, 2021, payment of the additional amount for *Khetri* and *Kolihan* mines was required to made from 1 April 2020.

The above reply of the Management is not acceptable as explanation to Section 8 of the Mines and Minerals (Development and Regulation) Amendment Act, 2021 clarified that all such Government Companies or Corporations whose mining lease had been extended after the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, would pay such additional amount after the commencement of the Mines and Minerals (Development and Regulation) Amendment Act, 2021, i.e., 28 March 2021.

3.5 Management of financial issues relating to award of mining contracts

3.5.1 Monitoring the execution and discharge of liabilities by the Contractors

Regarding reopening and operation of *Surda* mines along with *Mosabani* Concentrator Plant, the Company issued (April 2007) a work order to M/s Monarch Gold Mining Company Limited[51], Australia (Contractor). Further, M/s Monarch Gold Mining Company Limited created M/s India Resources Limited (IRL), a wholly owned subsidiary for operation of HCL's Surda Mines and Mosabani Concentrator Plant. The scope of the work included all activities relating to mining of ore at *Surda* mines, processing of ore to produce copper concentrate at *Mosabani* Concentrator Plant, and transportation of copper concentrate to Smelter plant of the Company at *Maubhandar*. The contract period was initially for seven years upto June 2014 and was subsequently extended upto March 2017 and finally upto December 2017.

Audit scrutiny revealed that due to poor performance, the Contractor was failing to achieve the monthly target of copper concentrate production during the period from January 2012 to May 2017 resulting in loss of production to the tune of ₹64.44 crore. Further, the Contractor, without any prior notice to the Company, stopped the work and suddenly abandoned (June 2017) the site, six months prior to expiry of the contract period. The Contractor asked the Company to take over the site within 24 hours from the date of termination. The Contractor warned the Company that any delay in takeover of the site would be at the risk and cost of the Company. The Contractor also prohibited the Company from using any equipment and infrastructure without prior compensation for the same to the Contractor.

Audit observed that there was poor monitoring of the activities of the Contractor by the Management. This is evident from the following observations:

[51] ***Name of M/s Monarch Gold Mining Company Limited was subsequently changed to Swan Gold Mining Co. Ltd (on 26 February 2010) and again to Eastern Goldfields Ltd (On 11 November 2015).***

(a) Loss of Revenue

Scrutiny of production records and correspondences of the Company with the Contractor revealed that the Contractor failed to achieve its monthly targets during the period from January 2012 to May 2017, which resulted in loss of production. The Company estimated (September 2017) this loss as ₹64.44 crore. The Company claimed (September 2017) ₹183.67 crore as damages from the Contractor towards loss suffered due to abrupt closure of the work, which was yet (November 2022) to be received. The Company had not even been able to initiate arbitration proceedings against the Contractor.

The Management, in its reply, stated (July 2022) that Liquidated Damages were imposed against the Contractor.

The fact, however, remained that the Company had not yet been able to initiate arbitration proceeding against the Contractor for recovery of its receivables.

(b) Payment of Provident Fund due to the workers employed by the Contractor

Scrutiny of records revealed that a complaint was lodged (December 2015) against the Contractor before the Regional Provident Fund Commissioner, Jamshedpur regarding non-deposit of Employees' Provident Fund. After thorough verification, the Company was directed (February 2017) to withhold sufficient amount from outstanding payment dues of the Contractor as the Contractor had not deposited the Employees' Provident Fund dues. It was, however, seen that the Company failed to retain such amount from the running bills of the Contractor as directed by the Employees' Provident Fund authorities. Thus, the Company was directed (July 2019) to deposit ₹2.81 crore (₹2.38 crore principal plus ₹0.43 crore interest) for the period November 2015 to June 2017. The Company, accordingly, deposited (September 2019) ₹2.81 crore to the respective authority.

Thus, due to inadequate monitoring of the activities of the Contractor and negligence in adhering to the directions of the Fund Commissioner, the Company failed to withhold sufficient amount from the bills of the Contractor towards unliquidated dues of the Employees' Provident Fund and as a result, the Company had to make avoidable payment of ₹2.81 crore to Provident Fund Authorities.

The Management, in its reply, accepted (July 2022) the fact that the Company had to pay Provident Fund contribution and interest which was payable by M/s IRL.

(c) Adjustment/recovery of advances to Contractor

Scrutiny of the records revealed that though there was no outstanding bill of the Contractor, the Company paid (February 2017 and March 2017) ₹1.50 crore and ₹0.70[52] crore to the Contractor as advances. The Company had been able to adjust (May 2017) only ₹0.50 crore before the Contractor abandoned the site and unilaterally short terminated (June 2017) the contract. Thus, ₹1.70 crore (₹1.00 crore plus ₹0.70 crore) given as advances to the

[52] ***₹0.70 crore (₹0.32 crore as advance + ₹0.38 crore HCL paid royalty on behalf of IRL)***

Contractor remained unadjusted (March 2022) causing loss to the Company. Importantly, the contract had no such clause of advance except mobilisation advance.

The Management, while accepting the observation, stated (July 2022) that the Contractor abandoned (June 2017) the site without giving notice to the Company, leaving the Management in the dark. The Company was able to recover one instalment of ₹50 lakh. The Management further added that the Company could have recovered the balance unadjusted advance if M/s IRL continued its operation till the end of the contract i.e., 31 December 2017 but the Contractor suddenly left the site on 2 June 2017, leaving the advances unadjusted.

The fact remained that the Company paid advances to the Contractor, though there were no contractual provisions in the contract.

(d) Excise duty liability of the Contractor

Central Excise Department issued (10 February 2017) notice to the Company under section 11(2) of the Central Excise Act, 1944 demanding a sum of ₹3.51 crore for the period from April 2015 to March 2017, as due and payable towards the Central Excise Duty by the Contractor. Central Excise Department further stated that an amount of ₹3.51 crore was required to be deducted from the bill of the Contractor and deposited with Central Government. However, this notice was subsequently withdrawn (6 March 2017) by the Central Excise Department. The Contractor had abandoned the site (2 June 2017) and unilaterally terminated the contract. Central Excise Department again issued (15 June 2017) the notice on the Company to make payment of Central Excise Duty of ₹3.27 crore (Basic Excise Duty) and directed to pay the penalty and interest (calculated from the date of default upto the date payment). The matter, however, was pending till date. In view of the above, it was observed that though the Management was well aware (February 2017) that the Contractor was not remitting Excise Duty from April 2015 to March 2017 it failed to take appropriate action, which pointed towards deficient monitoring by the Company in this regard. This resulted in shouldering of a liability amounting to ₹3.76 crore (₹3.27 crore towards Basic Excise duty and ₹0.49 crore towards interest and penalty upto September 2017) in the form of unliquidated Central Excise Duty.

The Management, while accepting the fact of demand of Central Excise Department, stated (July 2022) that the Company had already invoked the arbitration clause as per terms of the contract and lodged a counter claim against M/s IRL which included the above demand of the Central Excise Department.

The above reply of the Management is not acceptable as the Management had failed to initiate arbitration process even after lapse of more than five years.

(e) Recovery of electricity charges from the Contractor

During scrutiny of records, it was observed that the Contractor had not paid electricity bill amounting to ₹1.25 crore for the period from February 2017 to May 2017 before

abandonment (2 June 2017) of the site. This avoidable expenditure was also borne by the Company due to lack of monitoring by the Management.

The Management, while accepting the observation, stated (July 2022) that the Company could have recovered the outstanding amount of electricity if the M/s IRL continued its operation till the end of the contract, but the Contractor unilaterally abandoned the site suddenly before expiry of the contract, resulting in under-recovery of electricity bill.

(f) Payment of wages to Contractor's workers

As per clause 3.1.4 of the contract agreement, the Contractor was to operate and maintain the equipment at the *Surda* mines. Requirement of manpower was to be met by the Contractor. From scrutiny of the records, it was seen that the Contractor had not paid wages amounting to ₹3.43 crore to their workers during the period from February 2017 to May 2017 before leaving the project on 2 June 2017. The Company was already aware of the wage payment problem, as the Contractor had raised the issue with the Company of 40 *per cent* wage increase as per the Government of India order from 19 January 2017. Since, the Company had not ensured that wages of the workers were cleared timely, it had to bear this additional expenditure of ₹3.43 crore towards uncleared wages of the workers employed by the Contractor.

The Management accepted the fact that the Company had to shoulder the burden of payment of wages to the Contractor's workers. The Management further stated that the Company had invoked the arbitration clause as per terms of the contract and lodged a counter claim against M/s IRL which included the above wages amount. However, a provision had also been made in the books of Accounts, indicating remoteness in recovery of the said amount from M/s IRL.

(g) *Mosabani* Concentrator Plant

The Indian Copper Complex has one Concentrator plant at *Mosabani* (1970) with an installed capacity of 0.90 million tonnes per annum. As per the contract, the Contractor (M/s IRL) was required to maintain and upgrade the Concentrator Plant. In this regard, it was observed from the records that the Contractor had neither properly maintained nor upgraded the Concentrator plant during the contract period and only required machineries were refurbished to process 0.39 million tonnes of ore per annum while remaining equipment laid defunct. Further, scrutiny of the correspondence between the Contractor and the Company revealed that, over a period of time, due to improper maintenance and non-upgradation of the *Mosabani* Concentrator Plant, its capacity reduced from 0.90 million tonnes per annum to 0.39 million tonnes per annum.

After abandonment (June 2017) of site by the Contractor, in order to run the *Mosabani* Concentrator Plant, the Management had to renovate some parts at a cost of ₹22.52 lakh. Moreover, with the development in underground mines, the *Mosabani* Concentrator Plant needed to be refurbished at a cost of ₹9.50 crore for it to run at its full capacity i.e., 0.90

million tonnes per annum. In this direction, the Company had also approved[53] (2 May 2022) capex budget for the year 2022-23 for renewal and replacement of items in *Mosabani* Concentrator Plant at a cost of ₹4.73 crore.

Figure 3.11 Operations in Concentrator Plant at *Mosabani, Ghatsila*

Source: Images furnished by the Management

Thus, due to lack of proper monitoring of the Contractor's work by the Company, the operational capacity of *Mosabani* Concentrator Plant was reduced to 0.39 million tonnes per annum from 0.90 million tonnes per annum which would now require an additional expenditure of ₹9.50 crore to bring back the operational capacity to 0.90 million tonnes per annum.

The Management stated (July 2022) that as per the projected production plan, 0.90 million tonnes per annum ore production would be achieved from the year 2024-25. Detailed studies for upgradation of *Mosabani* Concentrator Plant would be required for sizing of equipment and refurbishment to achieve the projected milling of 0.90 million tonnes per annum and the same would be taken up in due course.

The reply of the Management may be viewed in light of the fact that *Mosabani* Concentrator Plant already had installed capacity of 0.90 million tonnes per annum. Had the Company ensured that the Contractor carried out required maintenance as per the provisions of the contract, the Company would not have to plan for ₹9.50 crore expenditure for re-instating the installed capacity.

Thus, due to lack of monitoring on the part of the Company, the Company had to bear an additional liability of ₹12.95 crore[54] which was to be borne by the Contractor Moreover, lack of initiative of the Management is also evident from the fact that even after lapse of nearly five years, the Company failed to initiate arbitration process against the Contractor for recovery of the above dues.

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[53] ***420th Board Meeting***

[54] ***₹2.81 crore towards Provident Fund +₹1.70 crore towards advances+₹3.76 crore towards excise duty+₹1.25 crore towards electricity charges+₹3.43 crore towards wages.***

Recommendation 12: The Management may assess the ore beneficiation capacity as per its mine expansion plan and improve the ore beneficiation plants for optimum recovery of metals.

3.5.2 Mobilisation Period and Liquidated Damages in *Kolihan* Mines and *Khetri* Mines

a) Kolihan mines

The Company awarded (January 2017) the work of mine development along with decline development, large diameter drilling and long hole drilling at *Kolihan* Copper Mines to a consortium led by M/s SMS Limited (Contractor). The contract was for a period of 60 months (starting from 17 April 2017 to 16 April 2022) after excluding mobilisation period of 90 days (starting from17 January 2017 to 16 April 2017).

Scrutiny of the records revealed that the Contractor started (November 2017) contract execution with a delay of seven months. It was scheduled to start in April 2017 as required by the terms of the contract. Moreover, at their request (May 2018), the Company extended the mobilisation period from 90 days to 308 days without charging Liquidated Damages. Moreover, extension of mobilisation period also contributed towards extension of the contract with escalation charges (from the contractual end date of 16 April 2022 upto 20 November 2022).

The extension of mobilisation period was granted on the plea that additional time was required to ensure deployment of diesel-based mining equipment as per the standards prescribed by Director General of Mines Safety, Ministry of Labour, Government of India. In this connection, it is worth mentioning that the Contractor was aware of the fact that as per Rule 171 (1) of The Metalliferous Mines Regulations, 1961, no internal combustion engine was to be used below ground in a mine except under certain specific conditions[55]. Moreover, as per the tender documents, the successful bidder was to deploy Director General of Mines Safety compliant diesel-based mining equipment within the period of 90 days from the letter of award of the contract which the Contractor had agreed upon to qualify in the technical bid.

Hence, *post facto* extension of mobilisation period by 308 days instead of maximum 90 days as per contract led to undue advantage to the Contractor by not charging Liquidated Damages as per the terms of the contract amounting to ₹5.06 crore for the excess number of days and payment of ₹2.55 crore as additional escalation bill, aggregating to ₹7.61 crore.

b) Khetri mines

Similarly, the Company awarded (January 2017) a contract for production of 27.10 lakh tonnes of ore along with mine development, diamond drilling and production drilling at *Banwas* block of *Khetri* Copper Mine, Rajasthan to M/s SMS Limited,

[55] ***With the written permission of Director General of Mines Safety and subject to such conditions as Director General of Mines Safety may specify.***

Nagpur (Contractor). As per the provisions of the work order and contract (entered on 3 April 2017), the Contractor was to commence mining activities at *Banwas* Block from 17 May 2017 after completion of the mobilisation period of 120 days (from 17 January 2017 to 16 May 2017). The work order was for a period of 84 months (from 17 May 2017 to 16 May 2024).

Scrutiny of the records revealed that in this case also, the Contractor started work with a delay of five months (from 26 November 2017 instead of 17 May 2017) as required by the contract. Audit observed that similar to *Kolihan* Mines (as discussed in the preceding paragraph), the Company wrongly allowed extension of mobilisation period by 313 days against the original 120 days leading to undue advantage to the Contractor by not charging Liquidated Damages as per the terms of the contract amounting to ₹5.48 crore and payment ₹2.34 crore as additional escalation bill, aggregating to ₹7.82 crore. Moreover, the Company also lost the opportunity to produce 0.10 million tonnes during this period.

The Management stated (July 2022) that the Contractors were not knowing about the condition prior to bidding for the contract.

The above reply of the Management that the Contractors were not aware of the fact is not acceptable as in the scope of work (after Corrigendum I dated 5 November 2016) of Notice Inviting Tender, it was clearly mentioned that the diesel operated equipment like Load Haul and Dump machine and Low Profile Dum Truck were to comply with all the modern gadgets and accessories as per Director General of Mines Safety Standard and circulars in order to get specific approvals from Director General of Mines Safety. It was the responsibility of the Management to ensure that the Contractors complied with the contractual provisions and in case of deviation, charged Liquidated Damages.

3.5.3 Payment of Escalation bill

The Company awarded (November 2008) a work order for 32,100 meters mine development and production drilling at *Khetri* and *Kolihan* to M/s TCL-MMPL Consortium. The contract was for a period of five years and as per the provisions of the Contract, price escalation for wages and fuel was not to be paid in case extension of the contractual period was due to non-fulfilment of targeted quantity by the Contractor.

Scrutiny of records revealed that after the contractual period of five years, in *Kolihan* Mines, the Contractor was yet to complete 4,202 meters of mine development (against revised target of 13,633 metres), 1.73 lakh meters of production drilling (against revised target of 4.04 lakh metres) and 33,016 meters of 165 mm large diameter drilling (against revised target of 86,000 metres) due to reasons attributed to the Contractor (mainly slow progress of work). For this, the Company extended (September 2014) the work order for further period of two years up to August 2016. Audit observed that though price escalation for wages and fuel components were not payable on the non-fulfilment of targeted quantity by the Contractor, the Company paid ₹1.36 crore as price escalation in *Kolihan* Mines which was in violation of the provisions of the contract. Similarly, ₹0.94 crore was paid as price escalation in *Khetri* mines.

Thus, the Company paid ₹2.30 crore as escalation bill on fuel and wages resulting in undue benefit to the Contractor.

The Management stated (July 2022) that the work order was extended against the time lost on account of the Company and hence payment of escalation was made to the Contractor as per the terms and condition stipulated in the contract.

The above reply of the Management is not acceptable because the performance target had already been reduced quantitatively by the Management due to delays attributable to itself.

Thus, the fact remains that lack of oversight while approving the bill of the Contractor led to undue payment of ₹2.30 crore to the Contractor which was in violation of the contract.

3.5.4 Payment of water charges in *Malanjkhand*

Malanjkhand Copper Project of the Company draws water for plant and township from *Banjor* river through intake point at *Bhimajori* village.

The Company entered (January 2002) into an agreement with State Government of Madhya Pradesh to draw 22,730 cubic meters of water per day. The Company, subsequently through a fresh agreement, reduced (January 2018) water intake to 17,000 cubic meters of water per day. The State Government of Madhya Pradesh, from time to time, revised the rate of water charges as well as notified separate rates for industrial/commercial and for domestic use. During the period from 2016-17 to 2021-22, the rates of water charges for industrial use was fixed at ₹5.50 per cubic meters whereas the rates of water charges for domestic use was upwardly revised 2 paise per cubic meter each year from ₹0.50 per cubic meter in 2016-17 to ₹0.60 per cubic meters in 2021-22. The Company deposited the monthly water charges as per demand notices served by the State Government.

Scrutiny of the records revealed that in *Malanjkhand* Copper Project, five flow meters were installed inside the plant and one flow meter was installed inside the township premises to measure the water consumption in the plant and township respectively. Thus, there were separate meters for measuring domestic and industrial water usages. During the period from 2016-17 to 2021-22, *Malanjkhand* Copper Project consumed 198.39 lakh cubic meter of water out of which 29.18 lakh cubic meter of water was used for domestic purpose. However, as *Malanjkhand* Copper Project had only industrial water connection instead of separate water connection for domestic usage, the Company paid water charges at the rate of ₹5.50 per cubic meter on the entire water consumed. Had the Company taken domestic water connection for domestic purposes, it could have saved ₹1.45 crore during the period from 2016-17 to 2021-22.

The Management, in its reply, stated (July 2022) that domestic water rates mentioned were meant for municipality, public health engineering department etc., for domestic use only and these rates were not applicable for industries like Hindustan Copper Limited.

The above reply of the Management is not acceptable as *Malanjkhand* Copper Project of the Company had separate water meter installed for its domestic water consumption in the township area and this township area was under Municipal Council of *Malanjkhand*. Hence, the domestic water rates mentioned were applicable for domestic consumption of water in the township of the Company located in Municipal Council of *Malanjkhand*.

Chapter: 4
Plant Operations

CHAPTER 4

PLANT OPERATIONS

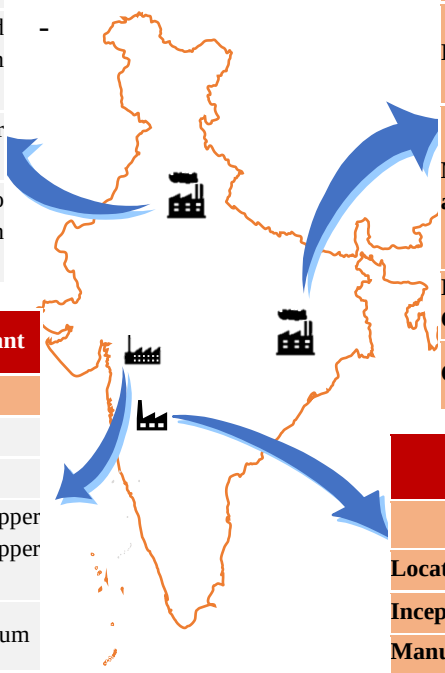
4.1 Introduction

Copper concentrate contains around 15 *per cent* to 28.25 *per cent* copper metal. It is processed in a smelter plant to produce copper anodes with copper purity of 99.50 *per cent* (primary smelting). Moreover, copper anode is also produced by re-processing copper scraps generated either during manufacturing process or scraps generated at the end of the life of the copper product (secondary copper production). Copper anodes are processed in refinery units wherein impurities and other base metals are recovered from them to produce copper cathodes with a copper purity of 99.97 *per cent*. Copper cathodes are converted into continuous cast copper wire rods of different diameters. The details of various smelter, refinery and wire plants operated by the Company are given in **Figure 4.1**.

Figure 4.1: Plants of the Company

Primary Smelter and Refinery Plant	
***Khetri* Copper Complex (KCC)**	
Location	*Khetri*, Rajasthan
Inception	1967
Manufacturing activity	Copper anode and copper cathode from copper concentrate
Installed Capacity	31,000 tonnes per annum
Current Status	Shutdown due to economic consideration since December 2008

Secondary Smelter and Refinery Plant	
Gujarat Copper Complex	
Location	Bharuch, Gujarat
Inception	February 2015
Manufacturing activity	Copper anode and copper cathode from copper scraps
Installed Capacity	50,000 tonnes per annum
Current Status	Suspension of operation since mid-2019. Under asset monetisation plan (December 2020)



Primary Smelter and Refinery Plant	
Indian Copper Complex (ICC)	
Location	*Ghatsila*, Jharkhand
Inception	1924, Nationalised in 1972
Manufacturing activity	Copper anode and copper cathode from copper concentrate
Installed Capacity	18,500 tonnes per annum
Current Status	Shutdown since December 2019

Copper Wire Plant	
***Taloja* Copper Project**	
Location	*Taloja*, Maharashtra
Inception	December 1989
Manufacturing activity	Continuous Cast Copper wire Rod
Installed Capacity	60,000 tonnes per annum
Current Status	Under operation

Source: Records of the Management

Audit scrutinised the activities carried out in the Company's smelting, refining and rolling Plants. Observations regarding Company's plans, and Plant operations are discussed in succeeding paragraphs:

4.2 Smelting and Refining operations

In the copper manufacturing business, copper concentrate produced in the mines, being marketable in nature can be sold in both domestic and international markets. The sale price of copper concentrate is determined by deducting Treatment and Refining Charges from the London Metal Exchange price of copper cathode. However, when the Company sells copper cathode, the Company also receives a premium along with London Metal Exchange price of copper cathode. Hence, the effective difference between the price of copper cathode and copper concentrate are the prevailing Treatment/Refining charges and premium.

4.2.1 Issues related to Company's Business Plans

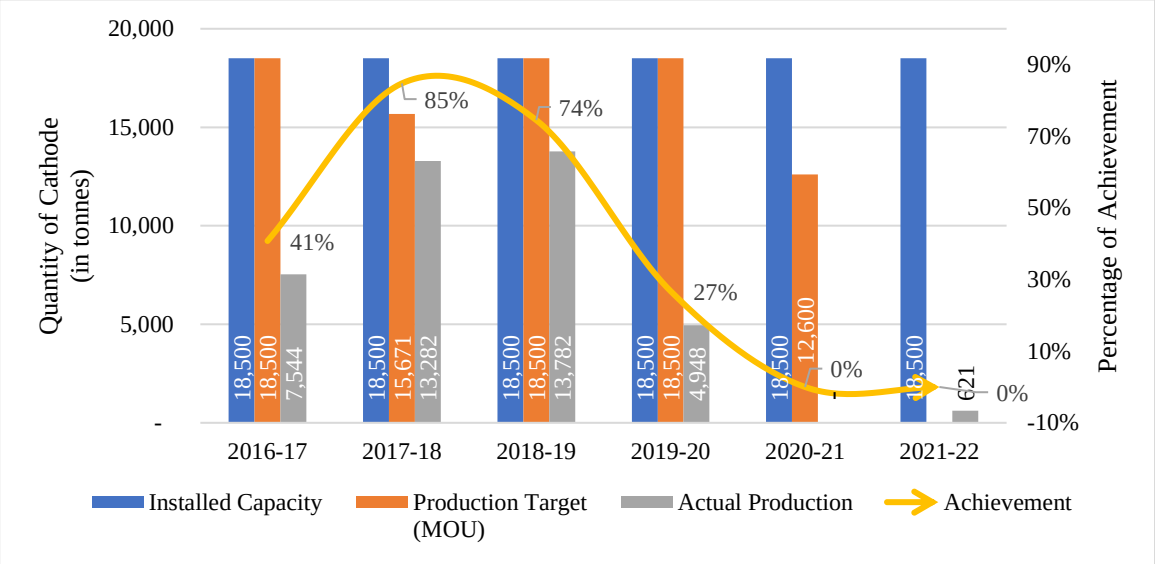
(a) Operational deviations from Corporate Plan 2020

The Company realised (November 2011) that the technology of the smelter plants was outdated and needed replacement if the Company was to compete with its peers. It needed to undertake a lot of steps towards achieving cost and energy efficiency which would require substantial investment. Without such improvement, the smelting and refining business was a loss-making activity as the Company was unable to recover even the processing cost. This continued to adversely impact overall profitability of the Company. In view of the above, the Company in its Corporate Plan 2020 considered (November 2011) the option of discontinuing the operations of its existing smelting and refining plants. Additionally, it was also decided to make investment in building new smelting and refining capacity which could be a stand-alone profit centre for the Company[56].

Scrutiny of records revealed that the refinery and smelter plant of the Company at *Khetri* was shut down (December 2008) before the above decision (November 2011) was taken. The operations of the refinery and smelter plant of the Company at *Ghatsila*, however, continued upto December 2019 as shown in **Figure 4.2**.

[56] ***Subsequently the Company made an unfruitful acquisition (February 2015) of a secondary copper smelter and refinery plant, Jhagadia Copper Limited at a total cost of ₹303.18 crore. The same was subsequently renamed as Gujarat Copper Project. The project (December 2013) for establishing a new hydro-metallurgical copper cathode plant was also not successful and productive after incurring ₹9.11 crore. These are discussed subsequently in Para No. 4.2.4***

Figure 4.2: Operations of the Smelter and Refinery unit at *Ghatsila*



Source: Records furnished by the Management

Scrutiny of cost related records of smelter and refinery plants at *Ghatsila* revealed that during the period between 2016-17 and 2019-20 (upto December 2019), the Company produced 39,556 tonnes of copper cathodes. The average processing cost at the smelter and refinery plants of the Company was ranging from ₹0.61 lakh per tonne (2016-17) to ₹1.32 lakh per tonne (2019-20) with an average cost of ₹0.91 lakh per tonne. Considering the then prevailing Treatment Charges/Refining Charges and premium, the smelting and refining margin available to the Smelters was ranging between ₹0.13 lakh per tonne (2019-20) to ₹0.19 lakh per tonne (2016-17), with an average margin of ₹0.16 lakh per tonne. Thus, during the period from 2016-17 to 2019-20, on processing of copper concentrate, the Company suffered average loss of margin of ₹0.75 lakh per tonne for production of 39,555.67 tonnes of copper cathodes. This adversely impacted the overall revenue of the Company by ₹296.06 crore (***Annexure 8*****).**

The Management stated (July 2022) that the Company was giving high priority to its capex projects for expansion of mining capacity and that additional investment in the smelting and refining plant for its refurbishment/upgradation would be done at a later stage after actual expansion of mines at Indian Copper Complex considering the cost-economics of operating the smelter-refinery at full capacity. Ministry of Mines endorsed (November 2022) the views of the Management.

The above reply of the Management and Ministry of Mines is not acceptable as the Company had invested ₹571.99 crore[57] in unfruitful smelting and refining plant related

[57] ***₹405.67 crore for Gujarat Copper Project (Capital cost ₹303.18 crore and operational loss of ₹102.49 crore) + ₹8.27 crore for Hydro-metallurgical project + ₹158.05 crore for Copper Ore Tailing Project=₹571.99 crore***

projects of *Gujarat* Copper Project (February 2015), Hydro-metallurgical project (December 2013) and Copper Ore Tail project (May 2016).

Recommendation 13: The Management may fix responsibility for running an unviable smelter and Refinery plant despite the decision of the Company in its Corporate Plan 2020 to discontinuing the operations of its existing smelting and refining plants.

(b) Issues with Corporate Plan 2030

The Company, in its Corporate Plan 2030 (adopted by the Company in June 2020), while re-iterating the limitations such as uneconomic capacity of Smelting-Refining Plant, old and outdated technology, higher cost of labour per tonne of output, higher cost of processing and high cost of logistics due to distributed operation etc., stated in Corporate Plan 2020, decided to continue smelting and refining operations at *Ghatsila*. Management considered this decision as more of a strategic one rather than an economic one so that it would have option of ensuring supply of copper cathode to the copper wire rod plant at *Taloja*.

However, Audit observed that the Corporate Plan 2030 was deficient to the extent that it neither laid down details as to how the smelter and refinery plants may be utilised by the Company in an economical manner nor did it have provision to keep the plant ready for operation.

Moreover, contrary to what was stated in the Corporate Plan 2030, the operation of smelter and refinery plant at *Ghatsila* was put under suspension in December 2019. This was because sale of copper concentrate was more profitable, and hence the Management decided to sell the copper concentrate produced at *Malanjkhand* mines instead of processing the same in the Smelter and Refinery plants at *Ghatsila*.

Thus, deficiencies in the strategic planning of the Company, as evident from the Corporate Plans, not only adversely impacted the revenues of the Company but also did not sufficiently guide the Company in pursuing its strategic interests.

4.2.2 Operational issues at *Ghatsila* Smelter and Refinery

Audit observations regarding operations of the Smelter and Refinery Plant at *Ghatsila* are discussed in the succeeding paragraphs:

(a) Recovery of copper metal

As per industry best practice, recovery of copper cathode from copper concentrate in a smelter and refinery plant should be about 98 *per cent* to 99 *per cent*. Scrutiny of records revealed that during the period from April 2016 to November 2019 (plant operation suspended since December 2019), the recovery of copper cathode from copper concentrate in the smelter and refinery plants was ranging from 86 *per cent* to 90 *per cent* only. Hence, considering 98 *per cent* as the industry standard for recovery of copper cathode, Audit observed that under recovery of copper metal during the period from 2016-17 to 2019-20

in the Company ranged from 8 *per cent* (2017-18) to 12 *per cent* (2016-17). Ageing of the plant was the main reason for such under recovery. This resulted in under recovery of 5,111.76 tonnes of copper metal valuing ₹203.64 crore (***Annexure 9***) during 2016-17 to 2019-20.

The Management stated (July 2022) that in a smelter, copper metal is recovered in the form of copper anode and secondaries like copper reverts, recovered dust, copper/process dust, red jam, copper jam mixed with dust etc. Management further stated that as per their available records, the recovery of smelter plant ranged from 95.39 *per cent* (2019-20) to 96.42 *per cent* (2017-18). Similarly, in case of refinery, copper metal is recovered in the form of copper cathode and secondaries. Recovery at refinery ranged from 99.68 *per cent* (2019-20) to 99.76 *per cent* (2016-17).

The Management's reply is not acceptable as secondaries like copper reverts, dust, red jam etc., are considered as waste products fetching lower prices for the Company. Further, even by Management's account, the overall recovery of copper from smelter and refinery plant ranged from 95.08 *per cent*[58] (2019-20) to 96.13 *per cent*[59] (2017-18). Hence, there was under recovery of 1,175.25 tonnes of copper metal valuing ₹47.87 crore[60]. Moreover, the Management, in its Corporate Plan 2020 and Corporate Plan 2030, had also admitted the fact that the actual recovery in *Ghatsila* plant was lower than the modern plants in the industry.

Figure: 4.3 Lifting of copper cathodes in Refinery

Source: From records furnished by the Management

[58] ***95.39 *99.68 /100=95.08***

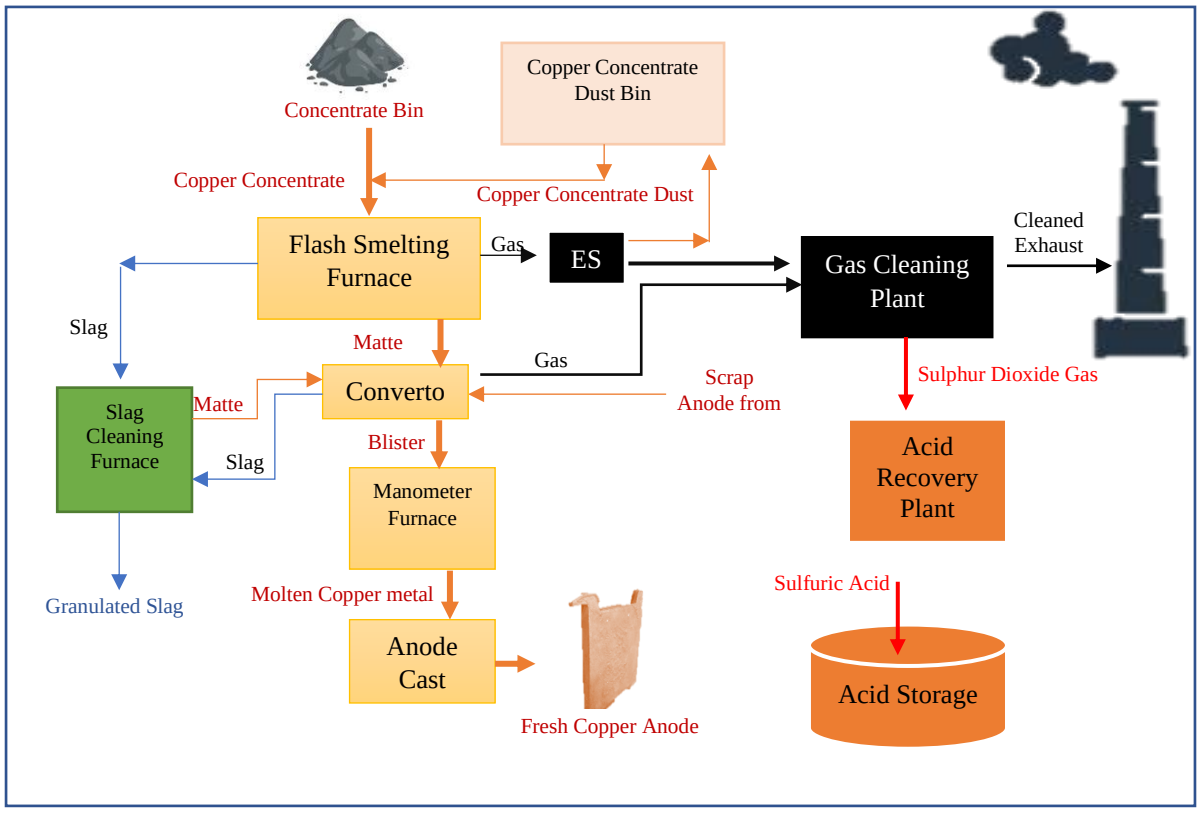
[59] ***96.42 *99.70 /100=96.13***

[60] ***Copper cathode produced = (98.00%-95.76%)*52,534.76 tonnes of Copper concentrate processed = 1,175.25 tonnes. Value of copper cathode produced=1,175.25 tonnes @ ₹407632.85 per tonnes = ₹47.87 crore.***

(b) Adequacy of Plant utilisation

The Company required 95,122 tonnes of copper concentrate each year to run the Smelter plant at *Ghatsila* at its optimum capacity. However, due to non-development and lower production of ore at *Kendadih* mines, *Surda* mines and *Rakha* mines (collectively called Indian Copper Complex group of mines) coupled with lower supply of copper concentrate from *Malanjkhand* mines caused lower availability of copper concentrate in the Smelter Plant. During the period from 2016-17 to 2019-20, the availability of copper concentrate ranged from 25,847 tonnes (2019-20) to 71,376 tonnes (2017-18) with an average availability of only 55,352 tonnes against the requirement of 95,122 tonnes leading to interruptions in smelting operations. Due to non-availability of copper concentrate, almost 12,965 plant hours were lost during the period from 2016-17 to 2019-20. Average loss of plant hours was 3,241 hours which was almost 37 *per cent*[61] of the total available hours[62].

Figure 4.4: Process flow chart of Smelting Operations



Source: From the records of the Management.

Such sub-optimal operation of the plant resulted in inadequate production of copper anode. Refinery plant at *Ghatsila* was receiving anodes in range from 6,405 tonnes (2019-20) to 16,820 tonnes (2017-18) against the annual requirement of 23,270 tonnes leading to inadequate Refinery operations.

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[61] ***3241 hours / 8760 hours = 37 per cent.***
[62] ***24 hours in a day x 365 days = 8,760 hours***

In addition to above, during the period from 2016-17 to 2019-20, due to non -availability of power (electricity) and frequent breakdown of equipment, the Smelter and Refinery plant could not operate for 929.04 hours and 1,417.69 hours respectively. In view of the above, the Company could not operate the Smelter and Refinery Plant at its optimum capacity.

The reply of the Management and Ministry of Mines is silent on inadequate operation of the Smelter and Refinery Plant due to erratic supply of copper concentrate, power failure and breakdown of equipment.

(c) Consumption of Oxygen and Fuel Oil

During the Smelting process, oxygen is used to process the copper matter (50 to 57 *per cent* copper content) to produce copper blister (98 to 98.50 *per cent* copper content). During this process, oxygen enriched air is blown through molten matte where Iron and Sulphur present in the matte are oxidised to form Iron Oxide and Sulphur dioxide. Similarly, for heating purposes, Fuel Oil (Heavy Furnace Oil or Light Diesel Oil) is used at various levels of smelting operations.

As per the norms for specific consumption of input materials as adopted by the Company, 611 Nm^3 oxygen[63] was to be used for production of one tonne of fresh copper anode. Similarly, the norms for consumption of Fuel Oil were 476 litres per tonne of fresh anode produced.

On scrutiny of year-wise details of oxygen and Fuel Oil consumption during the period from 2016-17 to 2019-20, it was observed that the actual consumption of oxygen ranged from 615 Nm^3 per tonne (2019-20) to 756 Nm^3 per tonne (2016-17) against the norms of 611 NM^3 per tonne. Further, the actual consumption of Fuel Oil ranged between 493.17 litres per tonne (2018-19) to 706.99 litres per tonne (2019-20). The main reasons for the excess consumption of above input materials were low plant availability, equipment breakdown and power failure, intermittent plant operation, mini shutdown, shortage of concentrate, trial of motor blower etc.

Hence, due to the above avoidable reasons, the total excess oxygen consumed during this period was 43,84,625 Nm^3 worth ₹4.03 crore and excess consumption of fuel oil during the period was 38.45 lakh litre worth of ₹16.56 crore.

The Management, while accepting the audit observation, stated (July 2022) that due to intermittent Plant operations, flash furnace, convertor and monometer were kept in heating position for good health of refractory during idle period resulting into higher consumption of fuel oil.

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[63] ***Nm^3 means normal cubic meter, being that amount of gas which when dry, occupies a cubic meter at a temperature of 25 degree centigrade and at an absolute pressure of 760 millimetres of mercury.***

The fact remains that lack of proper planning for optimal utilisation of the Plant was causing avoidable expenditure in the form of excess use of oxygen and Fuel Oil.

4.2.3 Upgradation of facilities at *Ghatsila* Smelter and Refinery Plant

While the Company had not planned for any comprehensive renovation or upgradation of the existing smelting and refining capacities, the Management identified certain activities like installation of a new Nickel recovery plant, reduction of power consumption of refinery, exploration of the possibility of replacing steam blower of converter plant with electric blower etc., to increase productivity and be more economical.

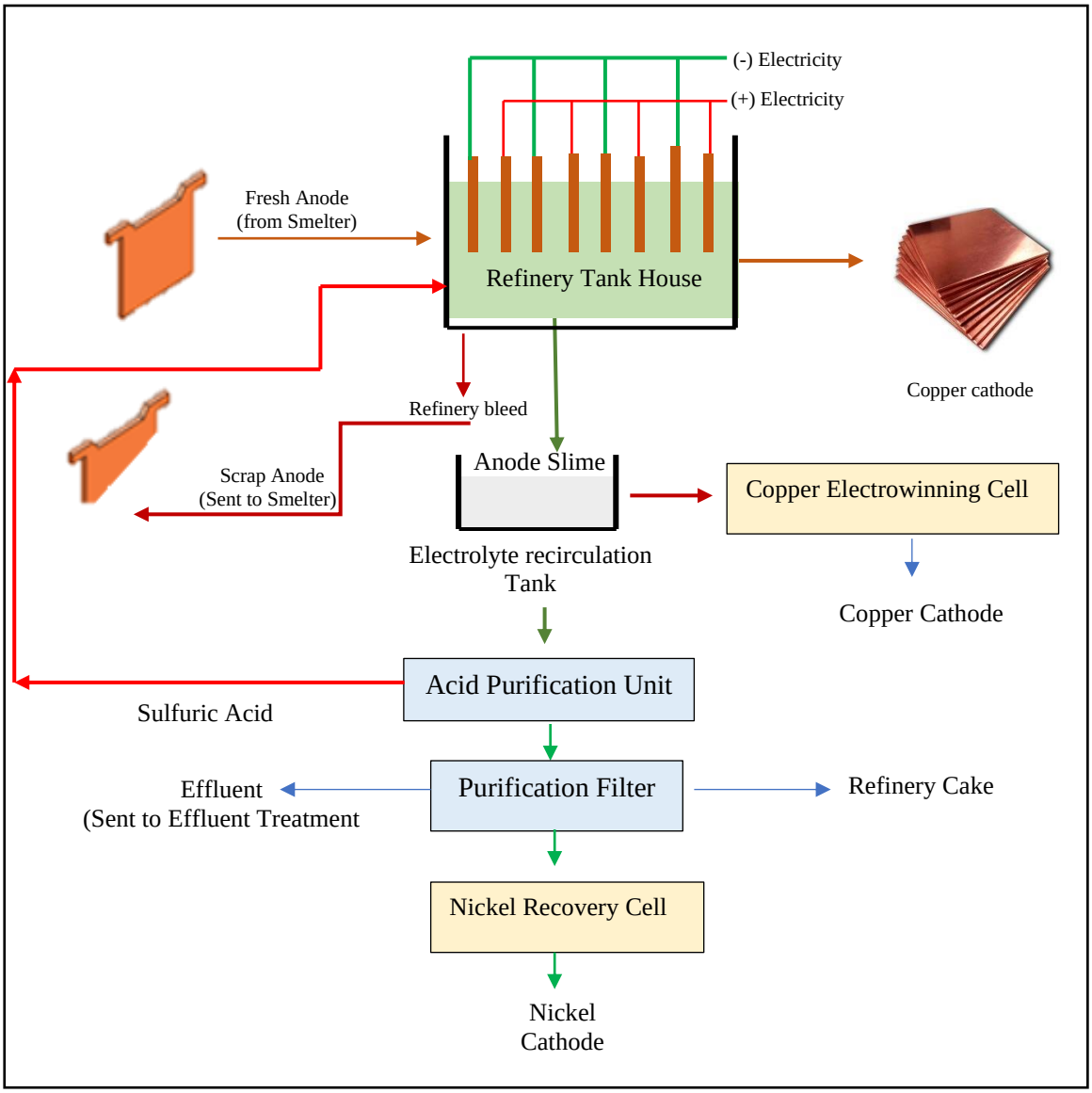
Audit observations regarding Company's activities in these aspects are discussed in the succeeding paragraphs.

(a) Installation of a nickel recovery plant

Nickel and other impurities present in copper anode get dissolved in refinery electrolyte during the electrolysis of anode for production of copper cathode. The electrolyte drained out of the cell after completion of electrolysis cycle is called bleed electrolyte. The Company awarded (September 2015) the work order for recovery of copper and nickel from bleed electrolyte to M/s Electro Metals for consideration of US Dollar 15,63,490. On completion, the project was commissioned (July 2016) at a value of ₹16.41 crore. As per the feasibility report, the projected recovery of nickel was 55 metric tonnes valuing ₹5 crore each year.

Scrutiny of records showed that the total nickel recovery during the period between 2016-17 and 2019-20 was only 1 metric tonne valuing ₹9 lakh.

Figure 4.5: Flowchart of Refining Operations *Ghatsila*



Source: Records furnished by the Management.

Audit observed that this was mainly because nickel content in the bleed electrolyte was ranging from only 4 grams per litre to 6 grams per litre against the estimated 10 gram per litre. As given in the feasibility report, the Management considered nickel content in bleed electrolyte of *Ghatsila* group of mines[64] instead of blended[65] copper concentrate, resulting in over estimation of nickel in bleed electrolyte. Majority of the concentrate used at the *Ghatsila* plant was coming from *Malanjkhand* mines which had lower nickel content. In this connection, it is worth mentioning that while giving concurrence to the tender documents, Director (Finance), had highlighted (June 2015) that the successful operation of Nickel recovery plant was dependent on availability of copper concentrate from *Surda*

[64] ***Indian Copper Complex or Ghatsila group of mines includes Surda, Kendadih and Rakha mining leases.***

[65] ***Use of copper concentrate originating in Ghatsila group of Mines along with the copper concentrate originating in other mines, namely Khetri and Malanjkhand.***

Mines. Hence, the project should have been considered when sufficient Copper concentrate from *Surda* and other Indian Copper Complex mines was available before execution of this Nickel project.

Thus, over assessment of nickel content in bleed electrolyte resulted in unfruitful expenditure of ₹16.41 crore.

The Management, while accepting the fact that Nickel recovery unit could not be operated on sustainable basis due to less content of nickel in bleed electrolyte (2 to 4 gm per litre) on use of *Malanjkhand* Copper Project Concentrate, contended (July 2022) that during finalisation of the project, it was envisaged that projected/augmented production from *Surda* and *Kendadih* would be resumed shortly and *Rakha/Chapri* block would also be re-opened. But due to various statutory compliance issues such as expiry of *Surda* mining lease, copper concentrate production could not be achieved as per projected planning. On achieving desired production from *Surda* and *Kendadih* and reopening of *Rakha/Chapri* mines, *Ghatsila* plant would operate at its full capacity with the use of Indian Copper Complex Concentrate (having high nickel content).

The above contention of the Management is not acceptable as even before finalisation of the project (May 2015), the Management was aware of the constraints (June 2012) in renewal of mining lease of *Surda* mines. Renewal of mining lease was affected due to not having environment clearance for *Surda* Mines. Hence, the Management operated smelter with concentrate of *Malanjkhand* Copper Project which was not rich in nickel content. Moreover, after suspension of the Refinery operations at *Ghatsila*, Nickel Plant remained out of use.

(b) Installation of a motor blower

The steam driven turbo blowers at *Ghatsila* had become inefficient due to ageing. The Company decided to replace the existing stream driven turbo blowers of the smelter plant with electricity driven motor blowers. Accordingly, the Company awarded the (January 2017) work order for design, supply, erection, testing, and commissioning of two electricity driver motor blowers to M/s Empire Industrial Equipment for a total value of ₹11.65 crore plus applicable taxes with scheduled completion date of 31July 2017.

After installation, load trials were undertaken but the motor blower could not perform satisfactorily because of frequent surging either due to abnormal rise of air pressure or low volume flow. Thereafter, the motor blower was redesigned and replaced. It faced the same performance issues as seen in load trials. Multiple modifications also failed. After replacing the motor blower, load trials with a newly designed motor blower were started from 3 October 2019. But the redesigned motor blower also could not perform satisfactorily. Thus, the motor blowers could not be commissioned (March 2022).

Scrutiny of records revealed that M/s Empire Industrial Equipment was awarded the contract despite not submitting any document which showed that it had satisfactorily

executed a similar contract. Importantly, it was one of the pre-qualification criteria. Thus, M/s Empire Industrial Equipment was not qualified to execute this contract.

Due to selection of an unqualified vendor, the Company had to make a net payment of ₹7.01 crore which had remained unfruitful (as of March 2022). Further, due to non-functioning of the motor blower, the Company was forced to run its captive power plant to generate steam required for running the steam driven turbo blowers. This resulted in avoidable expenditure of ₹7.59 crore for running of captive power plant during the period between 2018-19 and 2019-20.

The Management stated (July 2022) that the Company awarded the work order to M/s Empire Industrial Equipment, Kolkata because it submitted a job completion certificate issued to one of its consortium member SBW Electro-Mechanics Import Corporation China, as pre-qualification criteria.

The reply of the Management is not acceptable as documents submitted and subsequently accepted by the Company did not establish experience of the contractor in successful execution of a turnkey project of heavy-duty electric blower.

4.2.4 Installation of new facilities for Smelting and Refining

The Company, in its Corporate Plan 2020, decided to make investment in building new smelting and refining capacity which could be a stand-alone profit centre for the Company.

In this direction, the Company undertook the following activities:

(a) Acquisition of Secondary Smelter in Gujarat

The Company acquired Gujarat Copper Project (erstwhile Jhagadia Copper Limited, Gujarat) without ensuring the availability of raw materials and the plant remained almost wholly unutilised since commissioning (October 2016) which led to unfruitful investment of ₹303.18 crore and loss from operating Gujarat Copper Project amounting to ₹102.49 crore.

The above fact was duly printed in C&AG's Audit Report No. 18 of 2020 (Para no. 8.1) titled as "Unfruitful investment in acquisition and loss from operation of Gujarat Copper Project".

The Management, while accepting the above, stated (July 2022) that the commercial operation of Gujarat Copper Project was suspended since August 2019 due to non-availability of feed material at economical price. The Management further stated that the Board of Directors of the Company in its 412th meeting apprised (July 2021) that Asset Monetisation plan of the Company for financial year 2021-22 included Assets of Gujarat Copper Project (Land, Buildings, Plant & Machinery etc.) valuing ₹247.36 crore.

Ministry of Mines, in its reply, stated (November 2022) that Ministry had already taken Vigilance/Central Bureau of Investigation action against the decision of wrong investment

done by officials. Central Vigilance Commission had also recommended Central Bureau of Investigation action against the officials responsible.

(b) Setting up of hydro-metallurgical copper cathode plant in Chhattisgarh

The Company though aware (August/ November 2013) of the fact that hydro-metallurgical process was not a commercially proven technology, engaged (August 2014) M/s Outotec for a continuous process pilot test at its own research and development facility in Finland at a cost of ₹9.11 crore. Based on the results of pilot test, the Company prepared (December 2016 and January 2017) Techno-economic Feasibility Report and Financial Appraisal Report of the project. The Company sought (April 2017) approval from Ministry of Mines for investment of ₹3,025 crore in the above project.

The Ministry of Mines directed (December 2018) the Company to set aside the above project indicating that the Pyro-metallurgical process was economical at higher capacity in comparison to hydro-metallurgical process due to various technical issues[66]. Ministry also added that investment of ₹3,025 crore might not be appropriate as the Company should concentrate on increasing its ore production. The Company, thereafter, decided (December 2019) to abandon the project proposal in view of the present financial condition of the Company and also wrote off ₹8.27 crore[67] paid to M/s Outotec towards continuous process pilot test for setting up of hydro-metallurgical copper cathode plant.

In this connection, Audit further observed that the capital requirement for the Company's mine expansion plan (2018-2024) was estimated at ₹5,500 crore of which around ₹2,000 crore was planned to be raised through debt. Further, the projected debt capital of the copper cathode plant through hydro-metallurgy route was ₹2,269 crore (75 *per cent* of estimated project cost of ₹3,025 crore). The Company planned to meet the huge finance cost of the above debt from the expected revenue generated from Copper Tailing project. Ministry of Mines rejected (September 2017) the above plan of the Company indicating the same as imprudent financial practice.

The Company did not analyse the feasibility of the project in light of issues such as commercial viability of the hydro-metallurgy process, slow progress of the mine expansion plan and Company's unstable financial condition prior to taking up the pilot study though aware of the same. Thus, the decision of the Company to undertake pilot test ignoring viability of the project indicated lack of due diligence and led to incurrence of infructuous expenditure of ₹8.27 crore in conducting the pilot test.

While accepting the fact, the Management stated (December 2020) that based on the findings of the bench scale study, the erstwhile Management of the Company decided to conduct pilot test by M/s Outotec to go ahead with the full-scale commercial plant with the

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[66] ***Various technical issues like sensitivity to variation in input concentrate composition, precious metal recovery as well as copper recovery etc.***

[67] ***Management has made payment of ₹8.27 crore only out of ₹9.11 crore.***

above process. The Management also stated that this project was initiated by the erstwhile Management as Research and Development activity.

The above contentions are not acceptable because the Management was aware of the constraints of the project such as slow progress of mine expansion plan, unstable financial condition and basic flaws of hydro-metallurgy process prior to taking up the pilot study which were later highlighted by Ministry of Mines while rejecting the investment proposal of the Company for the project. Further, the Company did not fulfil requirement of entering into a MoU with Ministry of Mines to establish the pilot test as a Research and Development activity of the Company.

(c) Setting up of Copper Ore Tailing Plant at *Malanjkhand*

Imprudent decision of the Company to construct full scale Copper Ore Taillings beneficiation plant without adequately operating the pilot plant and verifying its feasibility /success thereof, resulted in unfruitful expenditure of ₹158.05 crore.

The above observation was reported in C&AG's Audit Report No. 14 of 2021 (Para no. 6.1) titled as "Unfruitful expenditure towards construction of Copper Ore Tailings Beneficiation Plant.". The first Action Taken Report on the above paragraph is yet to be received from Ministry of Mines/Management.

4.2.5 Financial Impact

The Company informed Ministry of Mines (October 2020) that borrowing had become extremely difficult due to net worth (₹339.29 crore) of the Company becoming lower than the share capital (₹462.61 crore), weak financial ratios (in particular, debt to equity ratio) and only a few tangible assets available with the Company for mortgage. The ongoing expansion/capex was principally being funded by debt. As the debt equity ratio had reached around 4.2:1 (March 2020), raising of further debt was difficult and would result into more interest burden on the Company. It could further result in non-payment of loan instalments on due dates. In the given circumstances due to incremental net cash deficit, there was a very high risk that the Company may not be able to sustain its operational activities as well as the planned capex from financial year 2020-21 unless immediate financial support was extended. It was thus felt that in view of the fund requirements, funding through infusion of equity capital was essential. Finally, the Company received (April 2021) ₹500 crore as equity infusion through Qualified Institutional Placement route.

In this connection, it is worth mentioning that the Management made the following injudicious decisions draining the scarce resources of the Company:

- Acquisition of Gujarat Copper Project by investment of ₹207 crore through borrowing and payment of interest of ₹27.09 crore did not bring any fruitful return {details in para 4.2.4 (a)}.

- Total borrowing and interest of ₹142.94 crore for setting up Copper Ore Tailing beneficiation plant at *Malanjkhand* became infructuous and yielded no return {details in para 4.2.4 (b)}.
- Loan of ₹529 crore taken and interest of ₹102 crore paid by the Company upto 31 March 2022 on development of *Malanjkhand* Copper Project Underground mines led to blockage of fund.
- The Company installed Copper Nickel and Acid plant at *Ghatsila* with cost of ₹16.41 crore for recovery of Copper Nickel and Acid. However, due to erroneous estimation, recovery of nickel metal was lower than envisaged. Since, recovery of copper and acid was also not encouraging, the investment turned out to be unfruitful.

Hence, investment in injudiciously selected projects through borrowing has not brought desired return. Further, excess borrowing increased the debt equity ratio and deteriorated the financial condition of the Company which created conditions under which the Company had to raise funds through Qualified Institutional Placements, causing dilution of the Government of India share by 3.29 *per cent* from 76.05 *per cent* to 72.76 *per cent*.

The Management stated (July 2022) that the Qualified Institutional Placement had been raised to fund the mine expansion plan as per Cabinet approval which also included *Malanjkhand* Copper Project underground mine. The Company was focusing on its core strength i.e., mining to increase its profitability and return on equity.

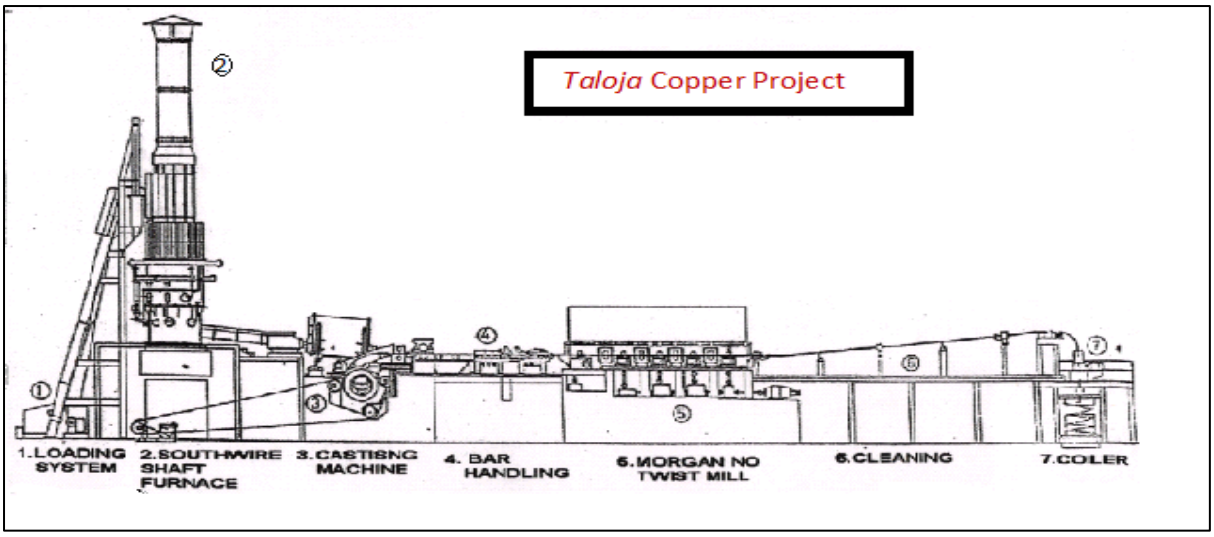
The above reply of the Management may be viewed in light of the fact that had the Management not invested its capital on unfruitful projects like Gujarat Copper Project, Copper Ore Tailing project etc., the Management would have not required to raise capital through Qualified Institutional Placement by diluting the ownership of Government of India.

Recommendation 14: The Management may ensure that the plan for its Copper Smelting and Refining operations is aligned with its overall Business Plan and does not adversely affect the Company's financial position and performance.

4.3 Rolling Operations at *Taloja* Copper Project

The Company setup (December 1989) *Taloja* Copper Project in Maharashtra to make copper wire rods of different sizes with an installed capacity of 60,000 tonnes per annum which could be expanded upto 80,000 tonnes per annum. *Taloja* Copper uses London Metal Exchange 'A' Grade Cathode as a basic input material received primarily from the refinery units of the Company (i.e., *Khetri* Copper Complex and Indian Copper Complex), supplemented through direct purchase from the open market and some quantity from *Gujarat* Copper Project during 2016 to 2019. One of the main considerations in deciding to set up this plant at *Taloja* was the availability of natural gas through pipeline.

Figure 4.6: Schematic diagram of *Taloja* Copper Project



Source: Records furnished by the Management

In the Corporate Plan 2020, the Company assessed (November 2011) that Continuous Cast Copper Wire Rod business at *Taloja* was profitable and would continue to be so in the forthcoming years as well. The production performance of *Taloja* Copper Project during the period from 2016-17 to 2021-22 is given in **Table 4.1**.

Table 4.1: Physical performance of *Taloja* Plant

(in tonnes)

Period	Installed Capacity	Target Production	Actual Production	Percentage of Achievement	Actual Capacity Utlisation
(A)	(B)	(C)	(D)	(E)=(D/C*100)	(F)=(D/B*100)
2016-17	60,000	39,100	18,167	46.46	30.28
2017-18	60,000	33,785	22,211	65.74	37.02
2018-19	60,000	34,765	21,450	61.70	35.75
2019-20	60,000	36,000	8,443	23.45	14.07
2020-21	60,000	24,200	1,360	5.62	2.27
2021-22	60,000	6,000	1,241	20.68	2.07

Source: Annual Reports of the Company and MOUs signed by the Corporate Office with Taloja Copper Project

The Company in the Corporate Plan 2020 and Corporate Plan 2030 identified optimum capacity utilisation, technological upgradation and improvement in packaging of copper wire rod as the key areas for *Taloja* Copper Project. Audit examined the above activities of the Company in its *Taloja* Plant and observations in this regard are discussed in the succeeding paragraphs.

4.3.1 Capacity utilisation of *Taloja* Copper Project

The Management realised (November 2011) that after closure of Smelter and Refinery at *Khetri* in 2008, the capacity of *Taloja* Copper Project to the extent of about 40,000 tonnes

per annum (66.67 *per cent*) was lying idle for want of input material, i.e., copper cathodes. To utilise this idle capacity, the Management planned (November 2011) to undertake job work for tolling[68] of copper cathodes for other companies to reduce the overall cost of *Taloja* Copper Project. The key strategy was that capacity utilisation should be kept above 90 *per cent* through enhanced job work. This was again reiterated (June 2020) in the Corporate Plan 2030 of the Company. On scrutiny of production records of the Company, it was seen that the annual capacity utilisation of the *Taloja* Copper Project was ranging from 2.07 *per cent* (2021-22) to 37.02 *per cent* (2017-18) against the requirement of 90 *per cent*. Such under-utilisation of the installed capacity was mainly due to lower supply of copper cathode due to suspension of own refining capacities[69] and lower job works. While production of own cathode was reduced to zero due to closure of Refining facilities, the Management also failed to enhance the quantum of job work due to the following challenges relating to job work (tolling activities):

(a) **Highly saturated market**: The total capacity of continuous cast copper wire rod manufacturing in India (December 2021) was around 12.20 lakh tonnes per annum whereas the consumption in India was about 6.60 lakh tonnes per annum only. This excess capacity had made the market for continuous cast copper wire rod segment in India highly competitive.

(b) **Technological challenges:** Several factories that were either producing or were in process of creating manufacturing capacity to produce continuous cast copper wire rod of various dimensions were equipped with the latest technology i.e., Contirod[70] technology. Whereas, *Taloja* Copper Project of the Company was having an old technology (namely Southwire). Contirod technology, being a newer technology, has advantages over Southwire technology as it has lower chances of bubble entrapment and no centre porosity.

(c) **Disadvantageous batch size*:*** *Taloja* Copper Project required minimum batch size of 200 tonnes to ensure the commercial viability of the plant operation. On the other hand, other companies were accepting tolling of small lots of 25 tonnes of the cathodes for third parties. Hence, *Taloja* Copper Project was not able to cater to small customers for the tolling/job work.

Audit observed that though the Management was aware of the above challenges, no road map/plan of the Company was prepared nor were effective activities undertaken by the Unit Management to tackle the above challenges. As a result, Management was unable to get sufficient orders for job work (tolling activities) to gainfully utilise the idle capacity of *Taloja* Copper Project resulting in loss of ₹27.33 crore[71] during the period from 2016-17 to 2019-20.

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[68] ***Conversion of copper cathode to continuous cast copper wire rod for outside agencies against a fees.***

[69] ***Gujarat Copper Project, Jhagadia (July 2019) and Indian Copper Complex, Ghatsila (December 2019).***

[70] ***Contirod Technology is a latest technology for producing continuous cast copper wire rod from copper cathode. It offers better drawability, lesser breakages during fine drawing at very high speed.***

[71] ***Compiled from the annual Cost Audit Report of Continuous Cast Copper Wire Rod of the Company for the period from 2016-17 to 2019-20. The Management has not prepared Cost Audit Report of Continuous Cast Copper Wire Rod for the years 2020-21 and 2021-22, as the Company does not***

The Management, while accepting the above audit observation, stated (July 2022) that the reduced capacity utilisation of *Taloja* Copper Project was mainly due to suspension of smelter and refinery operations at *Khetri* and *Ghatsila*. The Management in its reply further accepted (July 2022) the fact that the production capacity was almost double the total demand. This created intense competition for the tolling work. The Management further accepted (July 2022) that it could not accept copper cathode for lower quantity due to its batch size of 200 tonnes. However, in the current tolling policy, the Management had made a provision for accepting orders for copper cathode of less than 200 tonnes per customer, subject to the total processing being done on accumulation of 200 tonnes. The reply of the Management was, however, silent on technological challenges.

Recommendation 15: Considering the Management's decision not to produce copper cathode, the tolling policy for Taloja should be updated so that 90 per cent capacity utilisation of the Plant is ensured.

4.3.2 Impact of lower plant utilisation of *Taloja* Copper Project

Sub-optimal capacity utilisation of *Taloja* Copper Project not only caused lower revenue generation but also caused generation of defective products and higher fuel expenses as explained below:

(a) Defective products

During the period from April 2016 to March 2022, the Company processed 70,689 tonnes of continuous cast copper wire rod, of which 15,502 tonnes (around 22 *per cent*) were found defective, requiring reprocessing of the same. In terms of quantity, defects were most seen in continuous cast copper wire rod of grade 8 millimetres diameter with 10,934 tonnes of defective production (71 *per cent*[72] of the total defective production). But in terms of percentage, defects were mostly seen in 16 millimetres diameter grade continuous cast copper wire rod where 187 tonnes (76 *per cent*[73]) out of 247 tonnes manufactured were found defective requiring reprocessing. Moreover, it was also seen that during the period from April 2016 to March 2022, the customers had also returned 263.29 tonnes of continuous cast copper wire rod of various diameters causing loss to the goodwill of the Company apart from further reprocessing cost. Intermittent plant operations were attributed as the main reason for such defects in production by the Management. Moreover, the hot rolling operations were also affected as these plants were basically designed to function in continuous batches.

The Management accepted (July 2022) the audit observation. Ministry of Mines endorsed the reply of the Management.

prepare Cost Audit Report for products with annual turnover lower than ₹35 crore. As such profit/loss could not be computed for these two years.

[72] ***(10934/15502*100)***

[73] ***(187/247*100)***

(b) Consumption of fuel

Taloja Copper Project requires natural gas and electricity to operate the plant. To ensure smooth supply of both natural gas and electricity, the Company entered into long term agreements with the respective suppliers[74]. According to the agreements, a minimum quantity of consumption was guaranteed by the Company and even if *Taloja* Copper Project did not consume the minimum guaranteed quantity of natural gas and power, the Company had to pay for these minimum guaranteed quantities every month. Scrutiny of records revealed that due to sub optimal operation, *Taloja* Copper Project was unable to consume the minimum guaranteed quantity of natural gas/and electricity, but the Company had to bear ₹1.08 crore[75] per annum for minimum guaranteed consumption of natural gas and electricity. Audit further observed that due to sub-optimal plant operation, the actual specific consumption of electricity ranged from 101 kilowatt hour per tonne (2019-20 and 2021-22) to 108 kilowatt hour (2017-18) which was higher than the norms of 85 kilowatt hour per tonne.

The Management, while accepting the audit observation, stated (July 2022) that as per the agreement with GAIL, minimum ₹4 lakh per month was payable for natural gas irrespective of the consumption. However, the minimum amount payable for electricity was not the minimum guaranteed amount payable but the approximate amount payable even if the plant was not functioning. Management further stated that interrupted operation and intermittent supply of copper cathode was the reason for higher specific consumption of electricity.

Recommendation 16: The Company may frame a documented strategy for optimum utilisation of Taloja Copper Project.

[74] ***GAIL for natural gas and Maharashtra State Electricity Distribution Company Limited for electricity.***

[75] ***For natural gas minimum ₹4,00,000/- *12=₹48,00,000/- and for electricity, minimum ₹5,00,000/- *12= ₹60,00,000/-.***

Figure 4.7: Operations at *Taloja* Copper Project

Source: Records furnished by the Management

4.3.3 Quality of higher diameter wire rod product

Indian Railways require 19.6 millimetres diameter copper wire rod. Scrutiny of production related records of the Company for 19.6 millimetres copper wire rod for the period from 2016-17 to 2021-22 revealed that *Taloja* Copper Project produced 8,636 tonnes of 19.60 millimetres diameter wire rod out of which around 2,734 tonnes of wire rod (32 *per cent)* was rejected and required re-processing. This rejection reached as high as 40 *per cent* (May 2018) of the total production. These 19.60 millimetres diameters wire rods produced by *Taloja* Copper Project were frequently failing the quality tests due to presence of flakes, surface cracks, chippings and pit marks. This indicated that the quality of 19.60 millimetres diameter wire rods produced by *Taloja* Copper Project was poor. The Unit Management was aware that to mitigate this issue, the size of the cast bar had to be increased from 1,935 square millimetres to 2,100 square millimetres. However, Audit could not find any record showing that Management took any step in this direction.

In this connection, it is worth mentioning that reprocessing due to rejection led to additional processing cost. The weighted average process cost was ₹5,087.69 per tonne (excluding input material cost and fixed cost) as detailed in ***Annexure 10***. Hence, had the Company minimised rejection, it could have managed the processing cost to ₹4,102.98 per tonne, saving ₹984.71 per tonne.

The Management, while accepting the facts, stated (July 2022) that the rejections were mainly due to presence of flakes, surface cracks, pit marks etc. Moreover, the Management also listed actions taken to reduce the same.

Recommendation 17: The Management may ensure technological upgradation of the Taloja Copper Plant to ensure manufacturing of products with desired dimensions and acceptable quality.

Chapter: 5

Sales and Marketing Activities

CHAPTER 5

SALES AND MARKETING ACTIVITIES

5.1 Introduction

The Company has been in the business of mining and beneficiation of copper ore, production of copper cathodes and drawing of continuous cast copper wire rod since 1967. Continuous cast copper wire rods and copper cathodes were the primary finished products of the Company. Several copper wastes like granulated slag, reverts, waste bricks and boiler ash etc., and by-products like slime, sulphuric acid etc., generated during the Smelting and Refining process were also marketable. Semi-finished products like copper concentrate, beneficiated from copper ore and used for production of copper metal, was also marketed by the Company. Hence, the marketable products of the Company varied from a homogeneous pure copper metal to a heterogeneous copper concentrate powder. The Company sold these products in both domestic and international markets.

For undertaking marketing activities, the Company had a Marketing Department in the Corporate Office with Sales Offices located in various parts of the Country. The Sales Offices primarily collected market intelligence (like prevailing demand supply position in various domestic and international markets, premium on refined copper being charged by other manufacturers like Vedanta or Hindalco etc.) and executed sales orders. The Sales Offices also undertook day to day coordination with the buyers and transporters for smooth lifting of goods.

The Marketing Department in the Corporate Office, on the basis of market intelligence collected from the Sales Offices prepared and periodically revised their marketing policies, wherein only the pricing structure and quantitative restriction per customer, if any, was finalised. Moreover, the Marketing Department in the Corporate Office was also responsible for awarding all sale orders, collection of sales proceeds and overall liaising, communication and monitoring.

Audit examined the sales and marketing related policies/guidelines of the Company, the activities undertaken to promote sales and the processes involved in carrying out successful sales by the Company. Audit observations related to these aspects are discussed in the succeeding paragraphs.

5.2 Marketing Policy of the Company

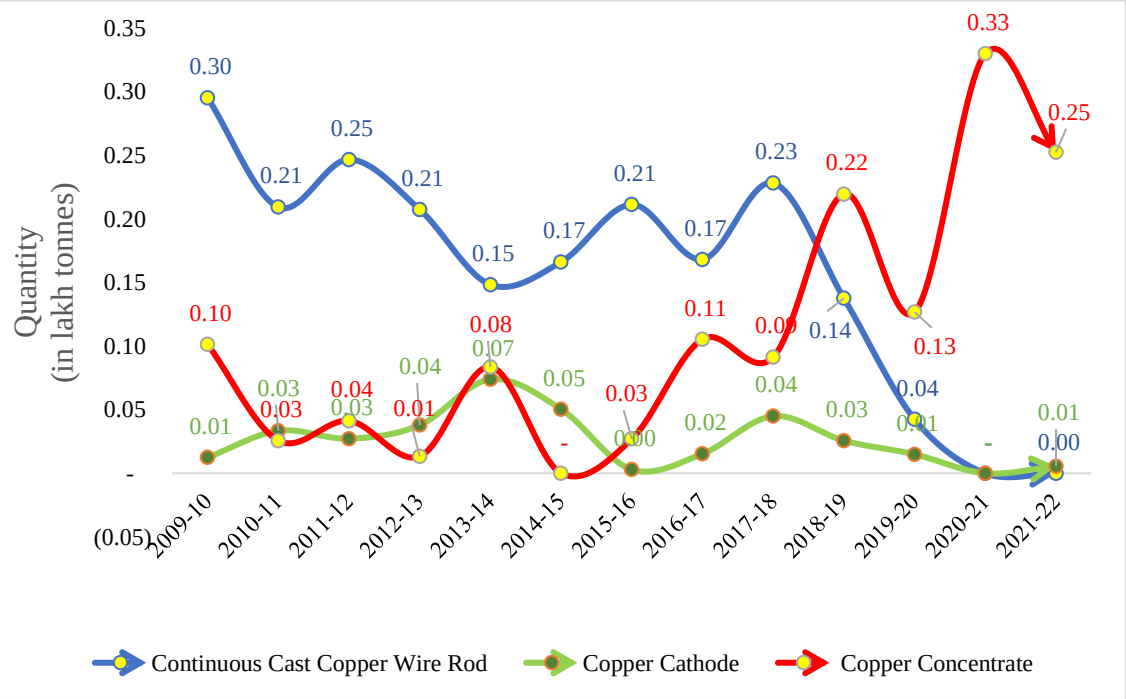
5.2.1 Updating the Marketing Policy in view of changed business focus

Marketing Policy of any Company is a set of guidelines prepared to streamline the marketing functions so as to ensure smooth inter-departmental functions of the Company, make operations convenient, expedite processing of proposals, ensure customer satisfaction and achievement of the organisational goals.

Audit examined the Marketing Policy of the Company and observed that it had Marketing Policies for each type of products like Refined copper (wire rod and copper cathode), by-products (granulated slag, sulphuric acid etc.) and semi-finished products (only for small lots upto 25 tonnes of copper concentrates). However, these Marketing Policies were merely documents for the prospective buyers about the pricing formula, premium charged, rebates and incentives allowed, lifting of products, payment terms and the procedure for sales order booking by the customers. These Marketing policies appeared deficient to the extent that they did not contain the guidelines regarding business growth, identification of prospective buyers, determination of economical lot sizes and quality control before despatch of products to assure that they were as per declared quality etc.

Moreover, in view of previous experience and future revenue projections, the Company decided to realign its business focus to mining operations with only strategic interests in other segments of the value chain. This resulted in many fold increase in sale of copper concentrate (semi-finished) with shrinkage in sale of refined copper products (finished products) which is evident from the **Figure 5.1**.

Figure 5.1. Sales performance of the Company



Source: Annual Reports of the Company

Marketing Policies should not only consist of existing working conditions but should also be futuristic. Though the Company shifted its business strategy from sale of refined copper to sale of copper concentrate, the Management had not yet developed a dedicated marketing policy for sale of bigger lots (greater than 25 tonnes) of copper concentrate. Moreover, unlike refined copper products with 99.97 *per cent* copper content, copper concentrates are heterogeneous with copper content ranging from 15 *per cent* to 28.25 *per cent.* The value of copper concentrate lies in the quantum of copper and other valuable

metals in it, which are determined through assaying[76]. This assaying required appointment of independent surveyors and even umpires in some cases to arrive at a consensual metal content and value thereof. However, the Marketing Policy of the Company was deficient to the extent that it did not cover these areas and hence could not guide the Management in handling such activities.

Recommendation 18: Management may adopt a well-defined marketing policy covering new market discovery, ensuring despatch of goods as per declared specification, proper material handling, laying better grievance and dispute redressal mechanism etc.

5.2.2 Planning for sale of copper concentrate

As holding of marketable inventory is equivalent to blockage of working capital, accumulation of inventory is not financially prudent for any organisation.

The Company sold its copper concentrate through tenders. The process of sale through tenders involved activities like publication of notice inviting tenders, receiving and compiling tender offers from prospective buyers and finalisation of sale contracts. These activities consumed a considerable period (average 59 days). Larger lot sizes of copper concentrate required higher inventory period (at the plant godown) while smaller lot size involved higher sales and tendering expenses. Hence, it was required that Management ascertained an optimum lot size to balance inventory holding costs with sales and tendering costs.

Scrutiny of records related to 29 sale contracts made available to Audit showed that the lot size (quantum of concentrate offered) varied from 2,200 tonnes (February 2021) to 60,000 tonnes (June 2019). Moreover, it was noticed in most of the tender documents that the entire lot size or quantity was broken down in smaller lots or consignments. This showed that lot sizes could have been made smaller to minimise inventory holding period.

Further, Audit observed that the average inventory holding period of copper concentrate was 145 days and the maximum inventory holding period was 582 days. The total inventory holding expenses borne by the Company during the period from 2016-17 to 2021-22 were ₹87.08 crore. Significantly, inventory holding expenses of the inventory held for more than 60 days were ₹81.75 crore (93.88 *per cent*).

Thus, in the absence of any comprehensive guidelines/policy for marketing/sale of copper concentrates, the Company was not able to ascertain optimum lot size resulting in higher inventory holding cost.

The Management stated (November 2022) that a comprehensive Standard Marketing Policy would now be framed for marketing of copper concentrate and copper bearing materials. Ministry of Mines endorsed (November 2022) the views of the Management.

[76] ***In metallurgy, an assay is a process used to determine proportions of precious metals in ores and other metallurgy substances such as silver or gold.***

Recommendation 19: The Management may ensure that the new Marketing Policy includes adequate guidance to facilitate minimisation of inventory holding period through efficient tendering with optimum lot sizes.

5.3 Storage and Transportation related issues affecting Sales

5.3.1 Storage space of copper concentrate

Storage facility (Bedding Building) at *Khetri* Copper Complex was of about 450 square meters, containing 15 bays used for storage of Copper Concentrate produced from the Concentrator Plant (Beneficiation Plant). The daily production of concentrate was accumulated in the first bay of bedding building[77] which was shifted to vacant positions of Bedding Building on day to day basis. Currently, shifting of concentrate was being done with the help of payloaders[78]. Since the floor of the Bedding Building did not have any concrete floor, there was always a possibility of mixing the concrete and soil during shifting of copper concentrate. Contamination of copper concentrate with soil/stones also occurred during handling of copper concentrates by payloaders for heap formation or loading in containers at the time of despatch.

The Management in its reply, while accepting the audit observation, stated (July 2022) that the Management was now awarding the contract for bedding building at *Khetri* Copper Complex. Ministry of Mines endorsed the views of the Management.

5.3.2 Handling of copper concentrate

After production of copper concentrate at *Khetri* Copper Complex, it was stored in the Bedding Building having a storage space of 450 square meters through a conveying system. The copper concentrate received from conveying system was handled by a tripper conveying system[79] for stacking of copper concentrate in a conical heap. This tripper conveying system facilitated optimal utilisation of the bedding building area, reducing the moisture in the copper concentrate through natural drying process and volumetric assessment of copper concentrate.

It was, however, seen that the tripper conveying system was lying idle for more than 10 years for want of repair and renovation at the cost of ₹ 22.30 lakh. The Management, instead of repairing and renovating the tripper conveying system, used Payloader and Poclain[80] at an operational cost of ₹45.90 lakh per annum (₹12,575/- per day * 365) for stacking and handling of copper concentrate manually in Bedding Building.

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[77] ***Bedding Building is a space for storage of copper concentrate produced from the Concentrator Plant.***

[78] ***a heavy wheeled vehicle with a large movable blade or scoop at the front, used for moving loose bulk material.***

[79] ***Belt Trippers are short belt conveyors that can be positioned at different points along a main belt conveyor to "trip" or divert the flow of bulk materials off through a chute.***

[80] ***A type of movable equipment used for excavation/handling of loose bulk material.***

It was worth mentioning that the floor of the Bedding Building did not have a concrete flooring. As a result, during manual handling of copper concentre by Payloader and Poclain, the copper concentrate, was getting contaminated with the soil.

It was observed by audit that the decision of the Management to use Payloader and Poclain instead of repair and renovation of the tripper conveying system not only resulted in avoidable expenditure of ₹ 2.59 crore (₹ 45.90 lakh[81] minus ₹ 2.72 lakh *6 years) during audit period but also adversely affected the quality of the copper concentrate by mixing of extraneous material (soil, concrete etc).

The Management, while accepting the audit observation, stated (July 2022) that the Management was now working for use of Tripper conveying System and flooring of Bedding Building. Ministry of Mines endorsed (November 2022) the views of the Management.

5.3.3 Transportation of Copper Concentrate

The Company engaged (September 2019) transporters for transportation of copper concentrate from their plants to the Ports for export. It was the responsibility of the transporter to transport the copper concentrate with utmost care while keeping the quality and safety of the copper concentrate intact till the despatch of the ship.

Scrutiny of the records revealed that the Management had despatched 7,323.41 wet metric tonnes of copper concentrate to Deendayal Port Authority (erstwhile Kandla Port) during 16 August 2020 to 28 August 2020 for onward transportation to M/s Cliveden Trading AG, Switzerland. It was, however, noticed in the records that the copper concentrate was stored in dilapidated building/place at Deendayal Port which had huge holes in the walls and silica and other materials were stored nearby. The godown area was also waterlogged leading to agglomeration of copper concentrate and contamination of the copper concentrate with broken pieces of bricks, loose mortar, stones etc. As a result, only 7,296.77 wet metric tonnes of copper concentrate could be despatched and the remaining 26.64 wet metric tonnes (7,323.41 wet metric tonnes minus 7,296.77 wet metric tonnes) of copper concentrate was brought back to *Khetri* Copper Complex with a transportation cost of ₹1.98 lakh and required an expenditure of ₹3.75 lakh towards reprocessing.

Thus, due to improper storage of copper concentrate, the Company had to bear an avoidable expenditure of ₹5.73 lakh[82] towards reprocessing and transportation cost.

The Management, while accepting the audit observation, stated (July 2022) that the Management had now changed the model of transportation to eliminate transportation loss.

The fact remains that due to improper storage/transportation, the Company had to incur financial losses.

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[81] ***Cost of operation of Payloader and Poclain ₹45.90 lakh per year (₹12,575/- per day * 365).***

[82] ***₹3.75 lakh towards reprocess and ₹1.98 lakh towards transportation.***

5.4 Quality Control related issues affecting Sales

Copper concentrate is a semi-finished product whose value is determined by the quantum of copper metal contained in it, which varies from *15 per cent* to 28.25 *per cent*. Moreover, the copper concentrate also contains impurities (like iron, sulphur etc.) affecting the overall quality and value of the product. The value of copper wastes like copper reverts, slag etc., are also determined based on copper content in it.

Quantum of copper contained in the concentrate is determined through a process of quality testing. In general terms, it can be understood that this process is carried out in two stages.

The first stage is before tendering wherein the drawing of sample and its testing is done by the Company itself in its own dedicated laboratories in its units for various copper bearing materials. Based on the results, tender documents are prepared and tenders are floated indicating the metal content based on test results. In the second stage, samples are drawn by independent surveyors and testing is done by both, the buyer and the Company, in their respective facilities to assess the metal content to facilitate invoicing. In case of variation in the results of the two, an Umpire is appointed whose decision is binding on both the parties.

Hence, testing of these copper bearing materials to assess its quality becomes essential for the sales process.

Audit examined the testing process followed by the Company and its effect on the sales of the Company. The related observations are discussed in succeeding paragraphs.

5.4.1 Testing process before sale of products

Khetri Copper Complex had stock of around 6,450 wet metric tonnes of Copper Reverts of different grades. On the basis of the test reports of the Company's laboratory at *Khetri* Copper Complex, the copper reverts were categorised in two categories. Firstly, 3,450 wet metric tonnes copper reverts with copper content in the range of 25 *per cent* to 30 *per cent* (average copper content 27.50 *per cent*) categorised as Grade-I. Secondly, 3000 wet metric tonnes of copper revert with copper content in the range of 13 *per cent* to 15 *per cent* (average copper content 14 *per cent*) categorised as Grade-II.

The Company had initiated (5 February 2021) the sale process for the stock of 6,450 wet metric tonnes of copper reverts. Three bids for only Grade-I of copper reverts were received and M/s TIC Corporation Limited, Korea emerged (4 March 2021) as successful bidder for 3,450 wet metric tonnes copper reverts. M/s TIC Corporation Limited, Korea, however, submitted (March 2021) Letter of credit for only a partial quantity of 680 wet metric tonnes of copper reverts. The Management accordingly despatched (April 2021) 642 wet metric tonnes of copper reverts to the Mundra Port for onward supply to M/s TIC Corporation Limited, Korea.

In the meantime, when the consignment of 642 wet metric tonnes copper reverts reached Mundra Port and was awaiting shipment, M/s TIC Corporation Limited, Korea raised (19 April 2021) quality dispute in the 642 wet metric tonnes copper reverts, putting the shipment on hold and requested for sample of revert from the Company. The Management again tested the copper reverts and found that the actual copper content was ranging from 12.65 *per cent* to 15.10 *per cent* (for two lots*)* instead of being in the declared range from 25 *per cent* to 30 *per cent* at the time of Sale contract. Subsequently, the Management arranged (23 April 2021) re-testing of sample of the same two lots at an independent laboratory which revealed that the copper content was ranging from 13.08 *per cent* to 16.20 *per cent*. In view of these test results, the Management cancelled the order and brought (May 2021) back 642 wet metric tonnes copper reverts lying at Mundra Port after incurring a transportation cost of ₹1.95 crore.

It was worth mentioning that the Company had been maintaining dedicated laboratories at its units which were not well equipped either by way of testing apparatus or manpower. Testing at Company's laboratories were not conducted properly as the same was evident in the above case where the testing results changed in both the instances of testing.

Thus, inadequate and ineffective testing of copper reverts resulted in over projection of copper content leading to cancellation of sale contract. This not only caused avoidable transportation cost of ₹1.95 crore but also adversely affected the goodwill of the Company in the domestic and global markets.

While accepting the above, the Management in its reply, stated (July 2022) that the Company was now implementing proper sizing of material and representative sampling from the entire lot before analysis of material for tendering. The Company introduced appointment of Independent Labs for cross checking of Company's lab reports prior to floating of tenders.

5.4.2 Adequacy of getting assurance of the chemical compositions of the product

The Company undertook checks for assessing the quantity and grade of payable metals (gold, silver and copper) in copper concentrate along with moisture content. However, the presence of adulterating materials and other non-desirable items were not checked. As a result, the Company was not confident of the complete chemical composition[83] of material despatched by it.

Audit scrutiny in this respect showed that the Company initiated proposal (26 June 2020) to liquidate an available stock of 2,664 wet metric tonnes of copper concentrates from Indian Copper Complex which was lying since November 2019. M/s TIC Corporation Limited, Korea was selected (26 August 2020) through open tender for sale of 2,500 wet metric tonnes (+/- 10 *per cent*) of copper concentrate of Indian Copper Complex from Kolkata Port. However, due to presence of impurities[84] (Uranium and Radium beyond

[83] ***The quantum of valuable metals (Copper, silver and Gold) and Iron, Sulphur and other impurities.***
[84] ***Radiation containing materials.***

permissible limits) in the copper concentrate despatched, M/s TIC Corporation faced problems in getting clearance from the custom authority at discharge port. Hence, M/s TIC Corporation claimed for demurrage and detention charges from the Company and also did not increase the value and validity of Letter of Credit.

Therefore, the Company was not able to realise the value of ₹4.38 crore against the second provisional invoice. Moreover, the final bill was not even raised by the Company, instead, it made provision in books of accounts for the dues from M/s TIC Corporation against this contract rather than raising a dispute. This may have been because the Company was not confident of realisability of the above amount, since the quality testing process of the Company was deficient and copper concentrate's complete chemical composition was not assessed. Further, M/s TIC Corporation claimed (May 2021) ₹ 6.75 crore (US$ 9,25, 650.74) for the extra expenditure incurred by them in the purchase of 2,500 wet metric tonnes copper concentrate from Indian Copper Complex.

Thus, the Company had to absorb loss of ₹4.38 crore as well as will have to bear extra burden of ₹6.75 crore towards claim from the buyer. This also adversely affected the goodwill of the Company in the international market.

The Management stated (July 2022) that the Company refuted party's (M/s TIC Corporation Limited) claim since the same was not as per contract and the Company requested them for payment of due amount since in Free On Board (FOB)[85] sales, customer had to ensure that the material specification was as per their requirements before participation and hence, the Company could not take responsibility in case of FOB Export.

The fact, however, remained that the Company could not recover ₹4.38 crore from the buyer due to dispute in the quality of the product.

5.4.3 Screening of material prior to despatch

The Company awarded (24 September 2019) contract for sale of 60,000 wet metric tonnes of copper concentrate to M/s Cliveden Trading AG with quarterly shipment of approximately 15,000 wet metric tonnes. Scrutiny of records, however, revealed that the copper concentrate sent by the Company in earlier consignments were held up by the Chinese Custom Authorities at Fangcheng Port, China due to the presence of banned solid waste in the copper concentrate. This delayed the lifting of copper concentrate by M/s Cliveden Trading AG, Switzerland by eight months. Finally, only 34,089.93 wet metric tonnes of copper concentrate was lifted (during the period June 2020 to October 2020) from *Khetri* against the contract of 60,000 wet metric tonnes. Hence, due to poor-quality product, the Company could not despatch 25,910.07 wet metric tonnes copper concentrate, which were not only deferred revenue of the Company for eight months but also adversely affected the goodwill of the Company in the market.

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[85] ***Free On Board (FOB) is a commercial term wherein the risk and reward of the goods are transferred to the buyer immediately on loading of the goods on the transport vehicle.***

The Management, while accepting the above, stated (July 2022) that considering the inherent property of *Khetri* to form lumps, the Unit Management had now started screening of material prior to despatch of copper concentrate.

The fact, however, remained that non-screening of copper concentrate before despatch led to delay in lifting of subsequent consignments and deferment of revenue of the Company.

5.4.4 Appointment of Independent Surveyor

Surveyor is an independent agency which is responsible for proper sampling of copper concentrate (a heterogenous product) for determination of copper grade. Independent surveyor is mutually appointed by the buyer and the seller. The fee of surveyor was to be borne equally by both parties and was to be paid within 30 days from the date of the completion of the work.

In this regard, Audit observed the following:

a) Regarding poor maintenance of records

- To review the system of payment of surveyor fees, Audit had called for the data for appointments, invoices and payments relating to the surveyors for the period January 2017 to March 2020. However, the Management submitted the surveyor related data for only *Malanjkhand* Copper Project (January 2020 to October 2020), *Khetri* Copper Complex (September 2019 to March 2022) and Indian Copper Complex (February 2021), indicating that either the Management was unwilling to share other records or the records were not available.

- Scrutiny of the available records revealed that the Company had entered into two contracts (on 24 September 2019 and 31 January 2020) for sale of copper concentrate to M/s Cliveden Trading AG, Switzerland. As per the sale contract, appointment of the surveyor was to be done by the buyer (i.e., M/s Cliveden Trading AG, Switzerland) and 50 *per cent* of the surveyor's fee was payable by the Company. After completion of the despatch, the buyer also submitted the invoices of the surveyor for reimbursement of 50 *per cent* charges i.e., US$ 51,853.80 by the Company. The Management observed that the claimed rate (₹131/- per wet metric tonne) of surveyor charges was very high in comparison to the rates (₹10/- per wet metric tonne to ₹13.50 per wet metric tonne) under other contracts of the concurrent period. Moreover, the documents indicating approval of the selection of surveyor was not available on records and could not be traced at the time of finalisation of the payment. Thus, due to poor records maintenance, the Management was not able to find out the agreed rate of the survey charges during

appointment of the independent surveyor. Therefore, the Company had to bear the burden of extra expenditure of ₹33.80 lakh (₹ 37.70 lakh[86] - ₹3.90 lakh[87]).

b) Regarding delays in payment

- Audit scrutiny also revealed that M/s Alex Stewart International Corporation Limited, a surveyor, intimated (October 2020) the Company that they had conducted work for the Gujarat Copper Project of the Company and accordingly raised eight invoices valuing ₹ 41.54 lakh (USD 56,476)[88] during the period from 3 July 2017 to 9 January 2020. As these bills were still pending, M/s Alex Stewart International Corporation Limited expressed their unwillingness to work for the Company till previous dues were fully cleared. The details of invoices raised by M/s Alex Stewart International Corporation Limited and payments made, if any, was not available in file, indicating systemic deficiencies and lack of internal control of the Management.

- From the surveyor related data submitted by the Management for *Malanjkhand* Copper Project (January 2020 to October 2020), *Khetri* Copper Complex (September 2019 to March 2022) and Indian Copper Complex (February 2021), it was observed that the payments against the surveyor invoices were made with delays ranging from one month to eight months in case of *Malanjkhand* Copper Project and one month to two months in case of *Khetri* Copper Complex and Indian Copper Complex. Also, delays in payment of surveyor related charges had a cascading effect, as it often led to delay in receipt of survey reports causing further delay in invoicing and realisation of the dues from the customers.

c) Regarding inadequate coordination between concerned departments, Audit observed that the process of surveyor appointment and other related correspondence were conducted by the Marketing Department of the Company whereas the payment to the surveyor was dealt by the Finance Department and hence, there was lack of system of confirmation by which the Marketing Department could track the final payments of surveyor charges. Further, no separate report of payment of surveyor charges for each contract was maintained.

Therefore, it is evident that there was lack of proper monitoring of the process of surveyors' appointments and payments which not only affected the sales activities of the Company but also resulted in extra expenditure for the Company.

The Management, while accepting the audit observation, stated (November 2022) that the Company had addressed grievances raised from all associated stakeholders in sale of concentrate like buyers, surveyors etc. They further added that they had resolved issues

[86] ***Amount actually paid by the Company: US$ 51,853.80 @₹72.7126 per US$***

[87] ***Amount payable as per the prevailing rate: 57,735.71 wet metric tonnes @ 50% of ₹13.50 per wet metric tonnes, i.e ₹6.75 per wet metric tonnes***

[88] ***US$ 56,476 x 73.56 exchange rate of October 2020***

that hindered their association with the Company, for improving participation and to maintain the appointment of independent surveyor on rotational basis. The Management also stated that the guidelines and approvals for surveyor contracts and its execution would be incorporated in Marketing Policy.

5.4.5 Assaying of samples by Umpires

After the sale of the copper bearing material, the samples taken from the despatch were given to the buyer/customer by the mutually appointed independent surveyor. From the samples given to the seller and the buyer/customer, both were to carry out assays independently and result of such assays were to be exchanged simultaneously by cross mailing or any other mutually acceptable method, within 30/60 days from the last date of despatch of the respective lot. The assays of copper concentrate for copper, gold and silver would be determined by both seller and the buyer/customer up to three decimal places. If the buyer's and seller's assay results were lower than the Splitting Limits[89], then the average of the two assays was to be used for the final settlement.

If the result was beyond the splitting limits, umpire assays were to be carried out by an independent agency. ln case the umpire assay fell between the results of the two parties or coincided with either, the arithmetical mean of the umpire assay and the assay which was nearer to the umpire assay was to be taken as agreed. Otherwise, the middle assay of the three assays was to be accepted as final. If umpire assay fell within the assays of the two parties and was the exact mean of the two, then the umpire assay was to be accepted as the final assay. The entire process of confirmation of assays beyond the splitting limits to receipt of umpire assay report was to be completed within a period of 45 days from the date of exchange of assays. Cost of the umpire assay would be borne by the party whose assays were farther from the umpire assay. The cost would be shared equally by both parties when the umpire assay was exact mean of the assays of the two parties. When enquired, the Management did not provide records relating to the date of appointment, invoice and payment details of the umpires upto 31 March 2022.

However, audit scrutiny of available information revealed that in two instances, the differences in the metal content as per assay report of the Company and the buyer were more than the splitting limits, which would have required assaying by the umpire. However, due to delay in decision making by the Management, the Company could not get the samples assayed by the umpire as the same were disposed of by the surveyor. Having no other option, the Management had to accept the average of the Company's and the buyer's assay results leading to loss of revenue.

[89] ***Assay results of buyer and seller varies. The Maximum acceptable limit within which these differences are averaged by the buyer and seller are called Splitting Limits. Beyond splitting limits, the samples are sent to Umpire for assaying. Splitting limits are Copper: 0.5 per cent, Gold: 0.5 gms /DMT or 0.5 ppm and Silver: 20 gms /DMT or 20 ppm***

For instance, in sale of copper concentrate to M/s Cliveden Trading AG, Switzerland (25 June 2019), inspite of having higher splitting difference, the Management could not get sample assayed by an umpire. This resulted in loss of ₹0.92 crore.

Similarly, in case of sale (March 2019) of anode slime to M/s TIC Corporation Ltd, Korea, the sample was destroyed by the surveyor (M/s Laboratory Services International, BV, Netherlands) after expiry of the retention period causing loss of revenue of ₹0.09 crore to the Company.

Hence, there was inordinate delay on the part of the Management in dealing with the samples for umpire which consequently resulted in delay in settlement of the contracts as well as disposal of samples by the surveyor and ultimately leading to avoidable expenditure of ₹1.01 crore (₹ 0.92 crore + ₹ 0.09 crore) to the Company.

The Management, while accepting the audit observation, stated (July 2022) that necessary changes had been incorporated to ensure that appointment of umpire was made on rotational basis through tendering process for each consignment and the surveyors were required to keep the samples for nine months and could not destroy the sample without the consent of the Company. Ministry of Mines endorsed the reply of the Management.

5.4.6 Invoicing mechanism and collection of receivables

The Company conducted quality tests (chemical specification) before each tendering process for copper bearing material (copper concentrate) and based on such results, the tenders were prepared and after execution of the contract, the buyer had to submit Letter of Credit of 110 *per cent* of the contracted value calculated based on the test results and the contracted quantity. The despatch of the materials was based on the same test results, although during the process of despatch simultaneously, an independent surveyor also surveyed the material.

The raising of bills for payment of payable metal was to be done in the following manner. The first provisional bill was raised immediately after the dispatch (Bill of lading/dispatch of rake) of the material. Thereafter, the second provisional invoice was required to be raised after the next month (the first calendar month following the month of delivery) and the final invoice was due for raising after the finalisation of the assay, by both the parties based on the assay exchange between both parties and thereafter umpires assay results, if any. Hence, the total process of final invoice raising was due after 110 days[90].

Scrutiny of the records made available to Audit revealed that there were delays in raising of invoices at every level (1st provisional, 2nd provisional and final provisional). These delays in raising the invoices were ranging between one day to 461 days which consequently caused an avoidable cost of ₹3.18 crore to the Company.

[90] ***From Dispatch of material 5 days for sample dispatch plus 30 days waiting time for Quotational Period and assay exchange plus 45 days from the assay exchange for umpire results plus 30 days for the dispatch month i.e., 110 days.***

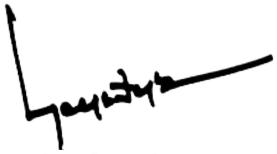
The Management stated (July 2022) that systems department of the Company was in the process of integrating the Management Information System for Sale of Concentrate/copper bearing material in Enterprise Resource Planning System, for online real time tracking of placement of order, execution of dispatch, invoicing, issue of credit notes and debit note, receipt of payment etc., for timely monitoring by the Management.

Recommendation 20: The Management may ensure that various aspects of its sales process such as storage, transportation, quality control, monitoring and internal control mechanisms are systematically upgraded and improved so that objectives such as customer satisfaction, full realisation of product value and preservation of the Company's goodwill are satisfactorily achieved.
Recommendation 21: The Management may fix responsibility for delay in raising sales invoices.

New Delhi
Dated: 31 March 2023

(R.G. Viswanathan)
Deputy Comptroller and Auditor General
(Commercial) and Chairman, Audit Board

Countersigned



New Delhi
Dated: 31 March 2023

(Girish Chandra Murmu)
Comptroller and Auditor General of India

Annexures

Annexure 1

(Refer to Para No 2.2.3.2)

Statement showing calculation of additional royalty payable on shortfall in production in Kolihan Mines

Particulars	Ore Production Target as per corporate plan (in Tonnes)	Ore Production target as per Mining Plan (in Tonnes)	Ore Production Shortfall (in Tonnes)	Metal in Ore (in Tonnes)	Price per Tonnes (₹ per Tonnes)	Total Value of Copper Metal (₹)	Royalty (@4.62%) (₹)	Additional Royalty (50 % of 4.62%) (₹)
	(A)	(B)	(C)=(A-B)	(D)=(C*1.03%)	(E)	(F) =(D*E)	(G)=(F*4.62%)	(H)=(G*50%)
2016-17	12,00,000	6,00,000	6,00,000	6,180	3,45,775.25	2,13,68,91,045.00	9,87,24,366.28	4,93,62,183.14
2017-18	15,00,000	6,00,000	9,00,000	9,270	415371.83	3,85,04,96,864.10	17,78,92,955.12	8,89,46,477.56
2018-19	15,00,000	7,00,000	8,00,000	8,240	442949.58	3,64,99,04,539.20	16,86,25,589.71	8,43,12,794.86
2019-20	15,00,000	7,00,000	8,00,000	8,240	415103.08	3,42,04,49,379.20	15,80,24,761.32	7,90,12,380.66
Total	**57,00,000**	**26,00,000**	**31,00,000**	**31,930**		**13,05,77,41,827.50**	**60,32,67,672.43**	**30,16,33,836.22**
(Block Cut-off grade (% of Copper) is 1.03 %)								
Price per Tonnes (E) - as per LME as published by IBM								

Annexure 2

(Refer to Para No 2.2.3.3)

Statement showing the calculation of Royalty paid and payable for Kendadih Copper Mines

Particulars	Ore Production Target as per corporate plan (in Tonnes)	Actual Ore Production (in Tonnes)	Ore Production Shortfall (in Tonnes)	Metal in Ore (in Tonnes)	Price per Tonnes (₹ per Tonnes)	Total Value of Copper Metal (₹)	Royalty (@4.62%) (₹)	Additional Royalty (50 % of 4.62%) (₹)
	(A)	(B)	(C)=(A-B)	(D)=(C*0.9%)	(E)	(F)= (D*E)	(G)=(F*4.62%)	(H)=(G*50%)
2016-17	2,10,000	-	2,10,000	1,890.000	3,45,775.25	65,35,15,222.500	3,01,92,403.28	1,50,96,201.64
2017-18	2,00,000	3,309	1,96,691	1,770.219	4,15,371.83	73,52,99,105.531	3,39,70,818.68	1,69,85,409.34
2018-19	2,00,000	25,451	1,74,549	1,570.941	4,42,949.58	69,58,47,656.155	3,21,48,161.71	1,60,74,080.86
2019-20	2,00,000	43,230	1,56,770	1,410.930	4,15,103.08	58,56,81,388.664	2,70,58,480.16	1,35,29,240.08
2020-21	2,00,000	41,772	1,58,228	1,424.052	5,09,273.33	72,52,31,704.133	3,35,05,704.73	1,67,52,852.37
2021-22	2,00,000	20,724	1,79,276	1,613.484	7,22,196.75	1,16,52,52,900.977	5,38,34,684.03	2,69,17,342.02
Total	**12,10,000**	**1,34,486**	**10,75,514**	**9,679.626**		**4,56,08,27,977.960**	**21,07,10,252.59**	**10,53,55,126.31**
(Block Cut-off grade (% of Copper) is 0.90 %)								
Price per Tonnes (E) - as per LME as published by IBM								

Annexure 3

(Refer to Para No 2.2.3.4)

Statement showing the calculation of Royalty paid and payable for Rakha Copper Mines

Particulars	Ore Production Target as per corporate plan (in Tonnes) (A)	Actual Ore Production (in Tonnes) (B)	Ore Production Shortfall (in Tonnes) (C)=(A-B)	Metal in Ore (in Tonnes) (D)=(C*0.96%)	Price per Tonnes (₹ per Tonnes) (E)	Total Value of Copper Metal (₹) (F)=(D*E)	Royalty (@4.62%) (₹) (G)=(F*4.62%)	Additional Royalty (50 % of 4.62%) (₹) (H)=(G*50%)
2017-18	15,00,000	-	15,00,000	14,400.000	4,15,371.83	5,98,13,54,352.000	27,63,38,571.06	13,81,69,285.53
2018-19	15,00,000	-	15,00,000	14,400.00	4,42,949.58	6,37,84,73,952.00	29,46,85,496.58	14,73,42,748.29
2019-20	15,00,000	-	15,00,000	14,400.000	4,15,103.08	5,97,74,84,352.000	27,61,59,777.06	13,80,79,888.53
Total	**45,00,000**	-	**45,00,000**	**43,200.00**		**18,33,73,12,656.00**	**84,71,83,844.70**	**42,35,91,922.35**
(Block Cut-off grade (% of Copper) is 0.96 %) (average of inferred resources of Rakha, Chapri and Tambapahar)								
Price per Tonnes (E) - as per LME as published by IBM								

Annexure 4

(Refer to Para No 3.1.1 (b))

Statement showing the additional royalty of 50 *per cent* on unmined ores of 2012-13 to 2020-21

Year	Production Quantity (in tonnes)	Metal in Ore (Copper Metric Tonnes)	Average LME for the year	Total Value of Copper Metal (₹)	Rate of Royalty (Percentage)	Additional Rate of Royalty (Percentage)	Additional Royalty (₹)	Dead Rent for the Period (₹)	Grand Total (₹)
(A)	(B)	(C)=(B*1.35%)	(D)	(E)=(C*D)	(F)	(G)=(F*50%)	(H)=(E*G)	(I)	(J)=(H+I)
2012-13	23,000	310.500	4,27,384.50	13,27,02,887.25	4.62	2.31	30,65,437	4,45,350	35,10,787
2013-14	48,000	648.000	4,29,796.47	27,85,08,112.56	4.62	2.31	64,33,537	4,45,350	68,78,887
2014-15	-	-		-	4.62	2.31	0	7,05,138	7,05,138
2015-16	-	-		-	4.62	2.31	0	8,90,700	8,90,700
2016-17	-	-		-	4.62	2.31	0	8,90,700	8,90,700
2017-18	-	-		-	4.62	2.31	0	8,90,700	8,90,700
2018-19	3,000	40.500	4,42,949.58	1,79,39,457.99	4.62	2.31	4,14,401	8,90,700	13,05,101
2019-20	35,000	472.500	4,15,103.08	19,61,36,205.30	4.62	2.31	45,30,746	8,90,700	54,21,446
2020-21	43,000	580.500	5,09,273.33	29,56,33,168.07	4.62	2.31	68,29,126	8,90,700	77,19,826
2021-22	-	-			4.62	2.31		8,90,700	8,90,700
TOTAL	**1,52,000**	**2052.000**		**92,09,19,831.17**			**2,12,73,248.10**	**78,30,738.00**	**2,91,03,986.10**
(Block Cut-off grade % of Copper) is 1.35%)									

Annexure 5

(Refer to Para No 3.1.5)

Statement showing calculation of additional royalty payable on shortfall in production in Khetri Copper Complex (Khetri & Kolihan Mines)

Period	Ore Production Target (in Tonnes) (A)	Actual Ore Production (in Tonnes) (B)	Ore Production Shortfall (in Tonnes) (C)=(A-B)	Metal in Ore (in Tonnes) (D)=(C*1.09%)	Price per Tonnes (₹ per Tonnes) (E)	Total Value of Copper Metal (₹) (F)=(D*E)	Royalty (4.62%) (₹) (G)=(F*4.62%)	Additional Royalty (50 % of 4.62%) (₹) (H)=(G*50%)
2016-17	16,00,000	11,17,241	4,82,759	5,262.073	3,45,775.25	1,81,94,94,607.09	8,40,60,650.85	4,20,30,325.43
2017-18	16,00,000	11,60,267	4,39,733	4,793.090	4,15,371.83	1,99,09,14,564.65	9,19,80,252.89	4,59,90,126.45
2018-19	16,08,000	13,49,566	2,58,434	2,816.931	4,42,949.58	1,24,77,58,403.34	5,76,46,438.23	2,88,23,219.12
2019-20	16,58,000	11,19,523	5,38,477	5,869.399	4,15,103.08	2,43,64,05,602.65	11,25,61,938.84	5,62,80,969.42
Total	**64,66,000**	**47,46,597**	**17,19,403**	**18,741.493**		**7,49,45,73,177.736**	**34,62,49,280.81**	**17,31,24,640.42**
Price per Tonnes (E) - as per LME as published by IBM								
(Block Cut-off grade (% of Copper) is 1.09 %) (average of Banwas, Khetri and Kolihan)								

Annexure 6

(Refer to Para No 3.3.1)

Statement showing loss due to inadequate grinding of ore resulting into lower Cu % recovery during the period April 2016 to March 2022 at KCC Concentrator Plant

YEAR	Actual Ore Milled (in tonnes)	Actual Head Grade	Metal in Ore	Target of Recovery (%)	Actual Recovery (%)	Under Recovery (%)	Under Recovery (in tonnes)	Average Price per CMT (in ₹)	Loss due to under recovery of copper metal (₹ in crore)
(A)	(B)	(C)	D=(B*C)	(E)	(F)	(G)=(E-F)	(H)=(D*G)	(I)	(J)=(H*I)
2017-18	11,58,800.0	0.966%	11,194.008	89.98	89.07	0.91	101.865	4,15,371.83	4,23,11,851.46
2018-19	13,08,900.0	0.960%	12,565.440	90.00	89.34	0.66	82.932	4,42,949.58	3,67,34,694.57
2019-20	11,30,700.0	0.872%	9,859.704	89.88	88.59	1.29	127.19	4,15,103.08	5,27,96,960.75
2020-21	10,07,800.0	0.825%	8,314.350	90.00	86.23	3.77	313.451	5,09,273.33	15,96,32,234.56
2021-22	11,18,500.0	0.844%	9,440.140	90.00	87.33	2.67	252.052	7,22,196.75	18,20,31,135.23
Total							**877.49**		**47,35,06,876.57**

Annexure 7

(Refer to Para No 3.3.2)

Avoidable expenditure on export of copper concentrate of KCC after 1 October 2020

YEAR		2020-21	2020-21	2021-22	2021-22	2021-22	Total
CONTRACT NO	**(A)**	HCL/HO/MKTG/KCC/ CONC/ 20-21/01	HCL/HO/MKTG/KCC/CONC/ 20-21/02	HCL/HO/MKTG/KCC/CONC/ 21-22/01	HCL/HO/MKTG/KCC/CONC/ 21-22/02	HCL/HO/MKTG/ KCC/CONC/ 21-22/04	
DATE OF CONTRACT	**(B)**	04 December 2020	03 February 2021	11 June 2021	18 August 2021	11 February 2022	
NAME OF THE CUSTOMER	**(C)**	M/S CLIVEDEN TRADING AG SWITZERLAND	M/S CLIVEDEN TRADING AG SWITZERLAND	M/s Glencore international AG, Switzerland	M/S TRANSAMINE TRADING SA	M/s Glencore international AG, Switzerland	
QUANTITY OF WMT SUPPLIED	**(D)**	10,987.750	11,964.950	11,673.650	10,500.000	12,458.390	57,584.74
QUANTITY OF DMT SUPPLIED	**(E)**	10,144.923	10,873.373	10,851.657	9,718.054	11,461.718	53,049.725
FINAL SALE VALUE (USD)	**(F)**	1,34,37,680.95	1,60,49,522.61	1,62,87,414.77	1,42,79,455.88	1,69,98,025.79	7,70,52,100.00
AVERAGE USD EXCHANGE RATE FOR THE YEAR	**(G)**	74.32	74.32	74.35	74.35	74.35	
FINAL VALUE (₹)	**(H)=(F*G)**	99,86,88,448.20	1,19,28,00,520.38	1,21,09,69,288.15	1,06,16,77,544.68	1,26,38,03,217.49	5,72,79,39,018.90
TRANSPORTATION COST PER MT (JULY 2020) (KCC TO KANDLA PORT)	**(I)**	21,752.00	21,752.00	21,752.00	21,752.00	20,092.00	
TRANSPORTATION COST (JULY 2020) (KCC TO KANDLA PORT)	**(J)=(D*I)**	23,90,05,538.00	26,02,61,592.40	25,39,25,234.80	22,83,96,000.00	25,03,13,971.88	1,23,19,02,337.0800

YEAR		2020-21	2020-21	2021-22	2021-22	2021-22	Total
INTEREST FOR 30 DAYS @8 %	**(K)=(H*8%*30/365)**	65,66,718.56	78,43,071.91	79,62,537.79	69,80,893.44	83,09,938.96	3,76,63,160.66
Rate of GST	**(L)**	5%	5%	5%	5%	18%	
No. of Days	**(M)**	180.00	180.00	180.00	180.00	120.00	
INTEREST on GST	**(N)=(H*L*8%*M/365)**	19,70,015.57	23,52,921.57	23,88,761.34	20,94,268.03	59,83,156.05	1,47,89,122.56
MATERIAL HANDLING LOSS 0.3%	**(O)=(H*0.3%)**	29,96,065.34	35,78,401.56	36,32,907.86	31,85,032.63	37,91,409.65	1,71,83,817.04
Rate of Transit Insurance	**(P)**	0.02%	0.02%	0.02%	0.02%	0.05%	
TRANSIT INSURANCE	**(Q)=(H*P)**	1,99,737.69	2,38,560.10	2,42,193.86	2,12,335.51	6,31,901.61	15,24,728.77
LOSS OF TC/RC	**(R)**	-	-	-	-	5,91,58,247.67	5,91,58,247.67
TOTAL ADDITIONAL COST FOR EXPORT SALE (₹)	**(S) =(J+K+N+O+Q+R)**	**25,07,38,075.16**	**27,42,74,547.54**	**26,81,51,635.65**	**24,08,68,529.61**	**32,81,88,625.82**	**1,36,22,21,413.78**
AVERAGE	**(T)=(S/D)**	22,819.78	22,923.17	22,970.68	22,939.86	26,342.78	**23,655.94**

Annexure 8

Annexure to Para No 4.2.1 (a)

Statement showing the calculation of loss of revenue due to the operation of ICC Smelter & Refinery during 2016-17 to 2019-20

Year	Cathode Production in Tonnes	ICC Smelter Plant-Processing Cost per Tonnes (₹)	ICC Refinery Plant-Processing Cost per Tonnes (₹)	Total Cost (₹)	ICC Total Processing Cost per Tonnes (₹)	Multiplication factor	TC& RC ($)	Premium ($)	Dollar to Rupees conversion Rate (₹)	Process cost (available in market) (₹)	Non recovery of Processing Cost per Tonne (₹)	Total Processing cost (₹)
	A	**B**	**C**	**D=A*(B+C)**	**E=D/A**	**F**	**G**	**H**	**I**	**J=(G+H)*F*I**	**K=(E-J)**	**L=A*K**
2016-17	7,544.000	48,868.00	11,831.00	45,79,13,256.00	60,699.00	1.0585	118.00	150.00	67.75	19,219.18	41,479.82	31,29,23,728.13
2017-18	13,281.622	72,291.21	38,606.98	1,47,29,07,840.06	1,10,898.19	1.0560	94.00	130.00	65.21	15,425.03	95,473.16	1,26,80,38,365.95
2018-19	13,782.000	63,898.74	9,729.16	1,01,47,39,717.80	73,627.90	1.0500	70.00	150.00	70.22	16,220.82	57,407.08	79,11,84,376.56
2019-20	4,948.049	1,11,980.02	19,906.86	65,25,82,744.70	1,31,886.88	1.0500	64.00	110.00	70.97	12,966.22	1,18,920.66	58,84,25,257.74
Total	**39,555.671**			**3,59,81,43,558.56**	**90,964.04**						**74,845.70**	**2,96,05,71,728.38**

Annexure 9

(Refer to Para No 4.2.2 (a))

Statement showing the calculation of Under recovery of Copper metal and loss thereof from the Smelter & Refinery Plant of ICC

Year	Copper Concentrate used /processed (CMT in Concentrate)	Yield at Smelter (%)	Refinery-Recovery of anode to cathode (%)	Recovery (%)	Modern Plant Recovery (%)	Difference in recovery/ Metal loss (%)	Quantity of Metal loss (in Tonnes)	Average Copper LME rate ($)	Dollar to Rupees conversion Rate (₹)	Copper price per Tonnes	Value of metal loss (₹ in crore)
A	B	C	D	E=C*D/100	F	G=F-E	H=B*G/100	I	J	K=I*J	L=H*K
2016-17	16,762.520	86.15	99.76	85.9432	98.0	12.0568	2,021.024	5,154.45	67.75	3,49,213.99	70,57,69,849.87
2017-18	15,357.863	90.20	99.70	89.9294	98.0	8.0706	1,239.472	6,444.22	65.21	4,20,227.59	52,08,60,326.72
2018-19	14,505.326	88.78	99.84	88.6380	98.0	9.3620	1,357.989	6,340.62	70.22	4,45,238.34	60,46,28,763.21
2019-20	5,909.054	89.94	99.68	89.6522	98.0	8.3478	493.276	5,859.54	70.97	4,15,851.55	20,51,29,591.05
Total	**52,534.763**						**5,111.761**				**2,03,63,88,530.86**

Annexure 10

(Refer to Para No. 4.3.3)

Statement showing Weighted Average Variable cost per Tonnes

Year	Average Variable Process Cost (₹)	**Total production (in tonnes)**	Total Process Cost (₹)
2016-17	4,553.79	18,166.488	8,27,26,371.39
2017-18	5,156.78	22,231.725	11,46,44,114.85
2018-19	3,950.81	21,450.650	8,47,47,442.53
2019-20	5,786.69	8,485.719	4,91,04,225.28
2020-21	15,935.94	1,359.451	2,16,64,129.57
2021-22	14,656.38	1,240.611	1,81,82,866.25
Total	**5,087.69**	**72,934.644**	**37,10,69,149.87**
A. Percentage of Rejection in 19.6 mm Rod			24%
B. Average Variable Cost (including rejection)			5,087.69
C. Average Variable Cost without including rejection {C=B/(1+A)}			4,102.98
D. Avoidable Variable Cost due to rejection (D)=(B-C)			984.71

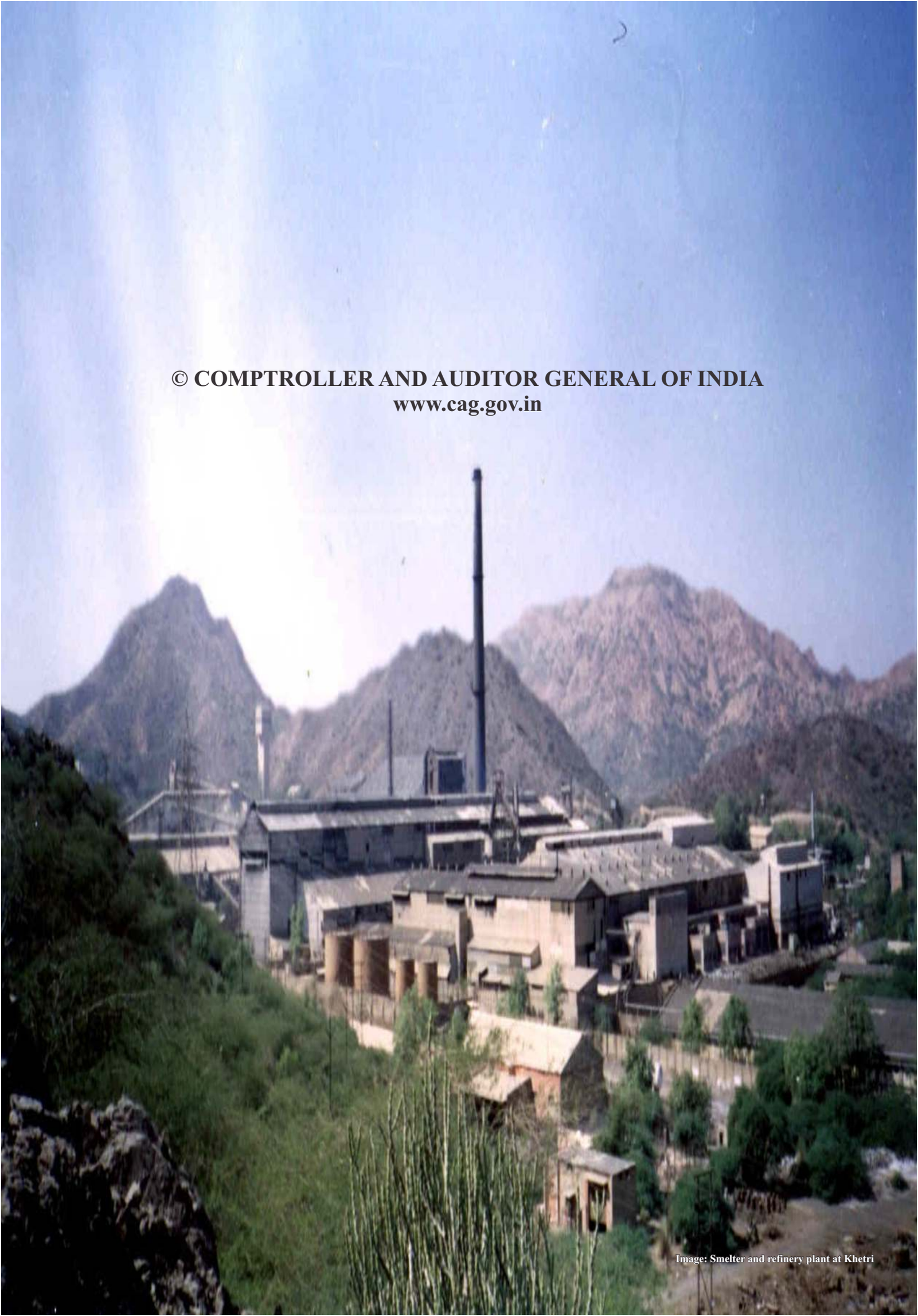


Image: Smelter and refinery plant at Khetri