



CHAPTER 3: SMELTER AND CAPTIVE POWER PLANTS



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The Calcined Alumina produced in the Refinery was processed¹⁴ in the Smelter Plant at



Picture 5: Captive Power Plant at Angul

Angul for production of metallic Aluminium. The Smelter Plant was commissioned (1987) with an installed capacity of 2.18 lakh tonnes per annum (TPA) for production of Aluminium. The capacity of the Smelter Plant was enhanced to 3.45 lakh TPA (2003-04) and finally to 4.6 lakh TPA (2009-10) in two phases.

Production of Aluminium in the Smelter Plant required continuous and uninterrupted power supply on a sustainable and reasonable cost basis. The Company, therefore, setup a coal based Captive Power Plant (CPP) at Angul, Odisha with an installed capacity of 600 Mega Watt (MW). The capacity of the CPP was also increased to 960 MW (2004-05) and subsequently to 1200 MW (2010-11) in two phases to meet the enhanced power requirement of the Smelter Plant.

3.1 Lower Capacity utilisation of Smelter Plant

The Government of India (GoI) allotted (August 2004) Utkal-E block at Talcher, Odisha to the Company to meet the additional requirement of coal for CPP towards its capacity expansion from 960 MW to 1200 MW. Complete synchronisation between the captive coal mining operations and the development of end use plants (Smelter Plant) was one of the major conditions for allocation of the coal block to the Company. It was also mentioned that in the event of unsatisfactory progress in implementation of the coal mining project or the proposed end user projector both, the allocation might be cancelled. The production of coal from the above captive coal block was scheduled to be commenced from February 2008 in line with the projected capacity expansion of the CPP and Smelter Plant.

¹⁴ Aluminium is produced by extracting Aluminium from Calcined Alumina through an electrolytic process.

Audit observed that the development of the captive coal block got delayed due to various reasons like delay in submission of modified mining lease map to the concerned Authorities, delay in deputation of surveyor and non-appointment of Mining Developer-cum-Operator. Due to such delays, the scheduled date of coal production was revised from February 2008 to June 2012. However, the Company failed to adhere to the revised target date of coal production and the above captive coal block was ultimately de-allocated in September 2014. The same was again re-allotted by the GoI along with another coal block (Utkal-D) to the Company in September 2015. It was, however, seen that both the above captive coal blocks were yet to be developed for production of coal therefrom (March 2018).

The Smelter Plant comprised of 960 pots¹⁵ in 4 potlines and generally 935 pots were operated at a time. It was observed that the average number of pots in operation ranged from 648 pots to 842 pots during the period 2012-13 to 2016-17, due to non-availability



Picture 6: Smelter Plant at Angul

of adequate power supply from the CPP for want of required coal. As indicated in Table 1 Para 1.3, the capacity utilisation of the CPP ranged from 54 per cent to 65 per cent.

It was seen that the annual production of Aluminium in the Smelter Plant was lower than its installed capacity of 4.60 lakh TPA and the production ranged

from 3.16 lakh tonnes to 4.03 lakh tonnes during the period 2012-13 to 2016-17.

Thus, there was lower production of 4.93 lakh tonnes of Aluminium during the above period for which the Company lost the opportunity of earning contribution¹⁶ amounting to ₹1086.63 crore¹⁷ (**Annexure III**). Moreover, the Company could not reap the full benefits of the capacity expansion of CPP¹⁸ and Smelter Plant¹⁹ after investing ₹2,986 crore.

¹⁵ An Aluminium Smelter mainly consists of a large number of cells or pots in which molten Aluminium is produced from Calcined Alumina through the electrolysis process.

¹⁶ Sales minus variable cost.

¹⁷ Loss of contribution calculated in the methodology adopted by the Management for the same in its letter no. NBC/ED (P)/2014/741 dated 04.08.2014 addressed to Ministry of Mines.

¹⁸ Capacity expansion from 960 MW to 1200 MW.

¹⁹ Capacity expansion from 3.45 lakh TPA to 4.60 lakh TPA.

The Management while accepting the delay in development of captive coal blocks stated (April 2018) that continuous follow up and monitoring was being done for opening of coal blocks. It was also stated that production of Aluminium in Smelter Plant was restricted keeping in view the availability of economical power from CPP. Ministry also endorsed (July 2018) the views of the Management.

3.2 Excess consumption of Calcined Alumina in production of Aluminium

As per the norms fixed by the Process Licensor, 1,924 kg of Calcined Alumina was required for production of one tonnes of hot metal of Aluminium. It was seen that during 2012-13, 2013-14 and 2016-17 the actual consumption of Calcined Alumina was more than the above norms which led to excess consumption of 16,522 tonnes of Calcined Alumina valuing ₹31.13 crore (**Annexure IV**). The major reason for such excess consumption of Calcined Alumina was operation of pots in lower amperage²⁰ due to inadequate power supply.

Both the Management and the Ministry while accepting the higher consumption of Calcined Alumina stated (August 2018) that the same was due to fluctuation/disturbance of power during potline operations.

3.3 Consumption of Fuel oil in the Bake oven plants

Fuel Oil (FO) was used in Bake Oven plants of Smelter Plant for baking²¹ of anodes. There were three Bake Oven plants and for each plant the Company had fixed norms for consumption of Fuel Oil. It was seen in audit that the actual specific consumption of Fuel Oil in all the three Bake Oven plants was higher than their respective norms during the period 2012-13 to 2016-17, excepting for the Bake Oven Plant-1 in 2012-13. This led to excess consumption of 3,619 kilolitres of FO valuing ₹10.71 crore (**Annexure V**). The major reason for higher specific consumption of FO in Bake Oven plants was higher rejection of baked anode due to deteriorated flue wall condition of Bake Oven plants.

The Management (April 2018) and Ministry (July 2018) accepted the audit observation.

²⁰ The strength of electrical current needed to make a piece of electrical equipment work properly

²¹ Anodes made up of petroleum coke and coal-tar-pitch needs to be baked in a Bake Oven Plant before using the same in the Potlines for electrolysis process.

3.4 Loss due to excess Station Heat Rate in CPP

Station Heat Rate (SHR) indicates quantum of heat energy (Kcal²²) required to generate one unit (KWh²³) of electrical energy at generator terminals of a thermal power plant. Audit observed that during the period 2012-17 the actual SHR of the CPP of the Company was higher than the SHR norms of 2,615 Kcal per KWh resulting in excess consumption of coal valuing ₹326.62 crore (**Annexure VI**). The higher SHR was mainly due to high dry flue gas loss and un-burnt carbon loss in ash.

The Management (April 2018) and the Ministry (July 2018) while accepting the audit observation stated that despite taking various proactive measures the actual SHR was 2,689 Kcal per KWh in May 2018.

3.5 Loss due to Grade slippage of coal

The Company entered into Fuel Supply Agreements (FSAs) with Mahanadi Coalfields Limited (MCL) for procurement of coal for its CPP at Angul and Refinery at Damanjodi. As per the provisions of the FSAs the Company could avail the facility of



Picture 7: Coal Stacker cum reclaimer

joint sampling of coal at the colliery siding/ loading point for determination of grade of coal. It was seen that in absence of any joint sampling of coal at such loading point, the grade of coal supplied was determined on the basis of sampling done by MCL at the loading point and the invoices for supply of coal were raised accordingly. Scrutiny of the records revealed that the actual

grades of coal received were inferior to the grades invoiced by MCL and the Company had to bear an additional expenditure of ₹239.23 crore (**Annexure VII**) towards grade slippage of coal procured during the period 2012-13 to 2016-17. Audit observed that in absence of joint sampling of coal at the loading point, the Company could not ensure that the invoices of coal were raised for the grades actually delivered by MCL.

²² Kilo Calories

²³ Kilo Watt Hour

The Management while accepting the fact of grade slippage stated (April 2018) that there was no provision in the FSA for claiming any compensation towards deviation in quality of coal supplied.

The reply of the Management is not relevant as the question of claiming any compensation towards grade slippage does not arise, if grade slippage was arrested through joint sampling of coal as per the provisions of FSA.

The Ministry, however, stated (July 2018) that third party sampling has been started since April 2018.

Audit Summation

The Company could not develop the coal blocks allotted, leading to underutilisation of Captive Power Plant, which further caused sub-optimal operations of potlines in the Smelter. Due to such sub-optimal operation of Smelter, there was lower production of 4.93 lakh tonnes of Aluminium during the period 2012-13 to 2016-17 with consequential loss in opportunity to earn contribution amounting to ₹1086.63 crore. Moreover, the Company could not reap the full benefits of the capacity expansion of CPP and Smelter despite having made a substantial investment. The actual consumption of Calcined Alumina in the potlines and Fuel oil in the Bake Oven Plants was higher than the respective norms for consumption. Further, the actual Station Heat Rate of the CPP was higher than the norms, which resulted in excess consumption of coal. The Company also did not exercise its option for joint sampling of coal, due to which it could not arrest grade slippage of coal supplied to the Refinery and Captive Power Plant.

