



CHAPTER 1: INTRODUCTION AND AUDIT APPROACH



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1.1 About the Company

National Aluminium Company Limited (Company) was incorporated on 7 January 1981, with its Registered Office at Bhubaneswar, Odisha. The Company acquired Navratna status in April 2008. The Company has its Bauxite Mines at Panchpatmali Hill, Odisha and Alumina Refinery for production of Alumina near to the Mines in Damanjodi. A Smelter Plant was established in Angul, Odisha near the Talcher coal deposits to produce Aluminium from Calcined Alumina along with a Captive Power Plant to ensure continuous supply of electricity. The Company is also the first Indian company in the Aluminium sector to venture into the International Market with London Metal Exchange (LME) registration since May 1989.

1.2 Details of production process

1.2.1 Mines

The Company mined Bauxite, the principal raw material for production of Aluminium, from its Panchpatmali Mines at Damanjodi, Odisha. The Company is required to prepare a Mining Plan for five years and get it approved by the Indian Bureau of Mines (IBM) prior to commencement of mining operations. The entire mining operations are to be carried out as per the approved Mining Plan. Deviations, if any, from such approved Mining Plan also required prior approval from the IBM. During mining operations, the overburden is removed to expose the Bauxite, which after excavation is transported through Dumpers to the Primary Crusher at the Mines, where the same is crushed for transportation to the Alumina Refinery through a 14.6 km long cable belt conveyor.

1.2.2 Alumina Refinery

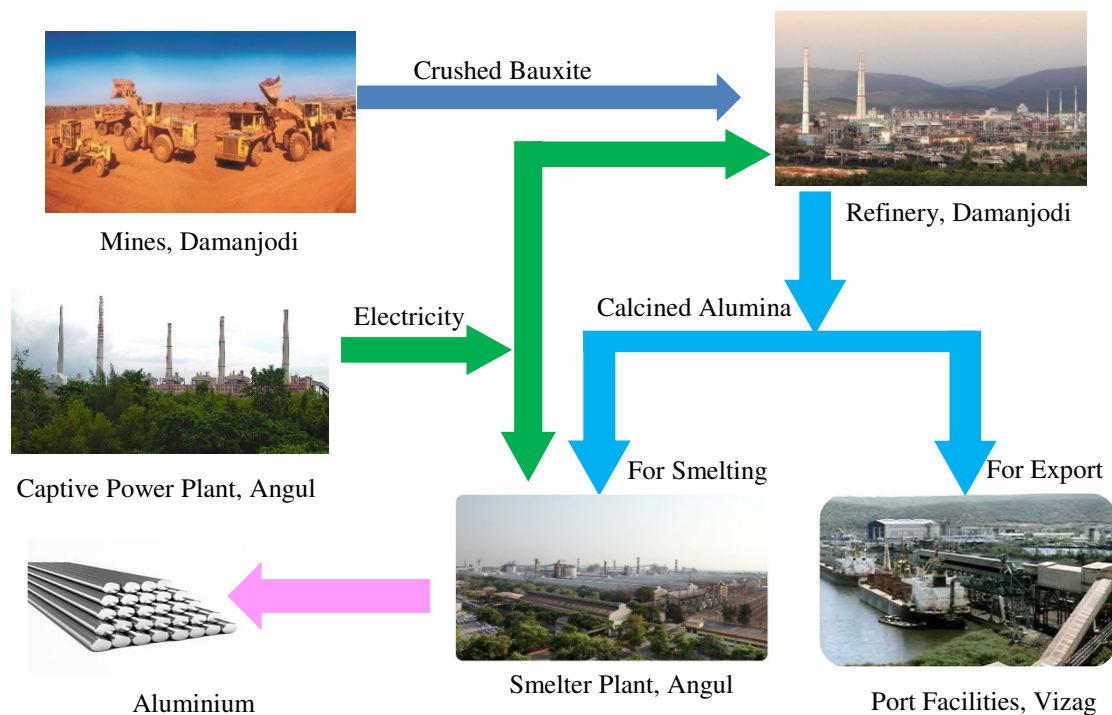
The Bauxite received from the Mines is processed in the Refinery with Caustic Soda and other chemicals for production of Alumina Hydrate. The same is further processed as Calcined Alumina in the Calciner Plants (Calciners) of the Refinery. A portion of the Calcined Alumina is exported and the remaining portion is sent to the Smelter Plant of the Company at Angul for production of Aluminium.

1.2.3 Smelter Plant

The Smelter Plant of the Company at Angul, Odisha produces Aluminium products like Aluminium Ingots, Billets etc. from the Calcined Alumina received from the Refinery. The Company also has a Rolled Product Unit in the Smelter Plant for production of different value added rolled products like Rolled Coil¹, Chequered Sheet² etc.

1.2.4 Captive Power Plant

Aluminium smelting being a highly power consuming process, the Company set-up a coal based Captive Power Plant (CPP) at Angul, Odisha, which is in close proximity to the Talcher Coal deposits, for supply of uninterrupted and reliable power to the Smelter Plant. CPP also provided a part of the power required by the Refinery at Damanjodi. A diagrammatic presentation is given below:



Picture 1: Diagrammatic representation of key units and processes

¹ Rolled coils are used in commercial and general engineering applications like bus bodies, fan blades, cladding in buildings, aluminium composite panels etc.

² Chequered sheets are mostly used in flooring and cladding (covering for protection) work in automobile and railways.

1.3 Production performance of the Company

The table below indicates the production data as well as capacity utilisation of different units of the Company during the five years ending 2016-17.

Table 1: Production details

Year	Particulars	Bauxite from Mines	Alumina Hydrate from Alumina Refinery	Aluminium from Smelter Plant	Electricity from Captive Power Plant
		(in lakh tonnes)	(in lakh tonnes)	(in lakh tonnes)	(in Million Units)
2012-13	Production Capacity	63.00	21.00	4.60	10,512.00
	Actual Production	54.19	18.02	4.03	6,855.27
	Capacity Utilisation (in Percentage)	86.02	85.81	87.61	65.21
2013-14	Production Capacity	68.25	22.75	4.60	10,512.00
	Actual Production	62.93	19.25	3.16	5,644.07
	Capacity Utilisation (in Percentage)	92.21	84.62	68.70	53.69
2014-15	Production Capacity	68.25	22.75	4.60	10,512.00
	Actual Production	57.39	18.51	3.27	5,805.81
	Capacity Utilisation (in Percentage)	84.09	81.36	71.09	55.23
2015-16	Production Capacity	68.25	22.75	4.60	10,512.00
	Actual Production	63.40	19.53	3.72	6,609.15
	Capacity Utilisation (in Percentage)	92.89	85.85	80.87	62.87
2016-17	Production Capacity	68.25	22.75	4.60	10,512.00
	Actual Production	68.25	21.00	3.90	6,869.18
	Capacity Utilisation (in Percentage)	100.00	92.31	84.78	65.35
Average	Production Capacity	67.20	22.40	4.60	10,512.00
	Production	61.23	19.26	3.62	6,356.70
	Capacity Utilisation (in Percentage)	91.12	85.98	78.70	60.47

Source: Cost Statement of respective units

1.4 Performance of the Company in the domestic Aluminium Sector³

The principal producers of Aluminium in India are National Aluminium Company Limited (the Company), Hindalco Industries Limited (Hindalco) and Vedanta Limited (Vedanta). While the Company is a Central Public Sector Enterprise, both Hindalco and Vedanta are functioning as private sector entities. The comparative performance of the Company in the production of Alumina and Aluminium with the above two domestic peers is discussed below:

1.4.1 Production Performance:

(A) Alumina: The installed capacity and actual production of Alumina in the Refinery by the above Aluminium producers during the period from 2012-13 to 2016-17 was as follows:

Table 2: Comparison of Alumina Production

(Figures in lakh tonnes)

Period	NALCO		Vedanta		Hindalco		Total	
	Capacity	Production	Capacity	Production	Capacity	Production	Capacity	Production
2012-13	21.00	18.02	12.00	5.27	15.00	13.20	48.00	36.49
2013-14	22.75	19.25	12.00	5.24	15.00	16.00	49.75	40.49
2014-15	22.75	18.51	12.00	9.77	30.00	23.00	64.75	51.28
2015-16	22.75	19.53	12.00	9.71	30.00	27.00	64.75	56.24
2016-17	22.75	21.00	12.00	12.08	30.00	29.00	64.75	62.08
Average	22.40	19.26	12.00	8.41	24.00	21.64	58.40	49.31
Average capacity utilisation (per cent)		86		70		90		84

It may be seen from the above table that the average capacity utilisation in respect of Alumina Refinery of the Company during the above period was 86 per cent, whereas the same of Vedanta and Hindalco was 70 per cent and 90 per cent respectively. It may also be observed that though the annual production of Alumina of the Company increased from 18.02 lakh tonnes to 21.00 lakh tonnes during the period 2012-13 to 2016-17, the share of the Company in total domestic production of Alumina had slid down from 49 per cent (2012-13) to 34 per cent (2016-17). This was mainly due to 100 per cent increase in capacity of Hindalco to 30 lakh tonnes during 2014-15 from earlier capacity of 15 lakh tonnes. Further, Hindalco not only increased its capacity but also achieved production to the extent of 97 per cent of extended capacity in 2016-17.

³ All figures are obtained from the published annual reports of the above three aluminium producing companies and Indian Minerals Yearbooks published by the Indian Bureau of Mines.

The Management while accepting the above stated (March 2019) that:

- Due to severe cyclonic HUDHUD during October 2014, production had been affected with consequential lesser than production level of previous financial year.
- Using Bauxite with higher Silica content in compliance with revised guidelines of IBM had lowered output i.e. Alumina even with handling same volume of Bauxite as input.
- The three aluminium producers were operating at different geographical locations having independent Bauxite mines with varied alumina and silica content. Hence, comparative analysis in such situation would not reflect a logical relation between different miners.
- Average capacity utilisation of NALCO during said five years was higher than that of the National average.

The Ministry endorsed (March 2019) the above views of the Management.

The above reply of the Management may be viewed in the light of the following:

- The impact of HUDHUD cyclone (October 2014) as stated by the Management was negligible with reference to the performance of the Company for five years ending 2016-17.
- The revised IBM guideline of using Bauxite having higher Silica content was applicable to the industry as a whole.
- Bauxite deposit being heterogeneous in nature, its quality varied from face to face in the same mines.
- The average capacity utilisation of the Company was lower than that of Hindalco during the five years ending 2016-17.

(B) Aluminium: The installed capacity and actual production of Aluminium in the Smelter by the above producers during the period from 2012-13 to 2016-17 were as follows:

Table 3: Comparison of Aluminium Production*(Figures in lakh tonnes)*

Period	NALCO		Vedanta		Hindalco		Total	
	Capacity	Production	Capacity	Production	Capacity	Production	Capacity	Production
2012-13	4.60	4.03	8.45	7.74	5.62	5.42	18.67	17.19
2013-14	4.60	3.16	8.45	7.94	5.62	6.13	18.67	17.23
2014-15	4.60	3.27	8.45	8.77	12.82	8.34	25.87	20.38
2015-16	4.60	3.72	23.20	9.23	12.80	11.00	40.60	23.95
2016-17	4.60	3.87	23.20	12.13	12.80	13.00	40.60	29.00
Average	4.60	3.61	14.35	9.16	9.93	8.78	28.88	21.55
Average capacity utilisation (in per cent)	79		64		88		75	

It may be seen from above table that the average capacity utilisation in respect of Aluminium Smelter of the Company during the above period was 79 per cent, whereas the same of Vedanta and Hindalco was 64 per cent and 88 per cent respectively. The average installed capacity of smelter of the Company for production of Aluminium was 16 per cent of the total domestic smelting capacity and the share of the Aluminium production of the Company was 17 per cent of the total domestic Aluminium production during the above period.

The Management while accepting the above, contended (March 2019) that the production of aluminium was regulated to optimise the profitability keeping in view the market price of aluminium and higher cost of production due to sourcing of coal from the other sources. The Management further stated that the average capacity utilisation of its smelter plant was higher than that of national average. The Ministry also endorsed (March 2019) the above views.

Audit would, however, like to point out that the lower production of Aluminium in Smelter Plant was due to sub optimal operation of the Captive Power Plant of the Company. This was primarily attributed to delay in development of Captive Coal Block by the Company as discussed in Para 3.1. Further the average capacity utilisation of the Company was lower than that of Hindalco during the five years ending 2016-17 and has scope for improvement.

1.4.2 Cost of production:

The Cost of production of Alumina and Aluminium of NALCO and Vedanta for the years 2012-13 to 2016-17 was as follows:

Table 4: Comparison of Cost of Production of Alumina and Aluminium

Period	Alumina			Aluminium		
	NALCO (₹ per tonne)	Vedanta		NALCO (₹ per tonne)	Vedanta	
		(₹ per tonne)	(\$ per tonne)		(₹ per tonne)	(\$ per tonne)
2012-13	13,793	19,241	353	111,375	102,300	1,879
2013-14	14,404	21,700	358	120,992	100,400	1,658
2014-15	14,212	21,800	356	114,355	Not Available	1,755
2015-16	13,033	Not Available	315	108,718		1,572
2016-17	13,629	Available	282	113,204		1,463

Note: The above information was not available in report of Hindalco.

The Management as well as the Ministry accepted (March 2019) the above facts.

1.4.3 Profitability:

(A) EBITDA Margin: The Revenue from operations and EBITDA⁴ in respect of Aluminium business include sale of both Alumina and Aluminium of the above three entities during period from 2012-13 to 2016-17, which were as follows:

Table 5: Comparison of Revenue from operation and EBITDA

(₹ in crore)

Period	NALCO			Vedanta			Hindalco		
	Revenue	EBITDA	EBITDA margin (per cent)	Revenue	EBITDA	EBITDA margin (per cent)	Revenue	EBITDA	EBITDA margin (per cent)
2012-13	6,809	1,417	20.81	10,024	1,272	12.69	8,776	1,423	16.21
2013-14	6,649	1,443	21.70	10,779	1,716	15.92	10,050	1,568	15.61
2014-15	7,262	2,527	34.80	12,726	2,517	19.78	14,105	2,084	14.77
2015-16	6,703	1,528	22.80	11,091	655	5.90	18,363	2,009	10.94
2016-17	7,438	1,448	19.47	13,686	2,306	16.85	19,983	3,473	17.38
Average	6,972	1,673	23.99	11,661	1,693	14.52	14,255	2,111	14.81

It may be seen from the above table that the average EBITDA margin of the Company was higher than the other Aluminium producers in the domestic market.

⁴ Earnings Before Interest, Tax, Depreciation & Amortisation

(B) Return on Capital Employed (ROCE): The following statement indicated the performances of the above three Aluminium producers to measure their efficiency of generating profit with reference to the Capital employed and Equity investments. However, these performance indicators did not reflect exclusively the efficiency in Aluminium business of Vedanta and Hindalco as they were also engaged in the business of other metals in addition to Aluminium.

Table 6: Comparison of ROCE and ROE

(figures in *per cent*)

Period	Return on Capital Employed (ROCE)			Return on Equity (ROE)	
	NALCO	Vedanta	Hindalco	NALCO	Hindalco
2012-13	5.91	17.00	4.22	4.97	5.00
2013-14	5.98	17.00	4.34	5.29	3.85
2014-15	10.89	16.00	5.22	10.33	2.48
2015-16	6.04	7.40	4.30	5.66	1.31
2016-17	7.12	14.40	5.89	6.55	3.29

Note: The figures of Return on Equity of Vedanta Limited were not available.

It may be seen from the above table that both the ROE and ROCE of the Company was highest during the year 2014-15 mainly on account of higher EBITDA (Table 5).

The Management as well as the Ministry accepted (March 2019) the above facts.

1.5 Audit Scope and Objectives

The operations of the Alumina Refinery depend on the supply of the desired quality of Bauxite in adequate quantity from the Mines, while the Smelter Plant needs uninterrupted power supply, which is met from the Captive Power Plant. From the table 1 it could be seen that the production performances of the Mines, Alumina Refinery, Smelter Plant and Captive Power Plant were lower than their respective production/ installed capacities. In this background, a Performance Audit was taken up. The Performance Audit covered the production performances of the Mines, Alumina Refinery, Smelter Plant and Captive Power Plant during the period 2012-13 to 2016-17. However, matters relating to earlier years and subsequent to 2016-17 have also been included, wherever pertinent.

The objectives of the Performance Audit were to assess whether:

- Mines were producing required Bauxite of desired quality for optimum capacity utilisation of the Alumina Refinery.
- Alumina Refinery was operating at full capacity for production of Alumina Hydrate in a cost effective manner.
- Smelter Plant was producing Aluminium of desired quality as per its design capacity in a cost effective manner.
- Different casting facilities were utilised upto their optimum capacities.
- Captive Power Plant was operating efficiently for supplying the required power to the Smelter Plant and Refinery in a cost effective manner.

1.6 Audit criteria

The audit criteria were derived from the following sources:

- Mining Plans of the Company.
- Norms specified by the Indian Bureau of Mines relating to mining operations.
- Norms prescribed by the Process Licensor⁵ (M/s RIO Tinto Alcan) for the operations of the Refinery and Smelter Plant.
- Norms fixed by the Company for consumption of input materials.
- Fuel supply agreements.

1.7 Audit methodology

The audit examination commenced with an Entry Conference with the Management on 28 July 2017 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 (31 January 2018) to the Management and an Exit Meeting was also held on 23 April 2018. The draft Performance Audit Report after incorporating the replies and views of the Management was issued (16 May 2018) to the Ministry of Mines. After receipt of the Ministry's reply, an Exit Conference was held with the Ministry on 13 August 2018, where in 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.

⁵ *Process Licensor is the party which by an agreement allows the Licensee (here the Company) to use a technological intellectual property in exchange of consideration. The Licensor further guides the Licensee from time to time during application of the said technology.*

1.8 Structure of the Report

This Report contains Chapters covering the performance of the Refinery and Mines, Smelter and Captive Power Plants, Environmental Issues, Conclusion and Recommendations. The Report also contains seven Annexures and a List of Abbreviations.

1.9 Audit Acknowledgement

Audit acknowledges the cooperation extended by the Management and the Ministry for timely completion of the above audit.